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(54) **METHOD AND DEVICE FOR PROVIDING USER INTERFACE IN ELECTRONIC DEVICE HAVING FOLDABLE DISPLAY**

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(73) Assignee: **Samsung Electronics Co., Ltd.**

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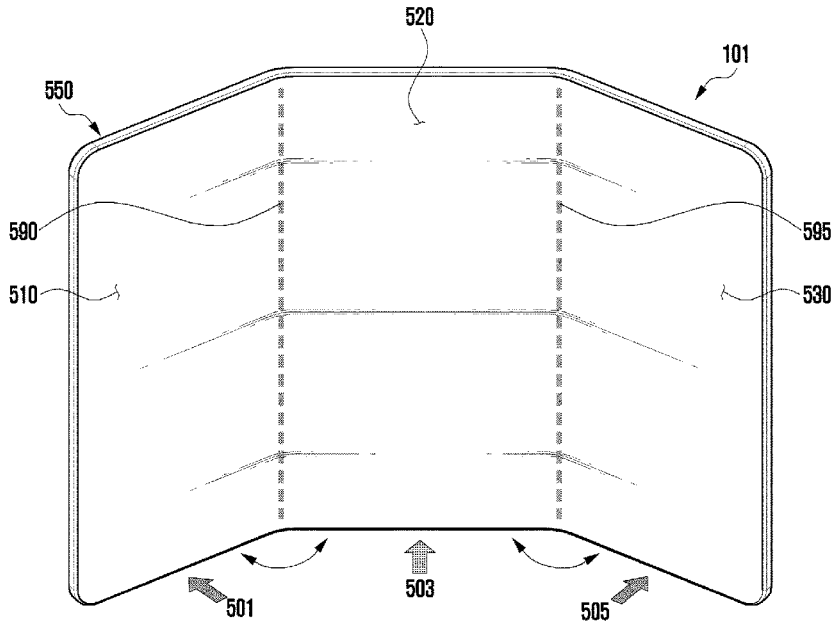
G09G 5/38	(2006.01)
G09G 5/14	(2006.01)

(52) **U.S. Cl.**

CPC ***G09G 3/035*** (2020.08); ***G09G 5/38*** (2013.01); *G09G 2340/0464* (2013.01); *G09G 2380/02* (2013.01); *G09G 2354/00* (2013.01); ***G09G 5/14*** (2013.01)

(57) **ABSTRACT**

An electronic device including a foldable display and a method of operating the same are provided. The electronic device includes a display, a processor, and a memory. The memory may store instructions that, when executed, cause the processor to display one or more objects through the display, detect an operation event in which the display is switched from a first state to a second state, monitor a state change of the display based on the operation event, detect the display being folded to a designated angle, divide the display into a first display surface and a second display surface based on the display being folded to the designated angle, and rearrange and display the one or more objects based on at least one of the first display surface or the second display surface.



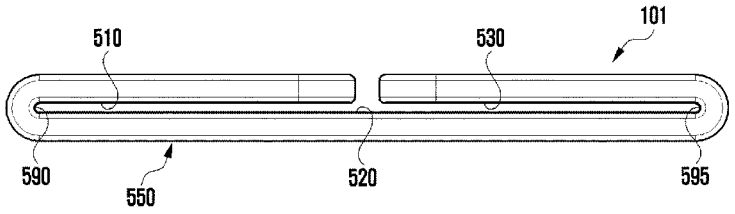


FIG. 1

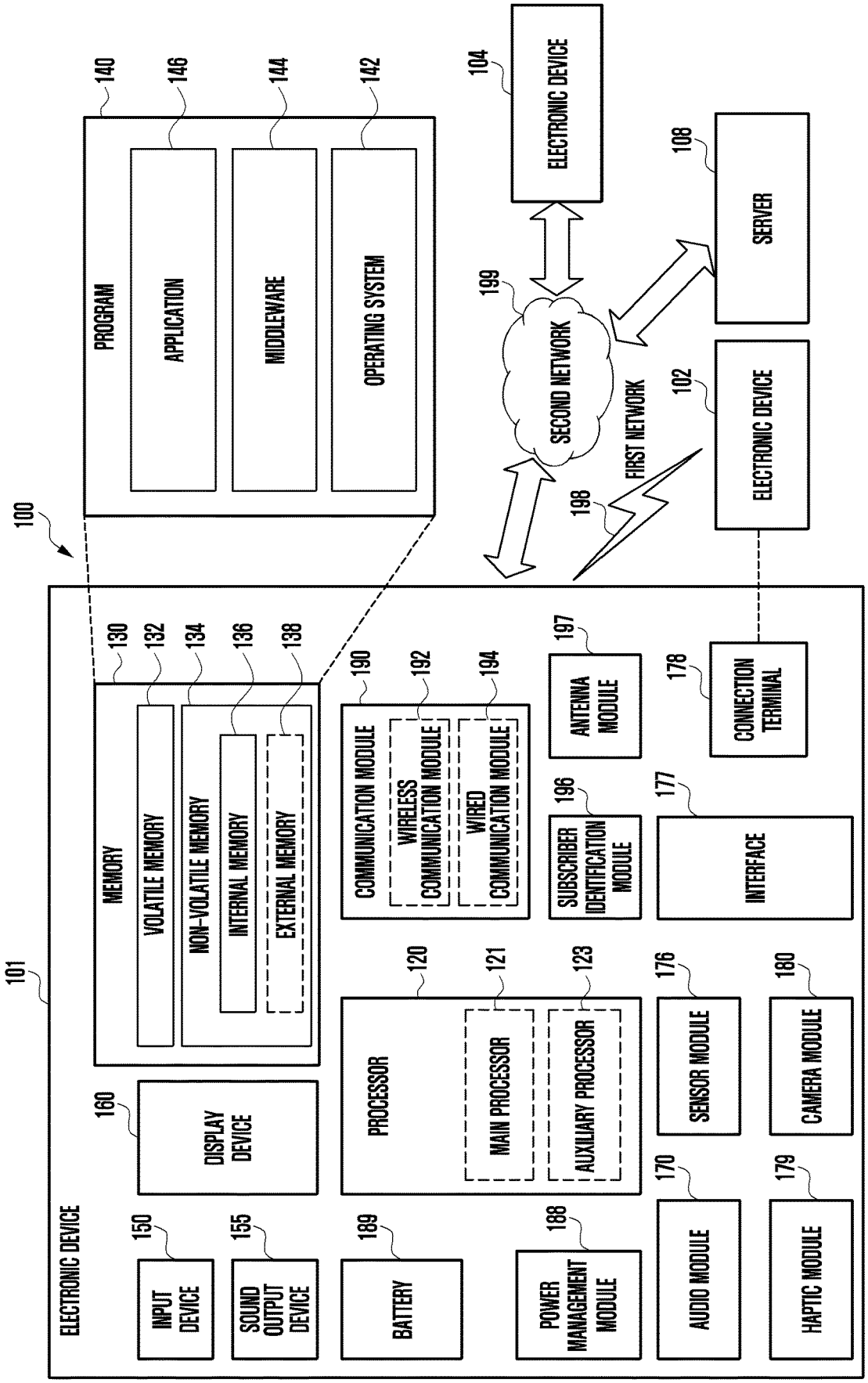

ELECTRONIC DEVICE
101
100
PROGRAM
140
APPLICATION
146
MIDDLEWARE
144
OPERATING SYSTEM
142
MEMORY
130
VOLATILE MEMORY
132
NON-VOLATILE MEMORY
134
INTERNAL MEMORY
136
EXTERNAL MEMORY
138
DISPLAY DEVICE
160
INPUT DEVICE
150
SOUND OUTPUT DEVICE
155
BATTERY
189
POWER MANAGEMENT MODULE
188
PROCESSOR
120
MAIN PROCESSOR
121
AUXILIARY PROCESSOR
123
COMMUNICATION MODULE
190
WIRELESS COMMUNICATION MODULE
192
WIRED COMMUNICATION MODULE
194
SUBSCRIBER IDENTIFICATION MODULE
196
ANTENNA MODULE
197
SENSOR MODULE
176
AUDIO MODULE
170
INTERFACE
177
CONNECTION TERMINAL
178
CAMERA MODULE
180
HAPTIC MODULE
179
ELECTRONIC DEVICE
104
SERVER
108
SECOND NETWORK
199
FIRST NETWORK
198
ELECTRONIC DEVICE
102

FIG. 2

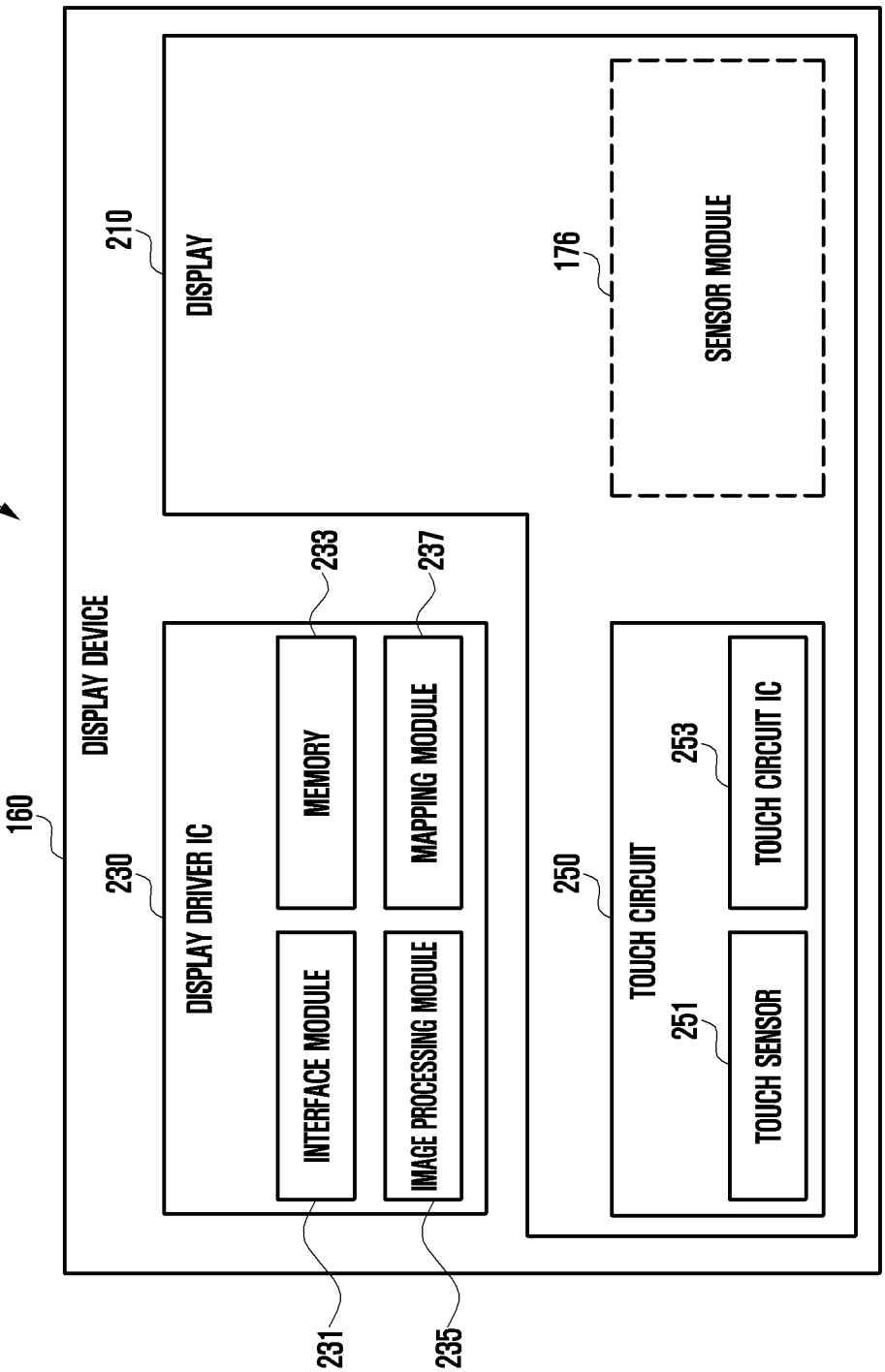

200
160
DISPLAY DEVICE
210
DISPLAY
176
SENSOR MODULE
230
DISPLAY DRIVER IC
233
MEMORY
237
MAPPING MODULE
INTERFACE MODULE
IMAGE PROCESSING MODULE
231
235
250
TOUCH CIRCUIT
253
TOUCH CIRCUIT IC
251
TOUCH SENSOR

FIG. 3

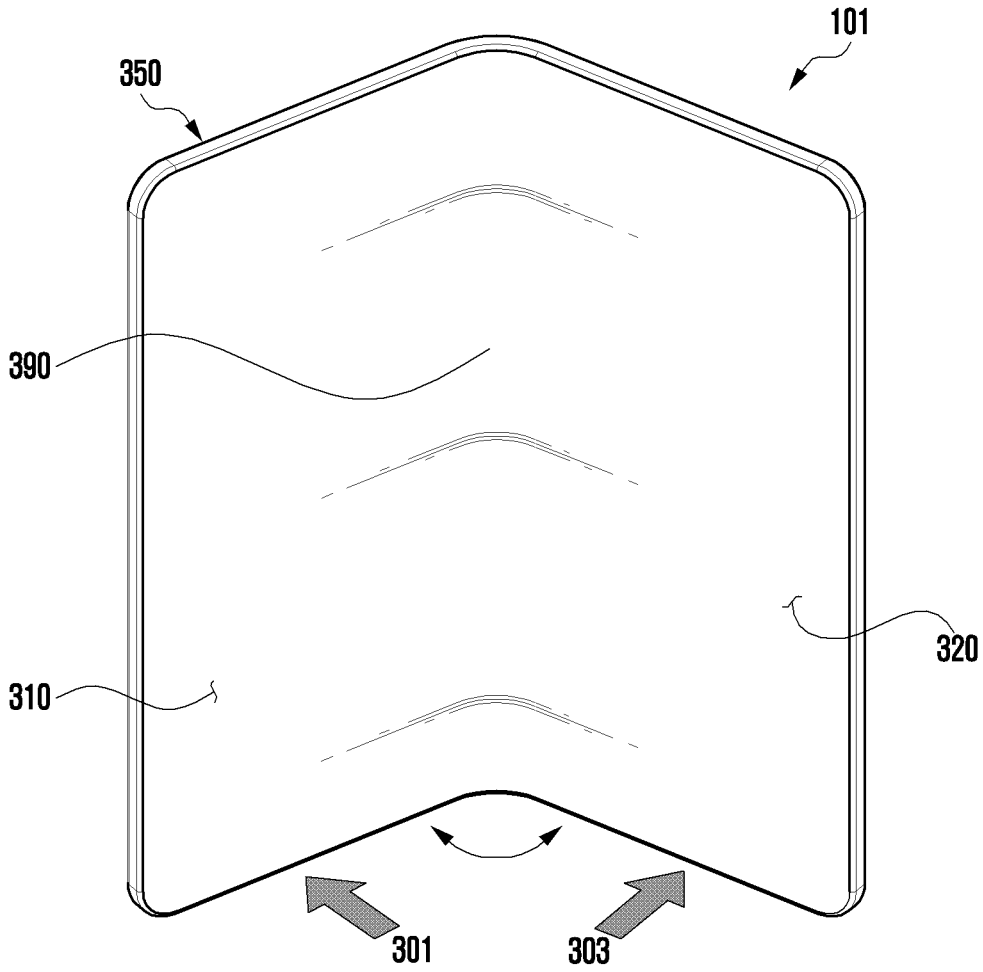


FIG. 4

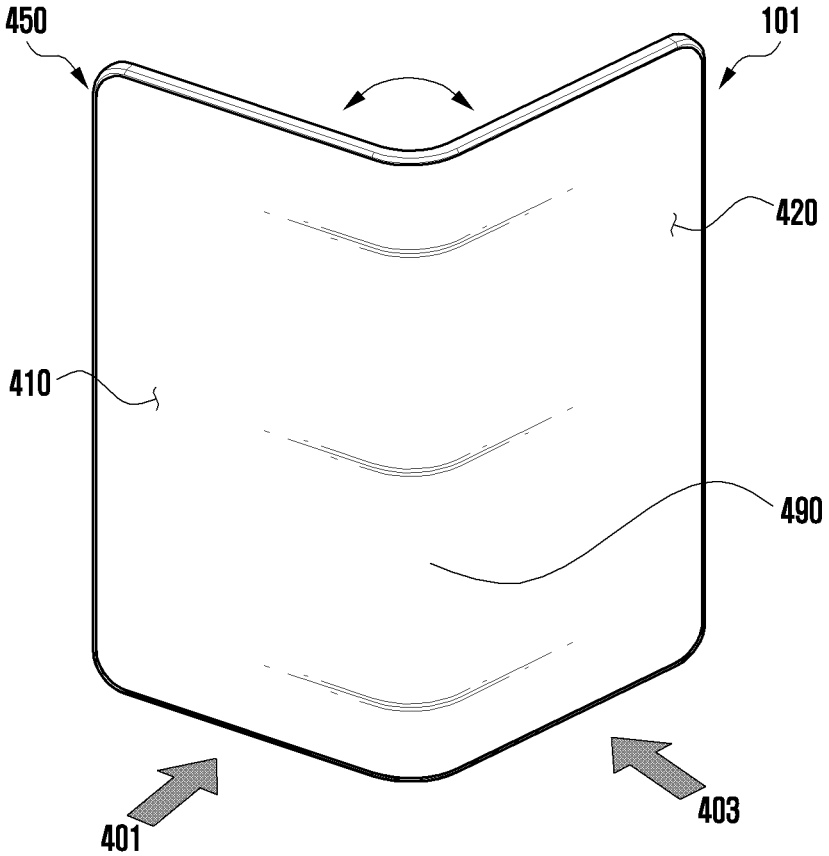
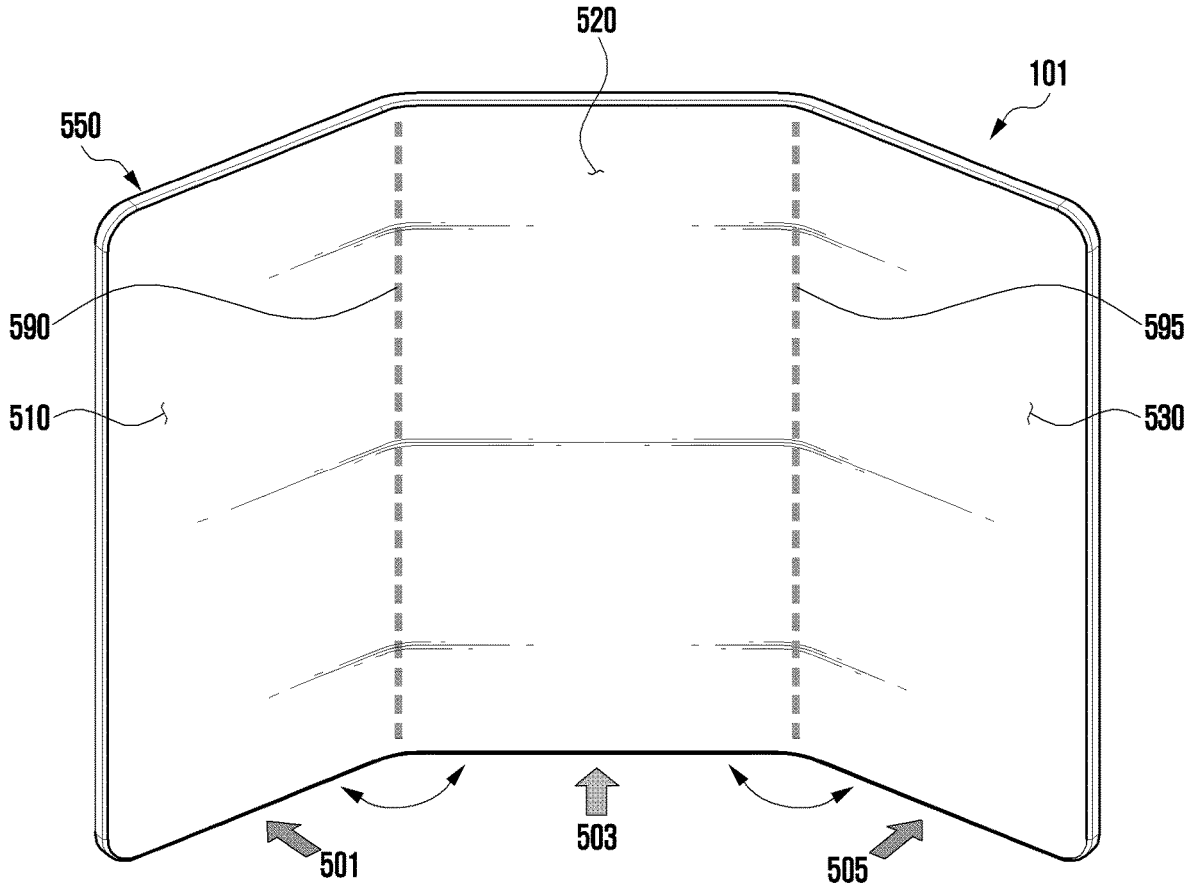


FIG. 5


520
101
550
590
595
510
530
501
503
505

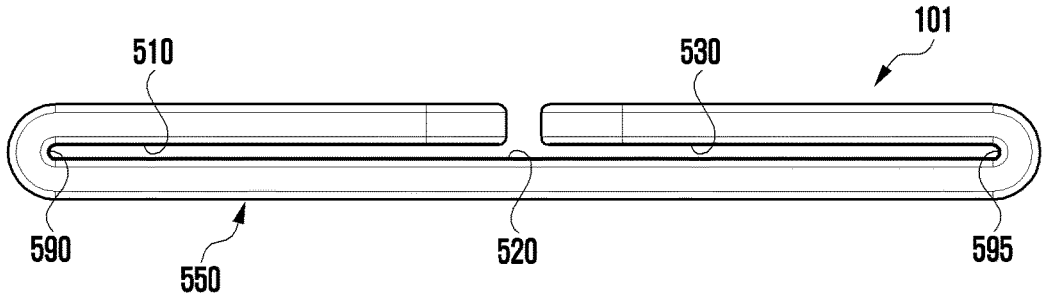
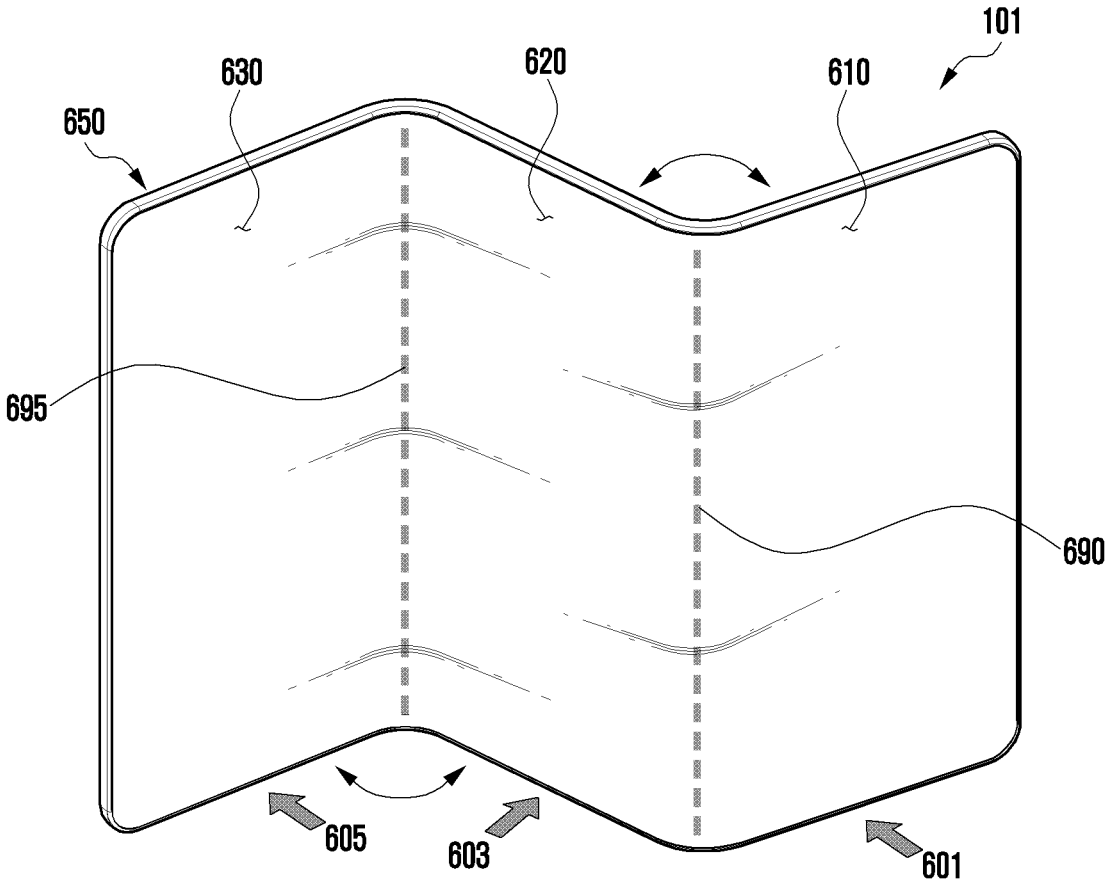

101
510
530
590
550
520
595

FIG. 6


101
630
620
610
650
695
690
605
603
601

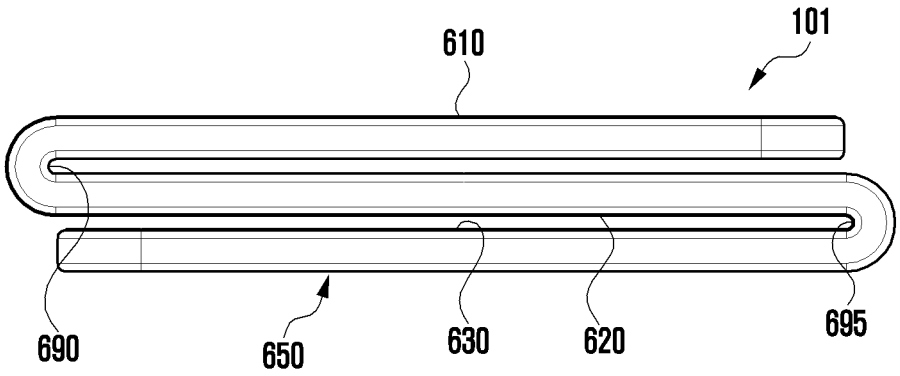

610
101
690
650
630
620
695

FIG. 7

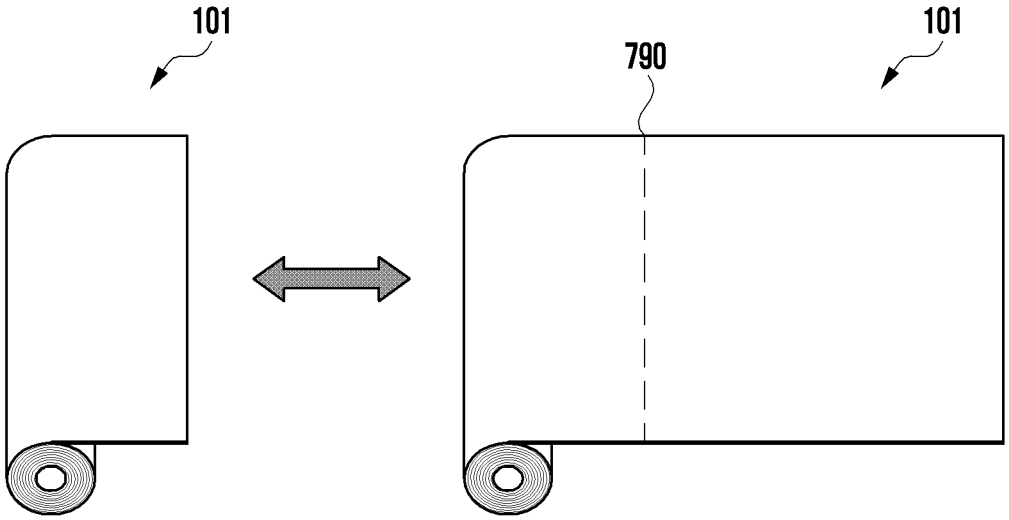


FIG. 8

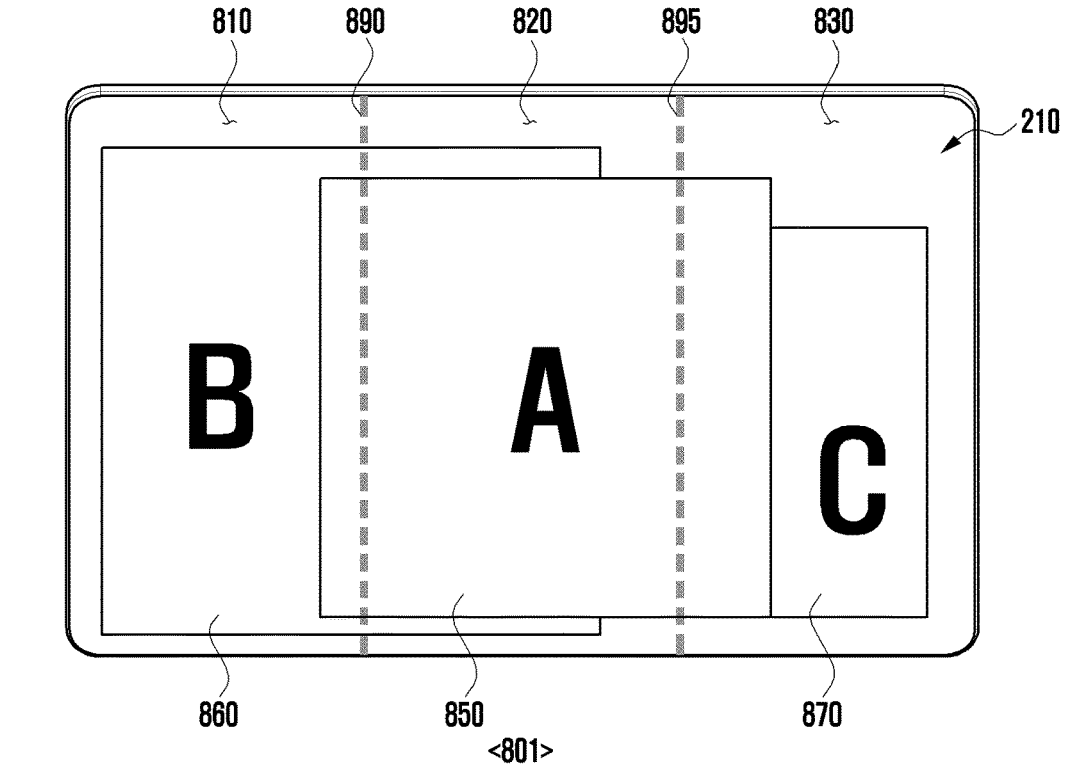

810
890
820
895
830
210
B
A
C
860
850
870
<801>
210
820
890
895
810
830
A
B
C
865
855
875
<803>

FIG. 9

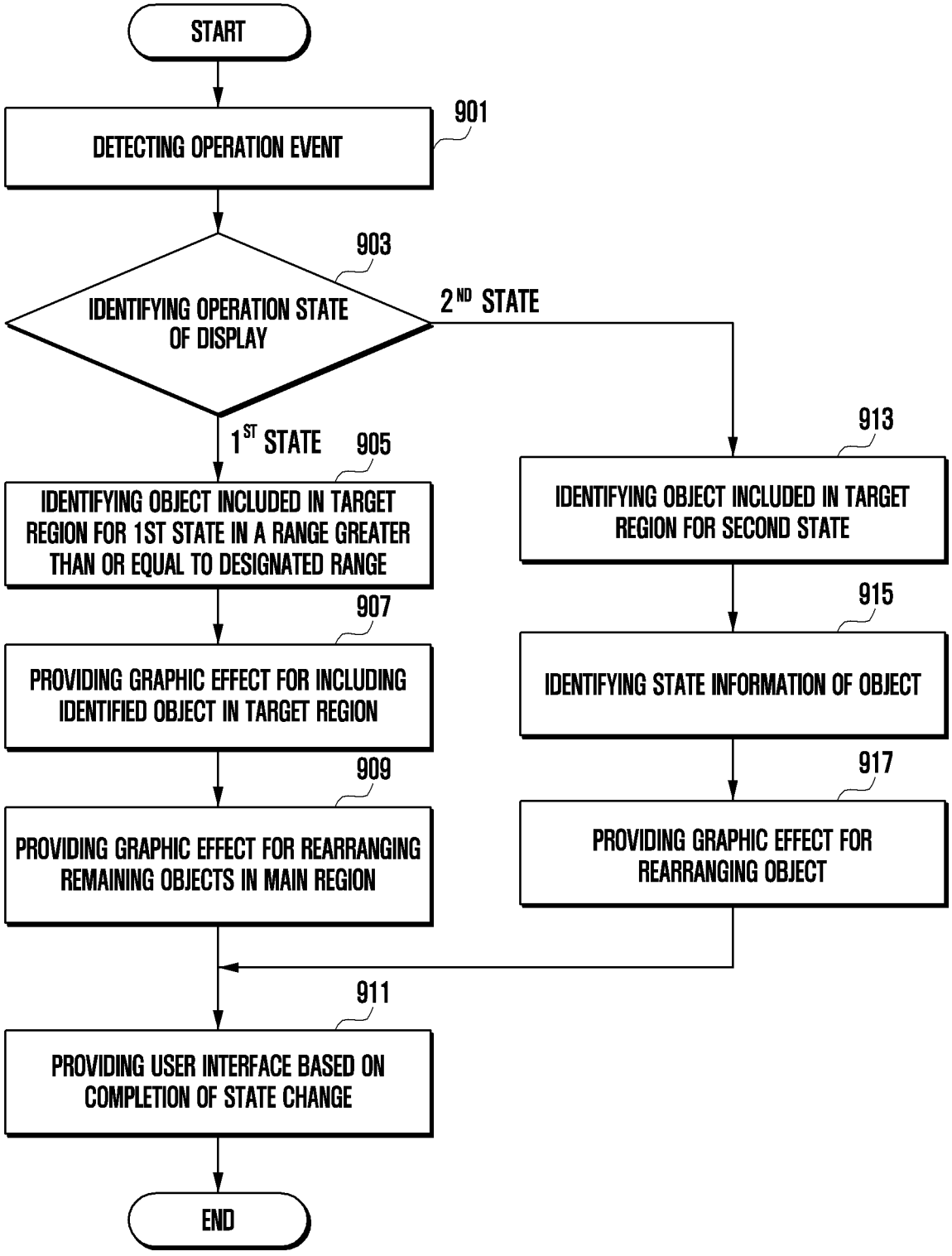

START
DETECTING OPERATION EVENT
901
IDENTIFYING OPERATION STATE OF DISPLAY
903
2ND STATE
1ST STATE
905
IDENTIFYING OBJECT INCLUDED IN TARGET REGION FOR 1ST STATE IN A RANGE GREATER THAN OR EQUAL TO DESIGNATED RANGE
907
PROVIDING GRAPHIC EFFECT FOR INCLUDING IDENTIFIED OBJECT IN TARGET REGION
909
PROVIDING GRAPHIC EFFECT FOR REARRANGING REMAINING OBJECTS IN MAIN REGION
913
IDENTIFYING OBJECT INCLUDED IN TARGET REGION FOR SECOND STATE
915
IDENTIFYING STATE INFORMATION OF OBJECT
917
PROVIDING GRAPHIC EFFECT FOR REARRANGING OBJECT
911
PROVIDING USER INTERFACE BASED ON COMPLETION OF STATE CHANGE
END

FIG. 10

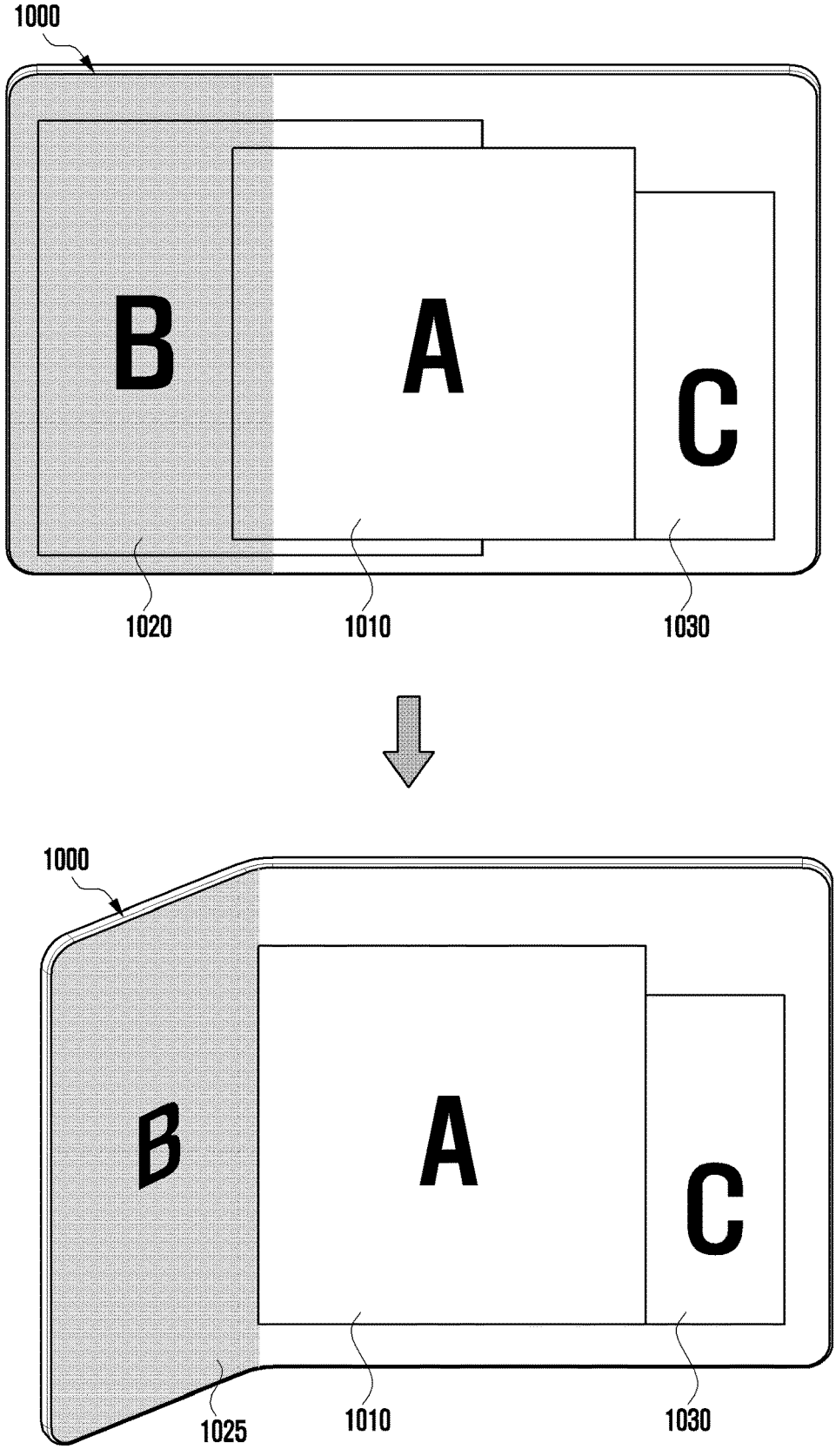


FIG. 11

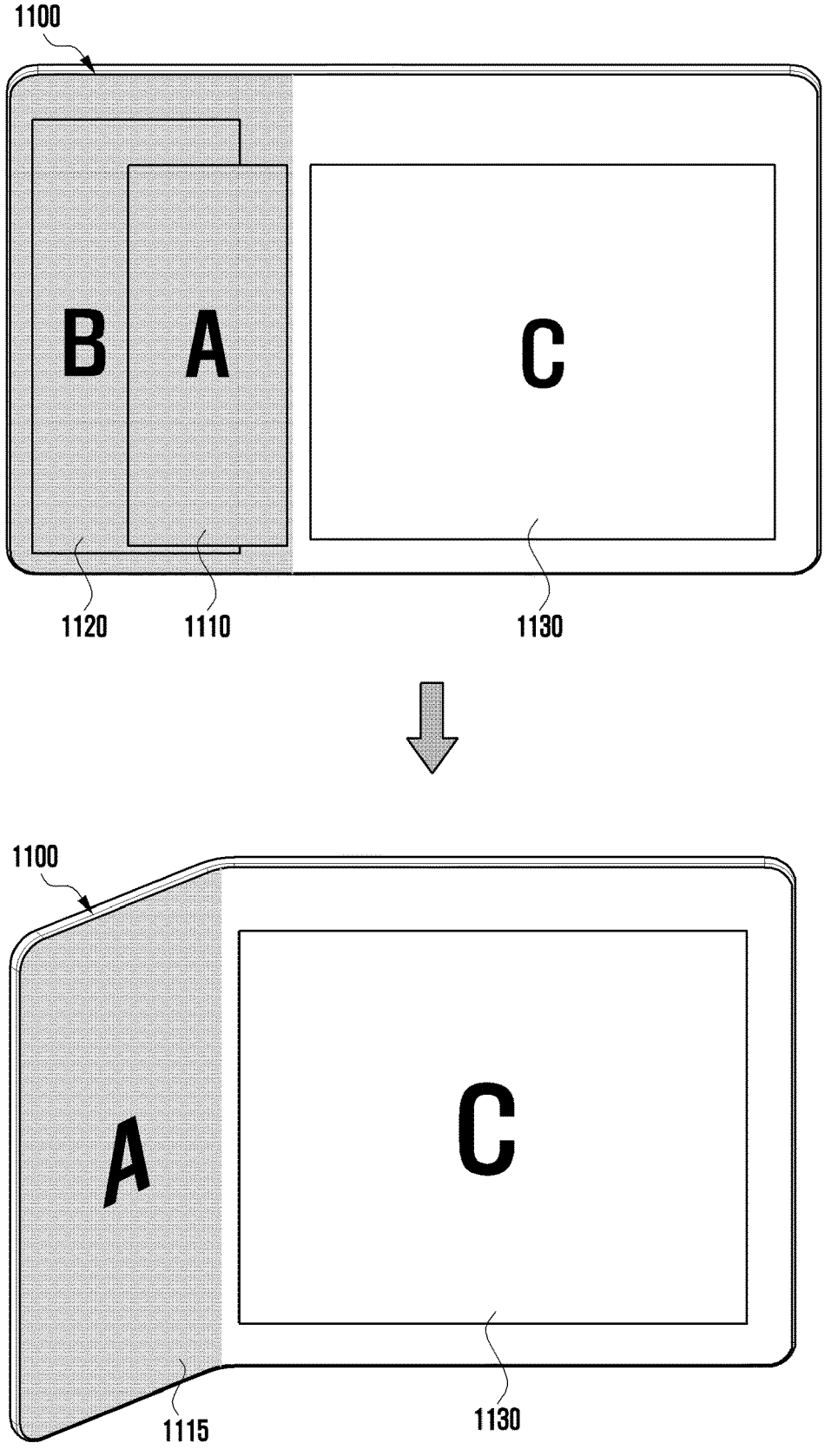


FIG. 12

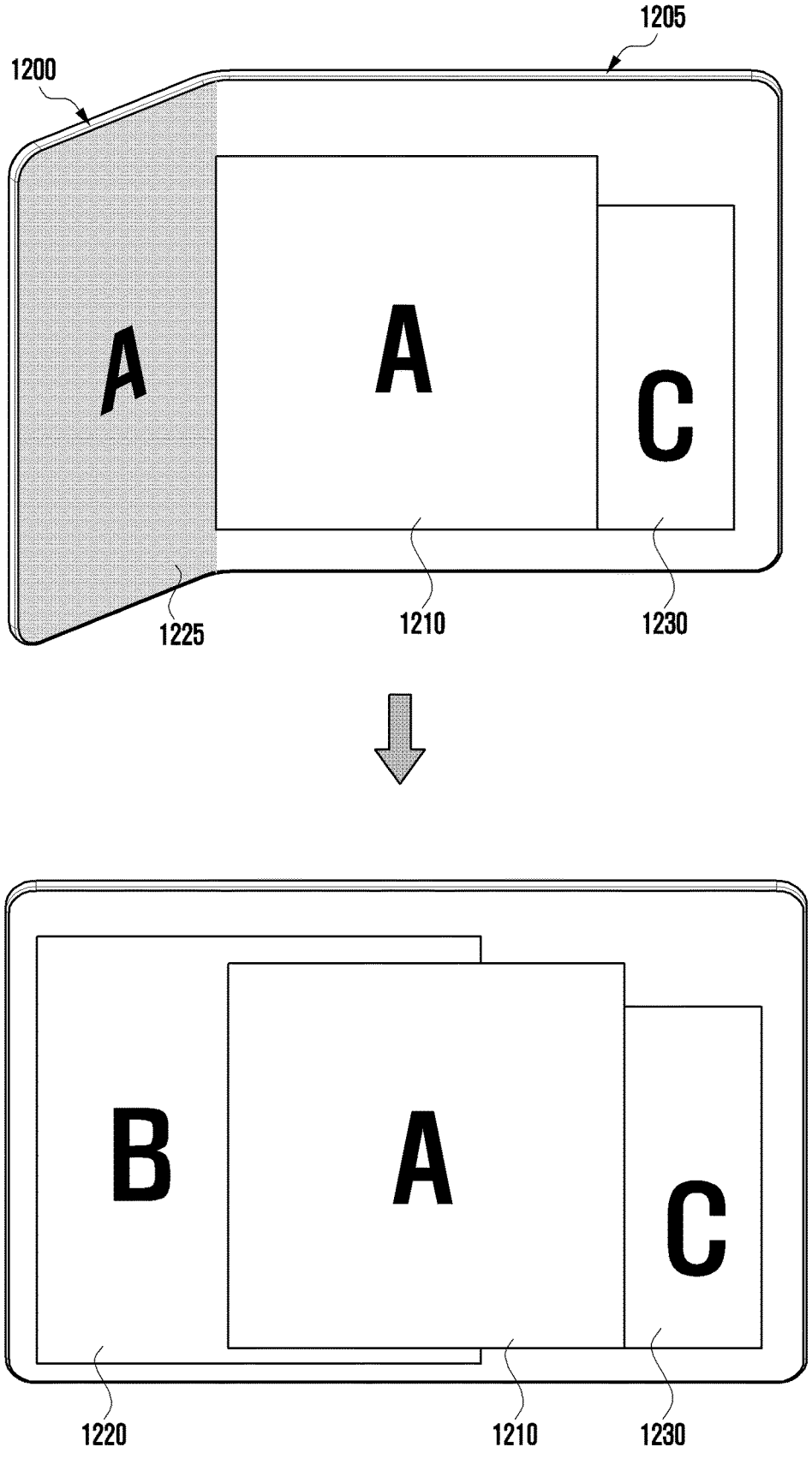


FIG. 13

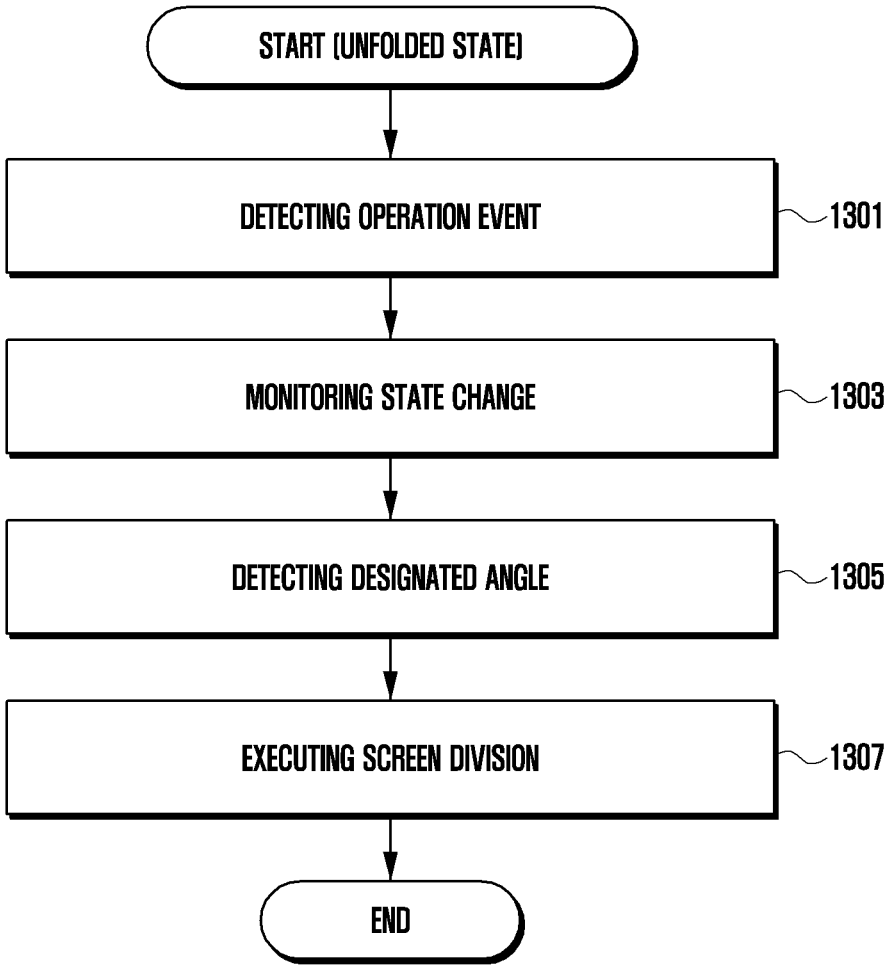

START (UNFOLDED STATE)
DETECTING OPERATION EVENT
1301
MONITORING STATE CHANGE
1303
DETECTING DESIGNATED ANGLE
1305
EXECUTING SCREEN DIVISION
1307
END

FIG. 14

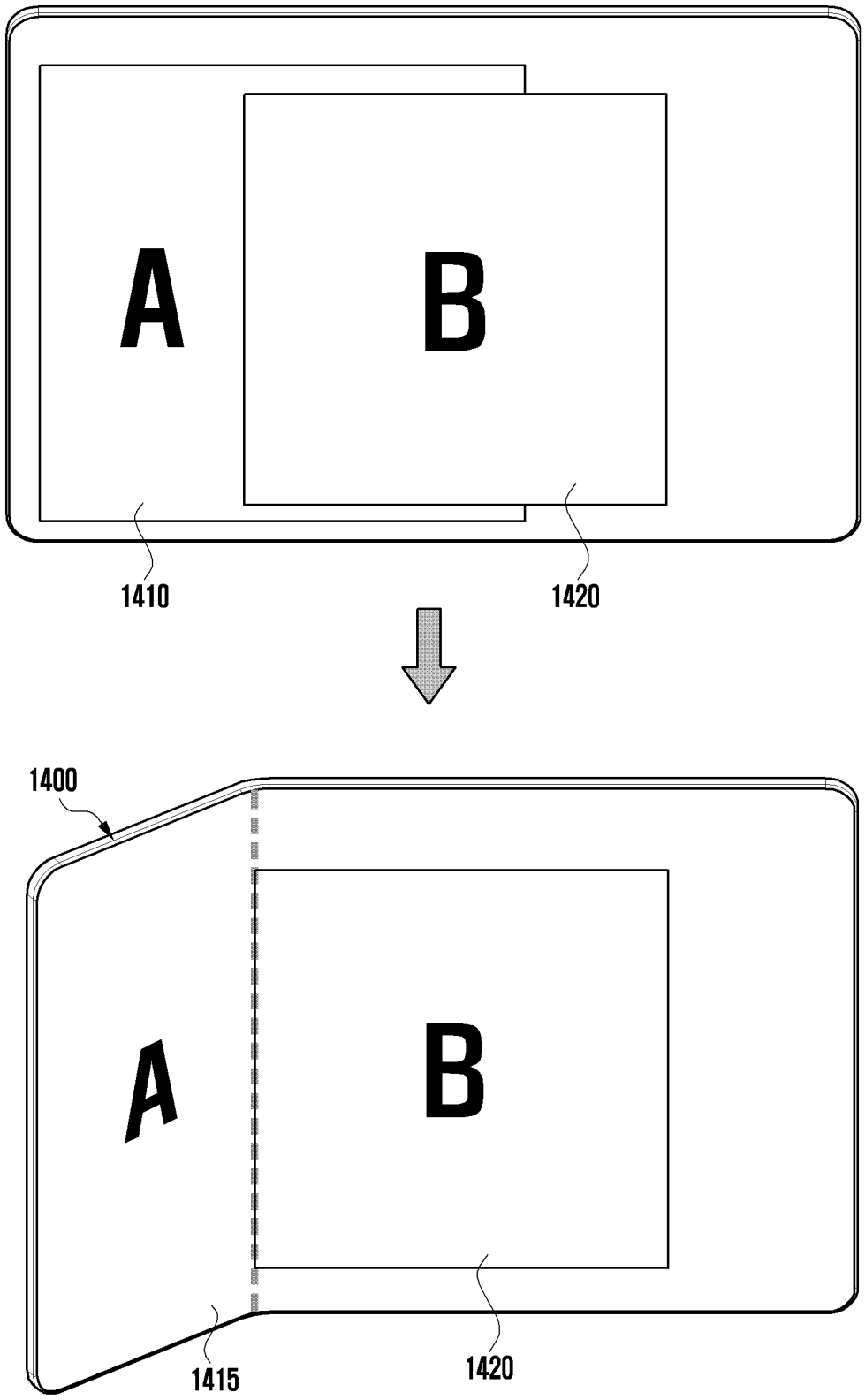


FIG. 15

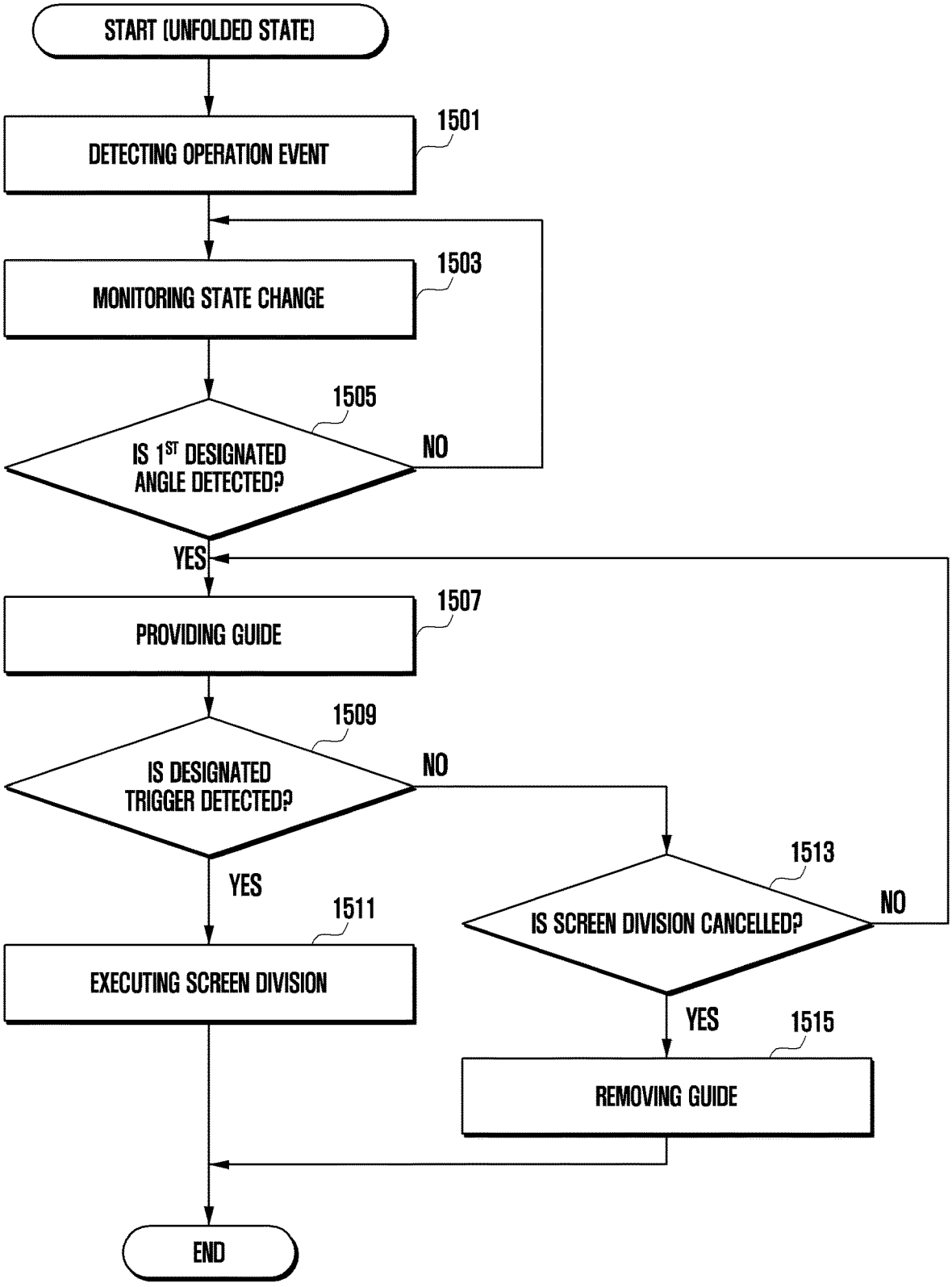

START (UNFOLDED STATE)
DETECTING OPERATION EVENT
1501
MONITORING STATE CHANGE
1503
IS 1ST DESIGNATED ANGLE DETECTED?
1505
NO
YES
PROVIDING GUIDE
1507
IS DESIGNATED TRIGGER DETECTED?
1509
NO
YES
EXECUTING SCREEN DIVISION
1511
IS SCREEN DIVISION CANCELLED?
1513
NO
YES
REMOVING GUIDE
1515
END

FIG. 16

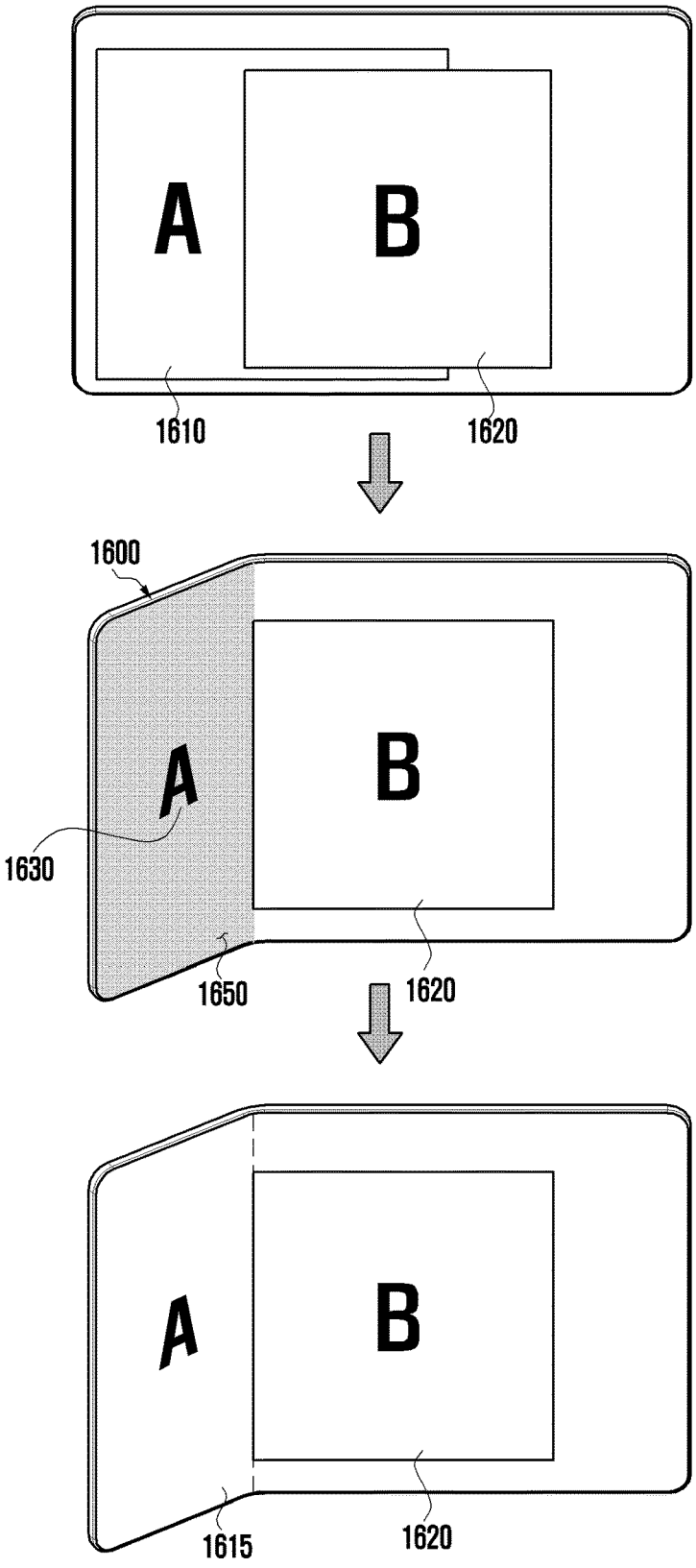


FIG. 17

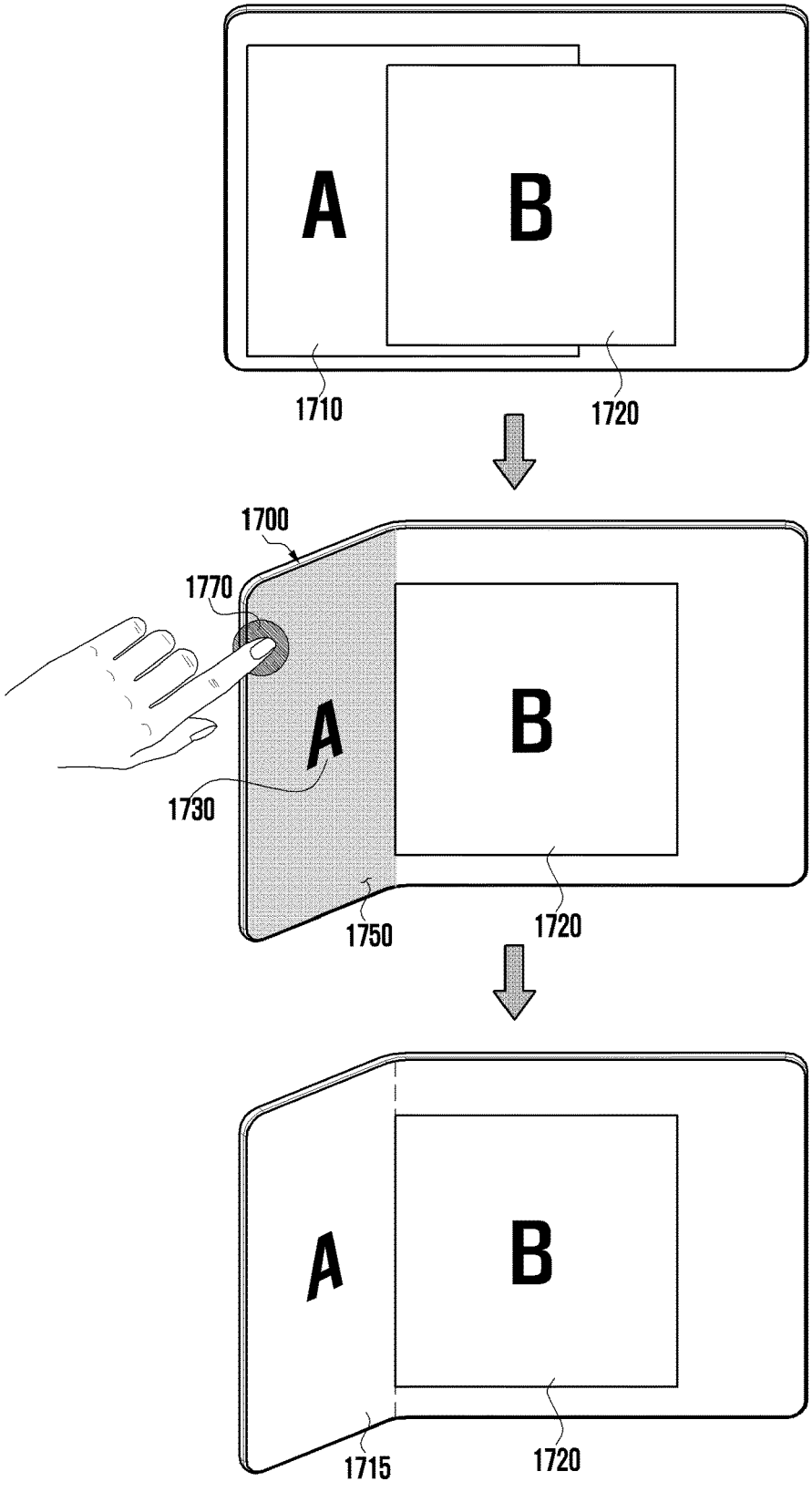


FIG. 18

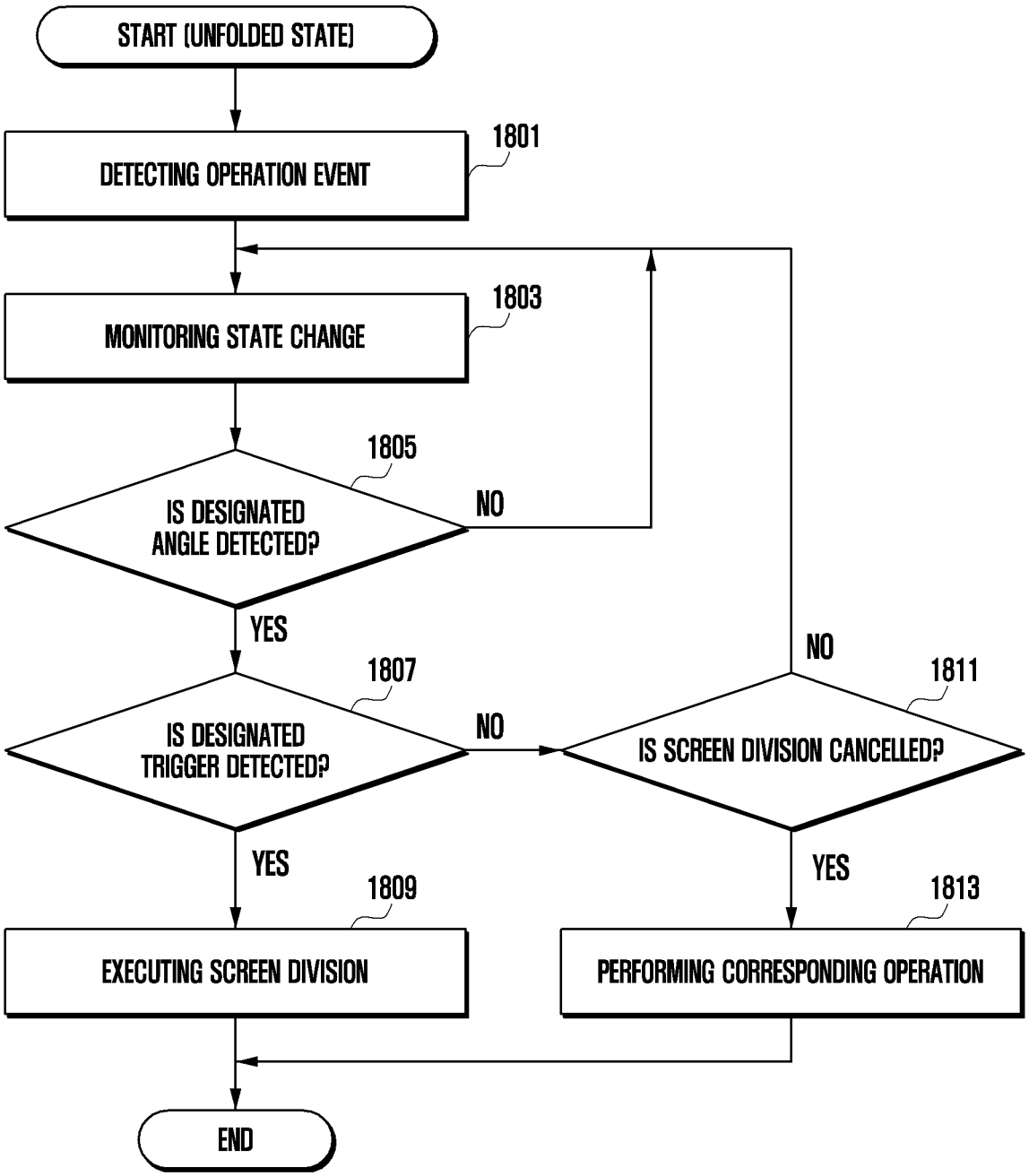

START (UNFOLDED STATE)
DETECTING OPERATION EVENT
1801
MONITORING STATE CHANGE
1803
IS DESIGNATED ANGLE DETECTED?
1805
NO
YES
IS DESIGNATED TRIGGER DETECTED?
1807
NO
YES
IS SCREEN DIVISION CANCELLED?
1811
NO
YES
EXECUTING SCREEN DIVISION
1809
PERFORMING CORRESPONDING OPERATION
1813
END

FIG. 19

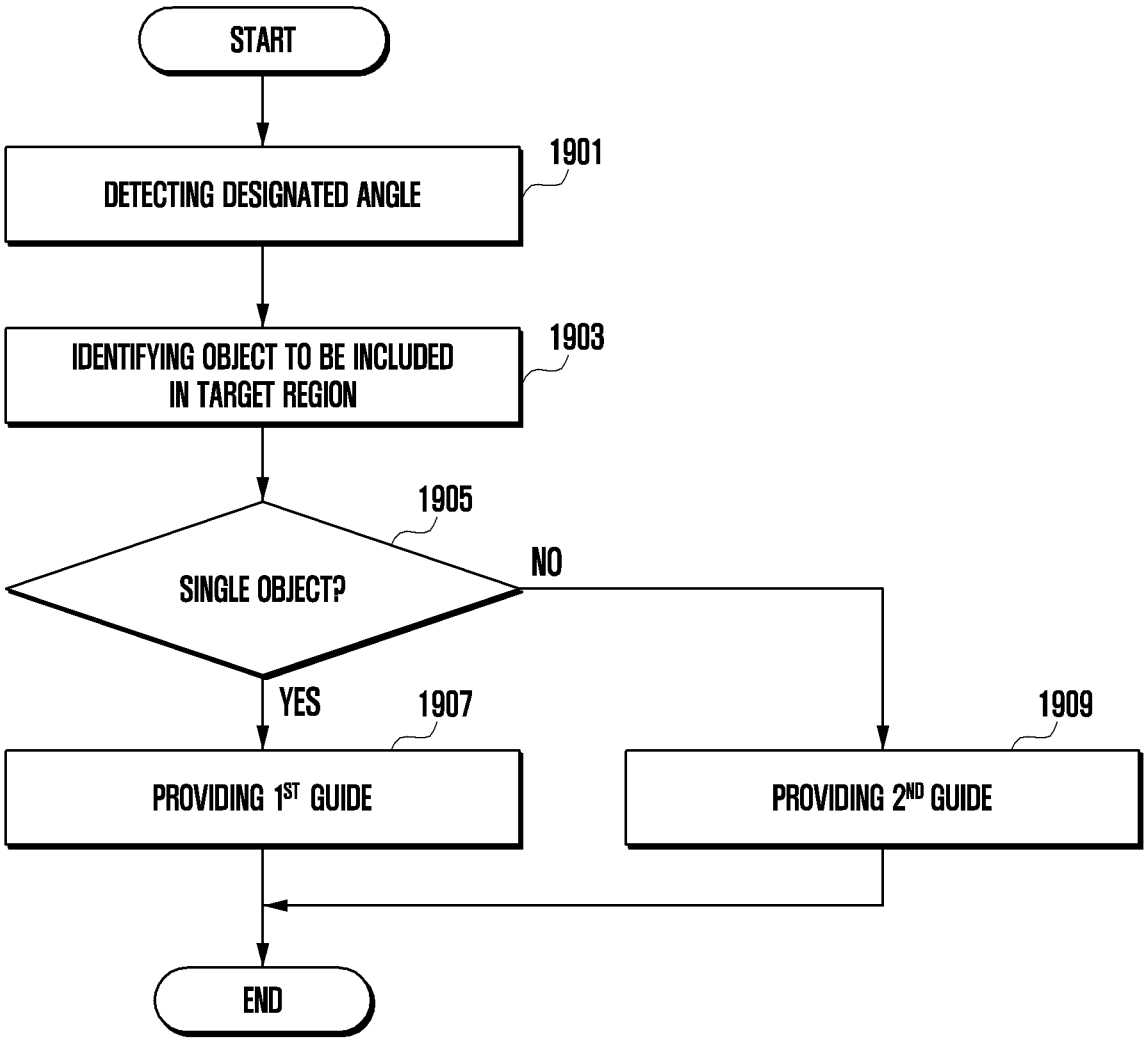

START
DETECTING DESIGNATED ANGLE
1901
IDENTIFYING OBJECT TO BE INCLUDED IN TARGET REGION
1903
1905
SINGLE OBJECT?
NO
YES
1907
1909
PROVIDING 1ST GUIDE
PROVIDING 2ND GUIDE
END

FIG. 20

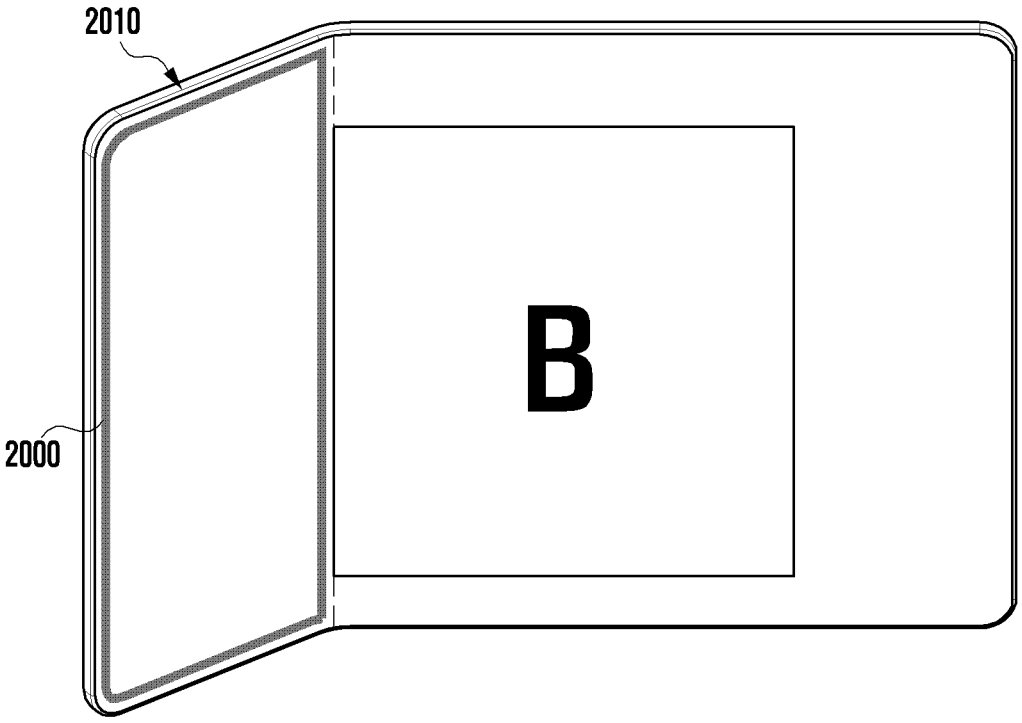


FIG. 21

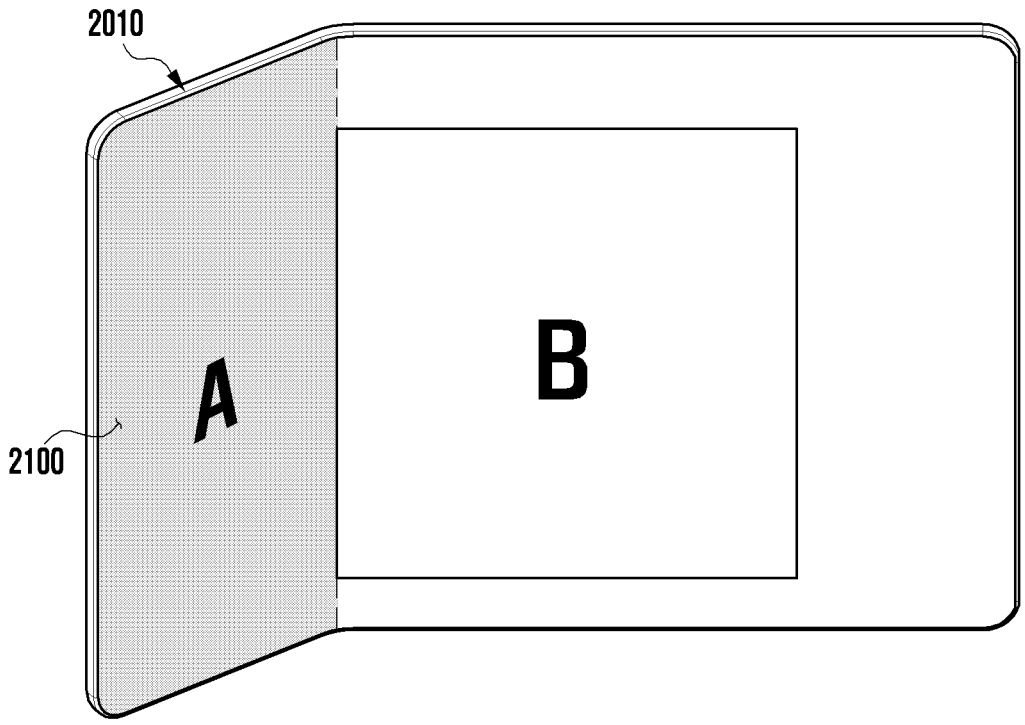


FIG. 22

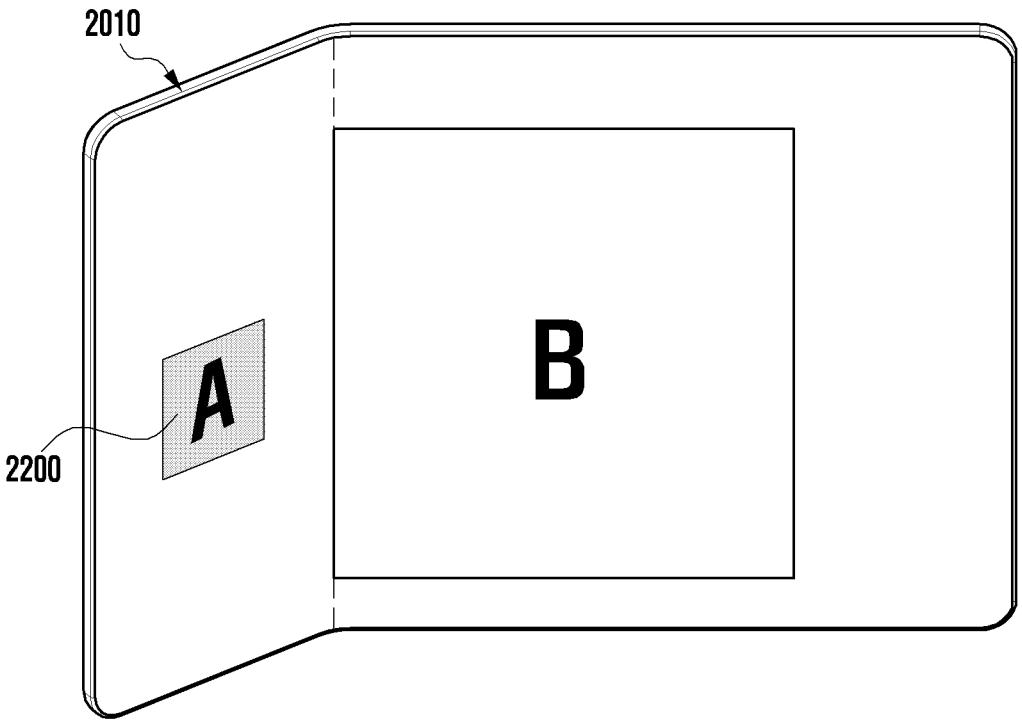


FIG. 23

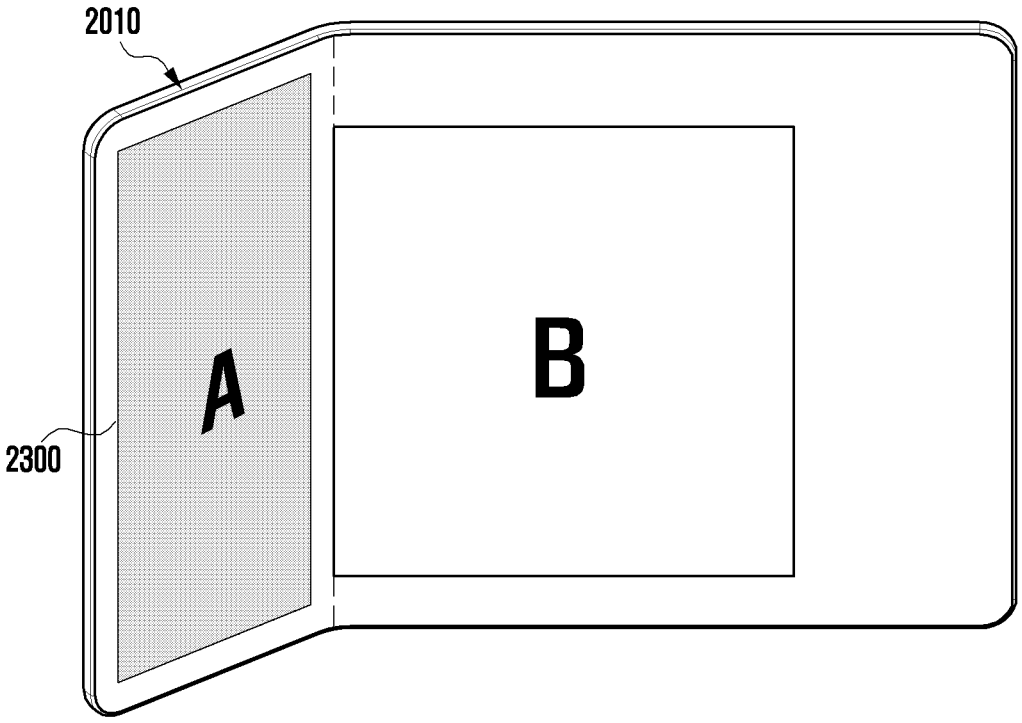


FIG. 24

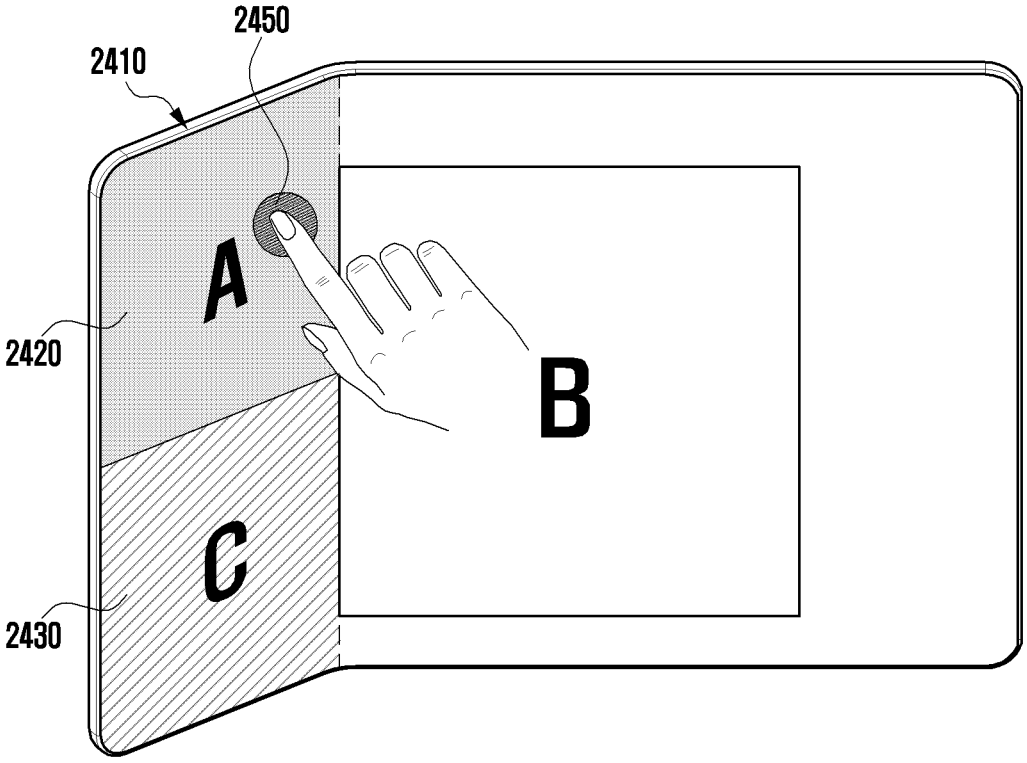


FIG. 25

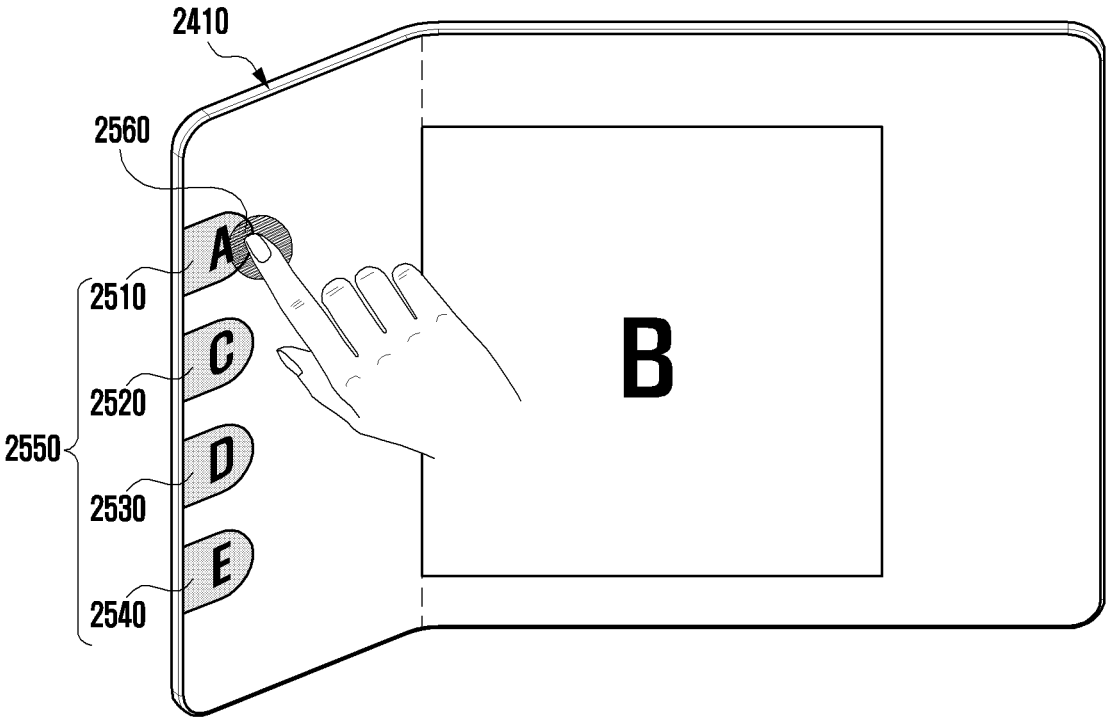


FIG. 26

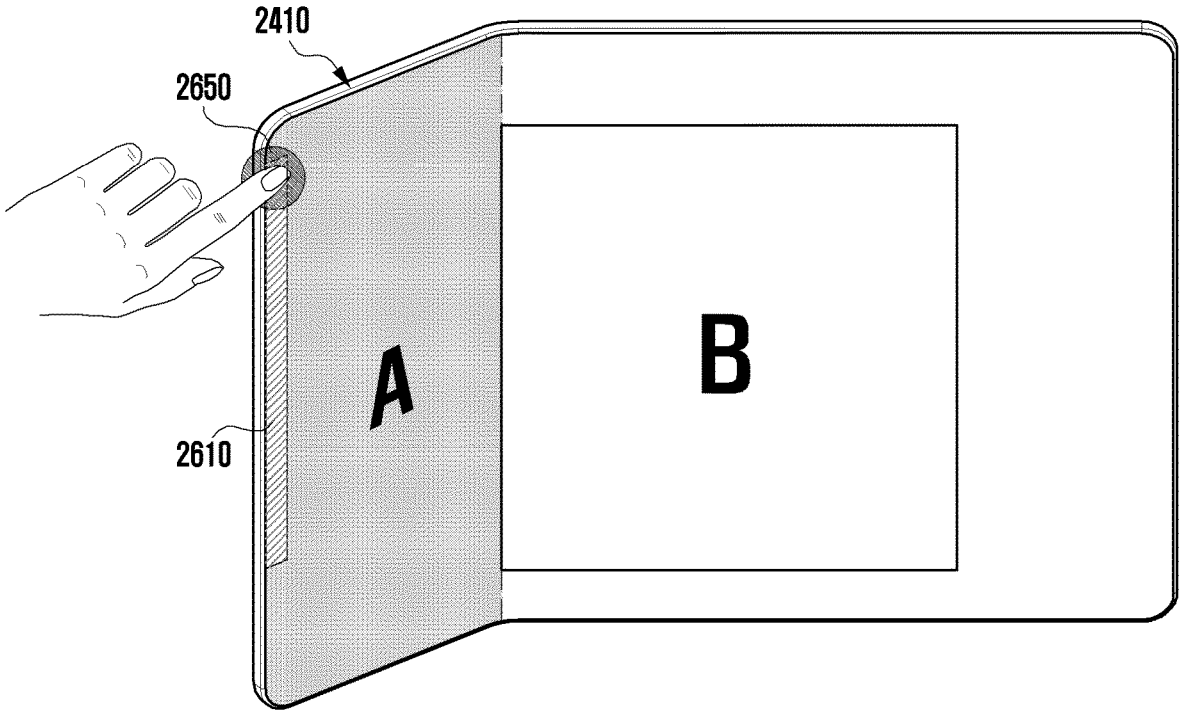


FIG. 27

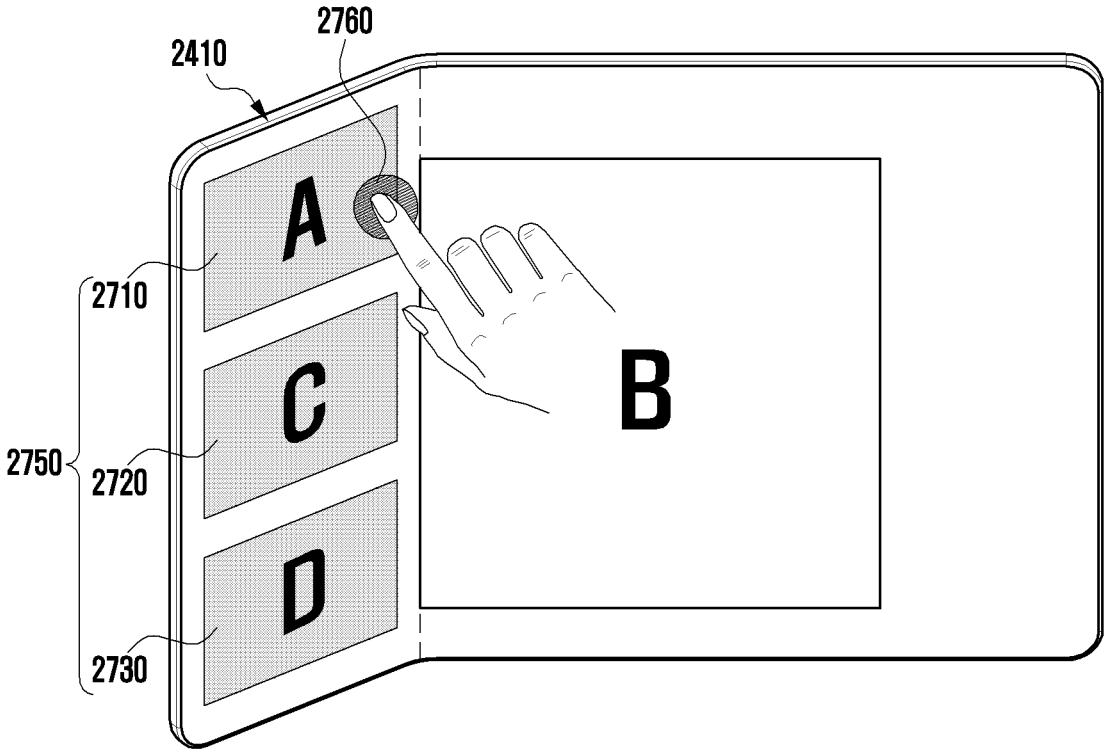


FIG. 28

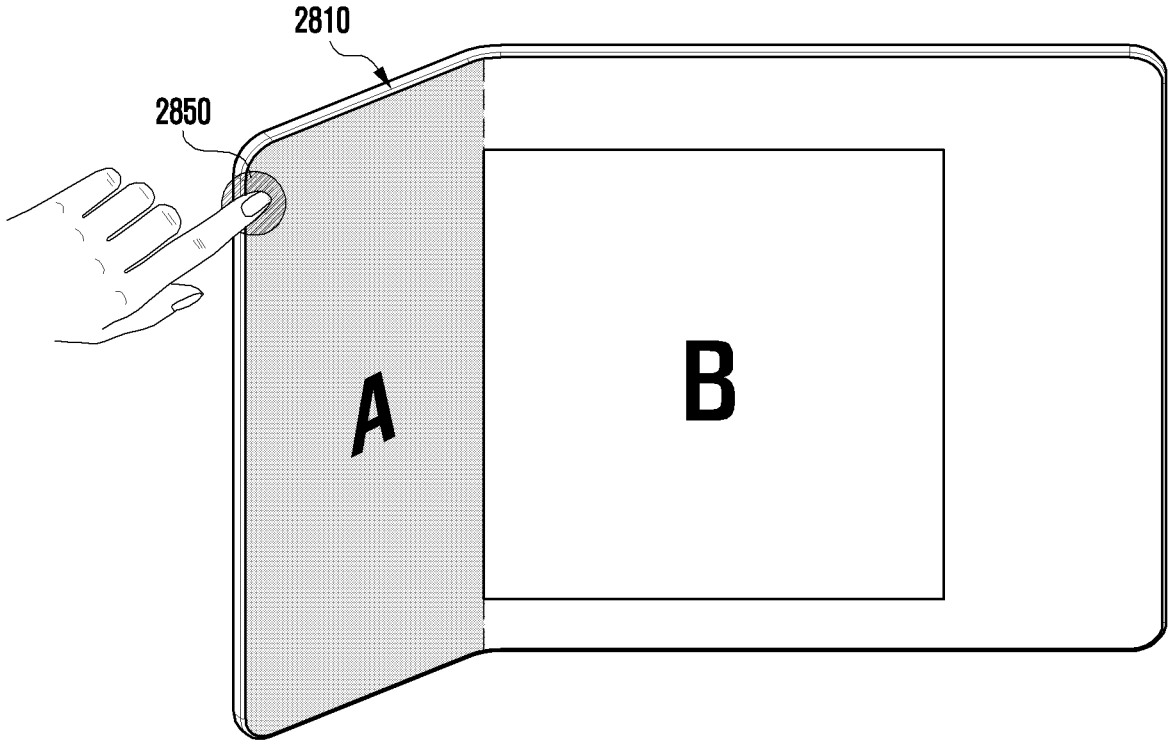


FIG. 29

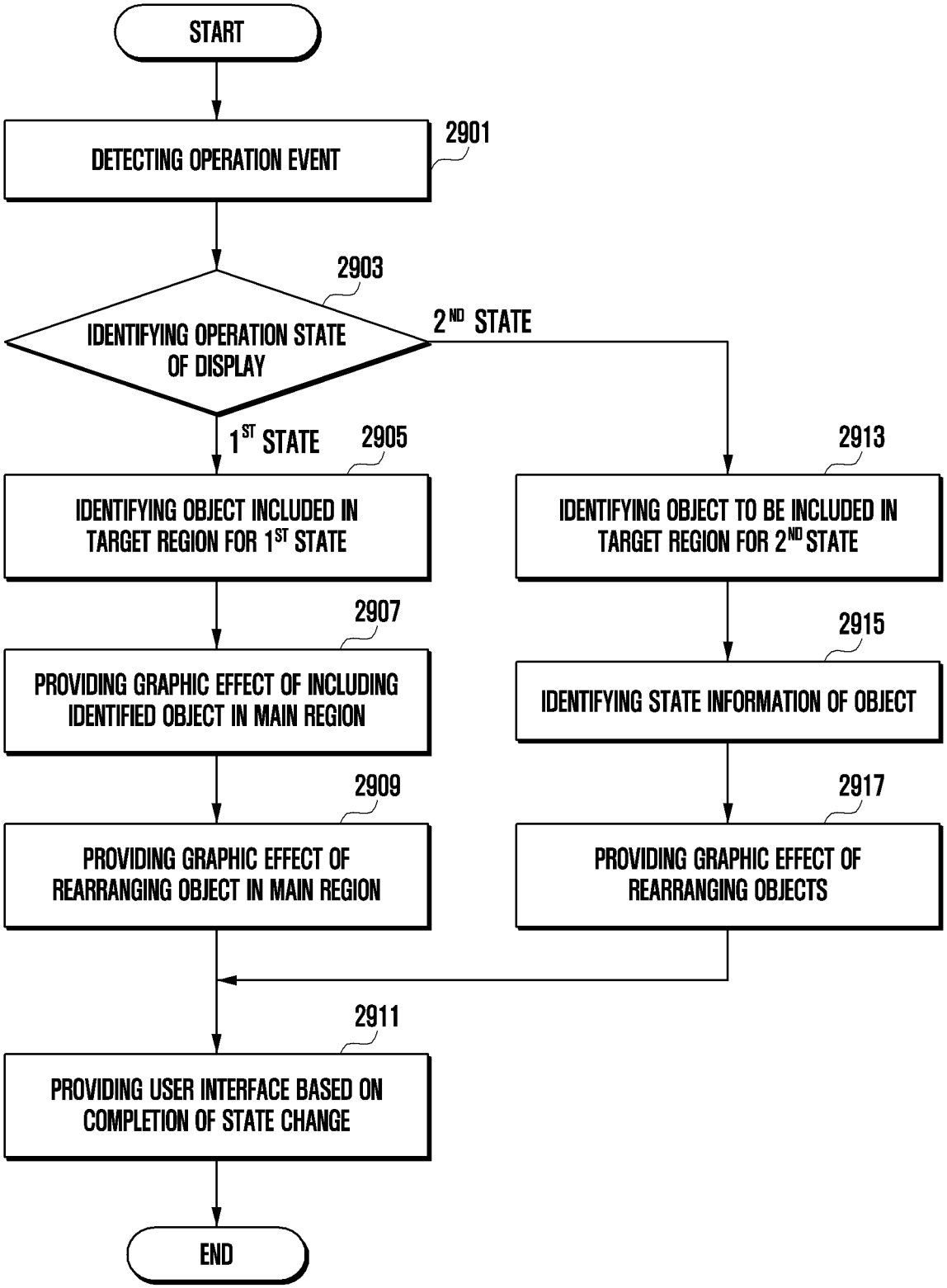

START
DETECTING OPERATION EVENT
2901
IDENTIFYING OPERATION STATE OF DISPLAY
2903
2ND STATE
1ST STATE
2905
IDENTIFYING OBJECT INCLUDED IN TARGET REGION FOR 1ST STATE
2907
PROVIDING GRAPHIC EFFECT OF INCLUDING IDENTIFIED OBJECT IN MAIN REGION
2909
PROVIDING GRAPHIC EFFECT OF REARRANGING OBJECT IN MAIN REGION
2913
IDENTIFYING OBJECT TO BE INCLUDED IN TARGET REGION FOR 2ND STATE
2915
IDENTIFYING STATE INFORMATION OF OBJECT
2917
PROVIDING GRAPHIC EFFECT OF REARRANGING OBJECTS
2911
PROVIDING USER INTERFACE BASED ON COMPLETION OF STATE CHANGE
END

FIG. 30

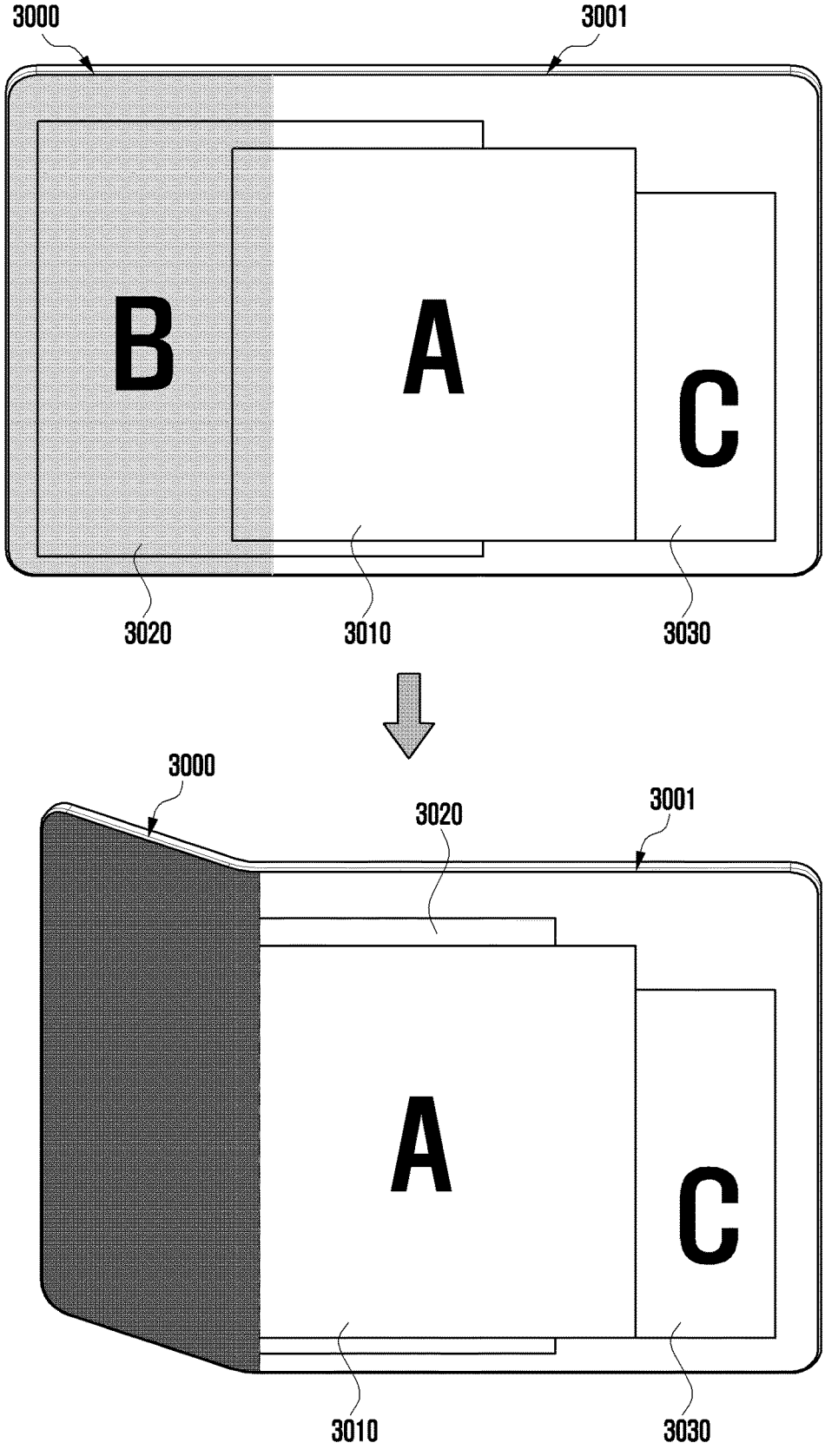


FIG. 31

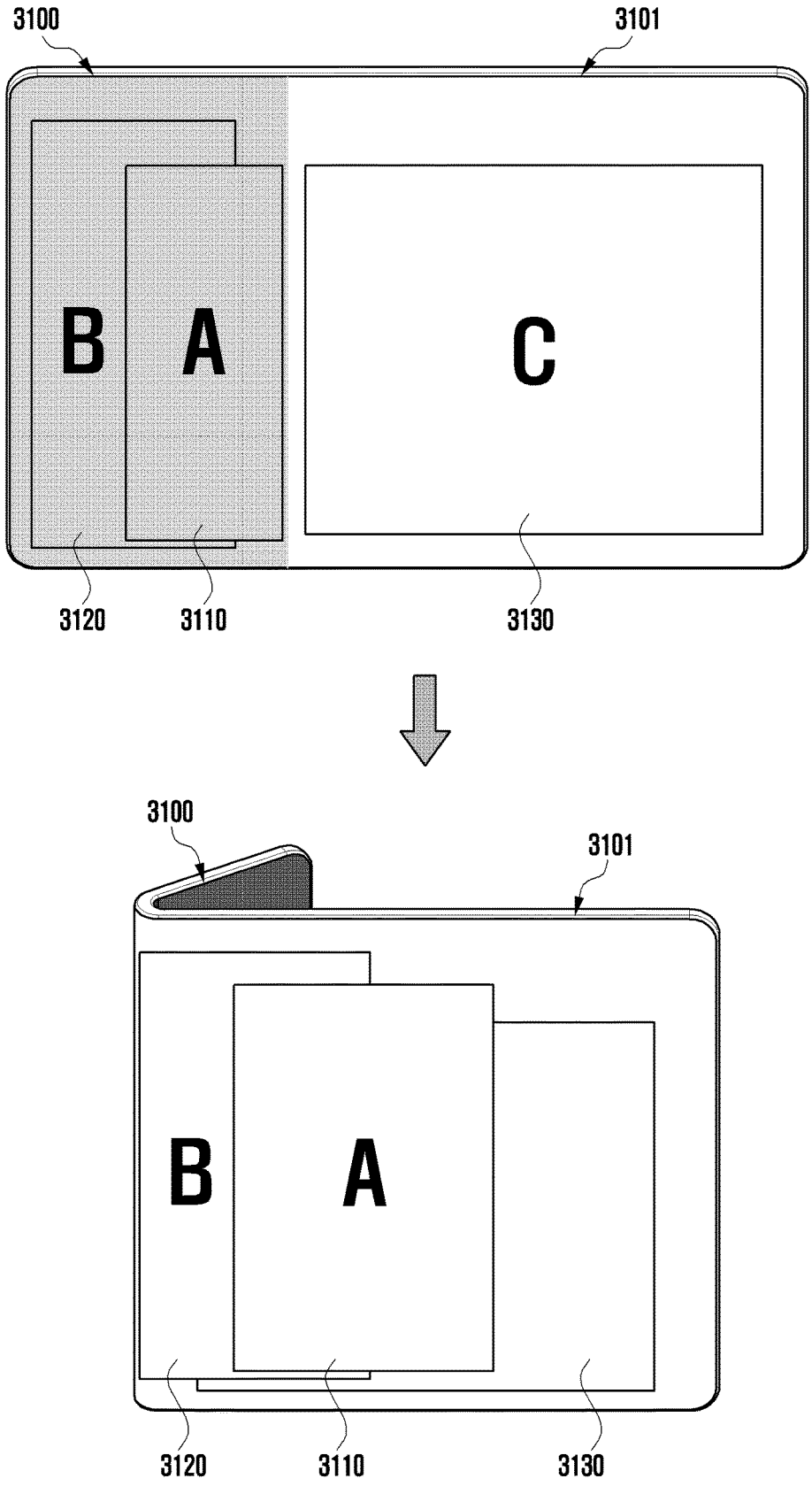


FIG. 32

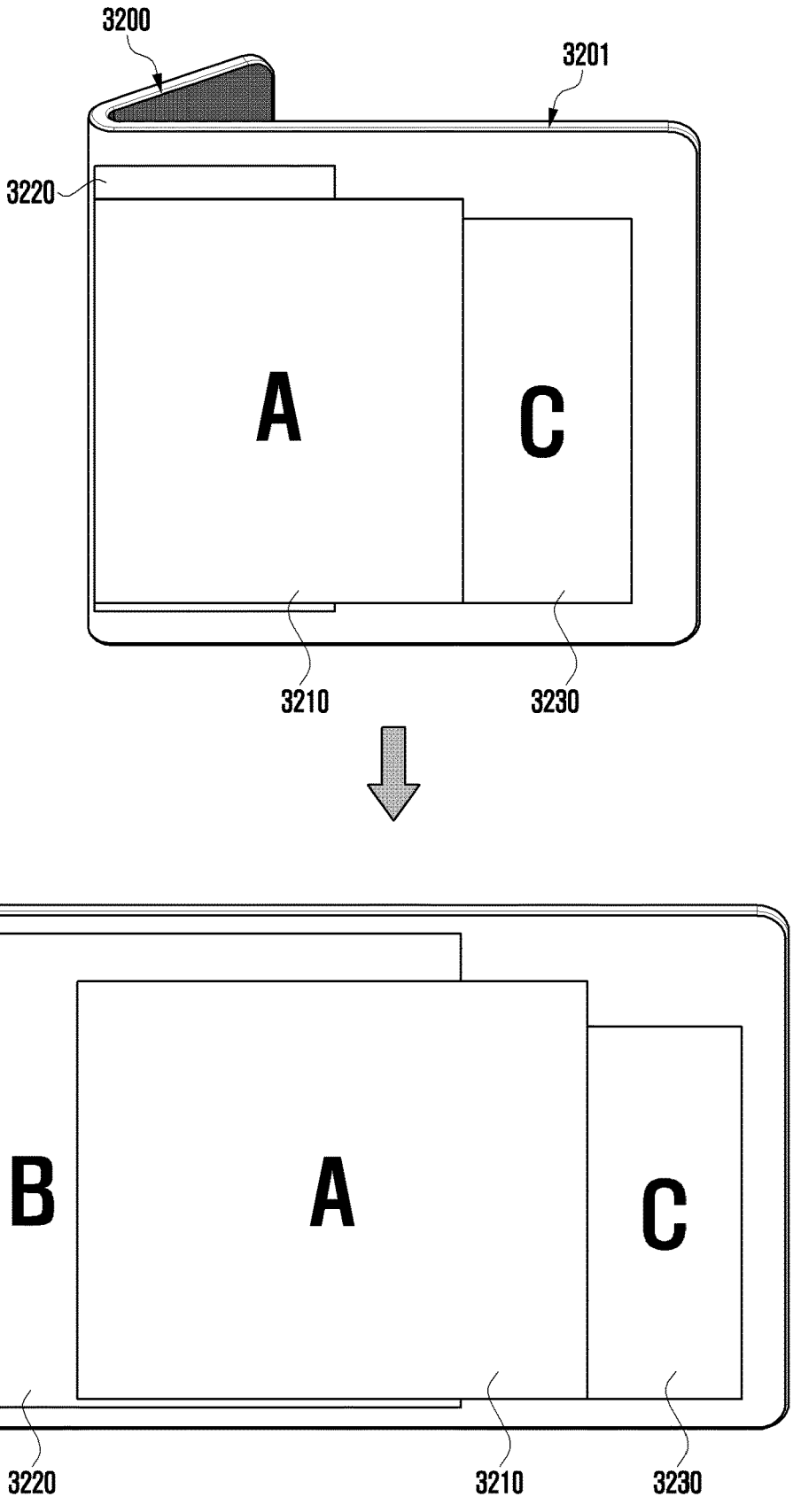


FIG. 33

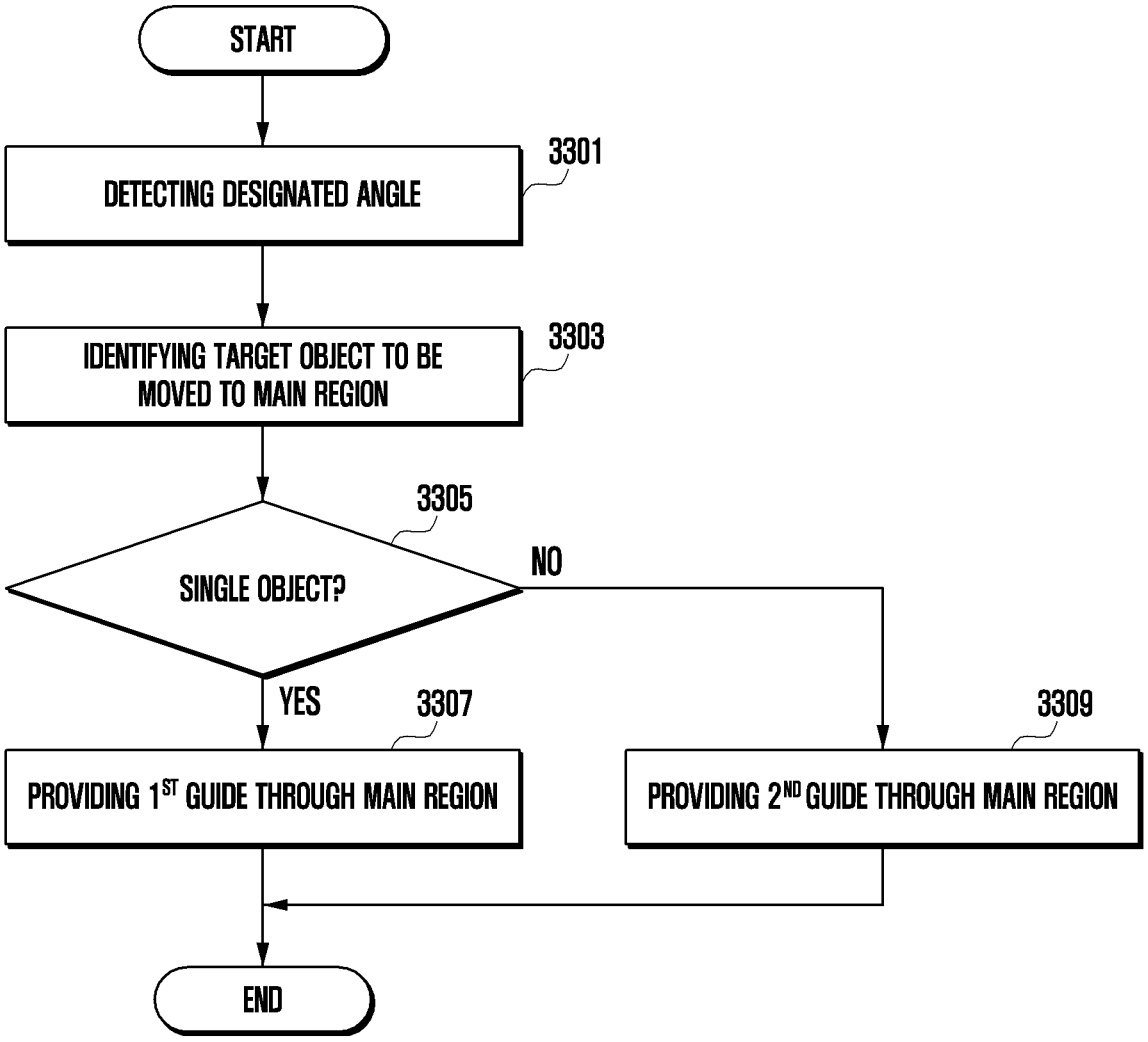

START
DETECTING DESIGNATED ANGLE
3301
IDENTIFYING TARGET OBJECT TO BE MOVED TO MAIN REGION
3303
SINGLE OBJECT?
3305
NO
YES
PROVIDING 1ST GUIDE THROUGH MAIN REGION
3307
PROVIDING 2ND GUIDE THROUGH MAIN REGION
3309
END

FIG. 34

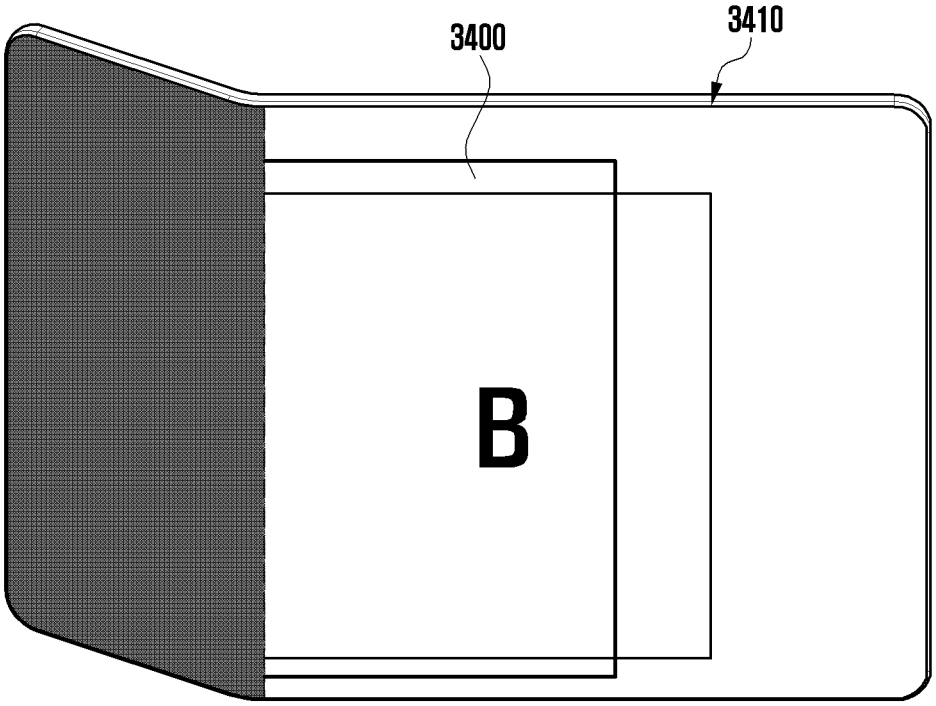


FIG. 35

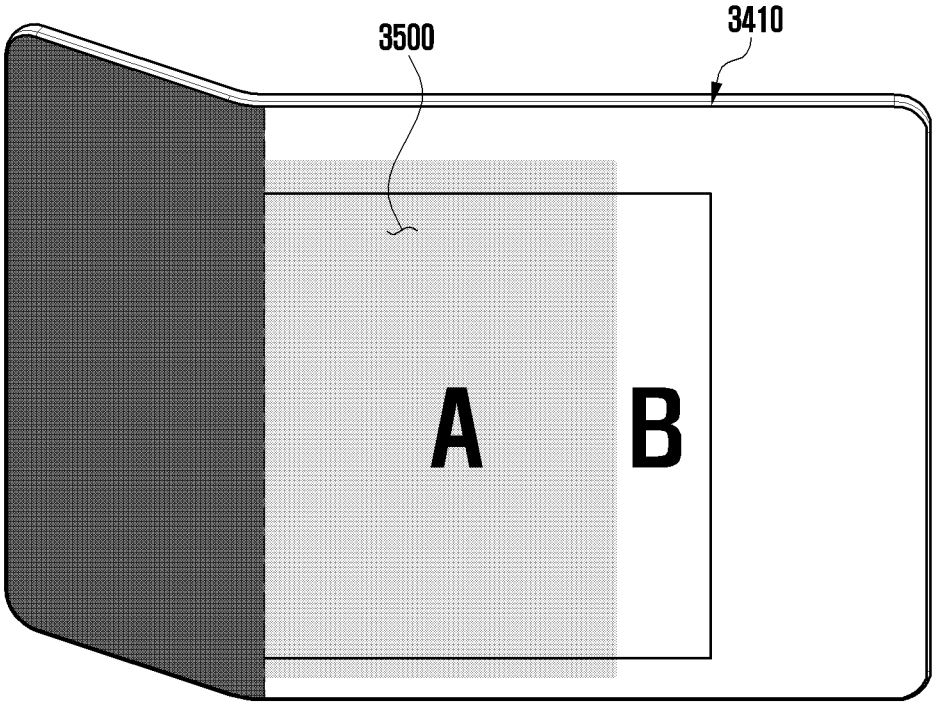


FIG. 36

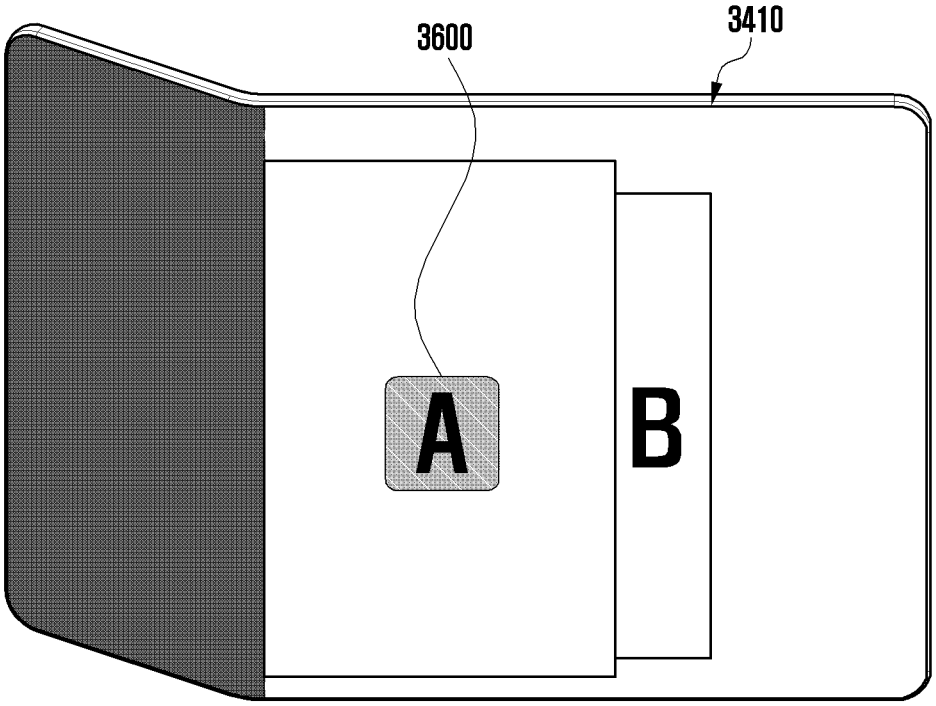


FIG. 37

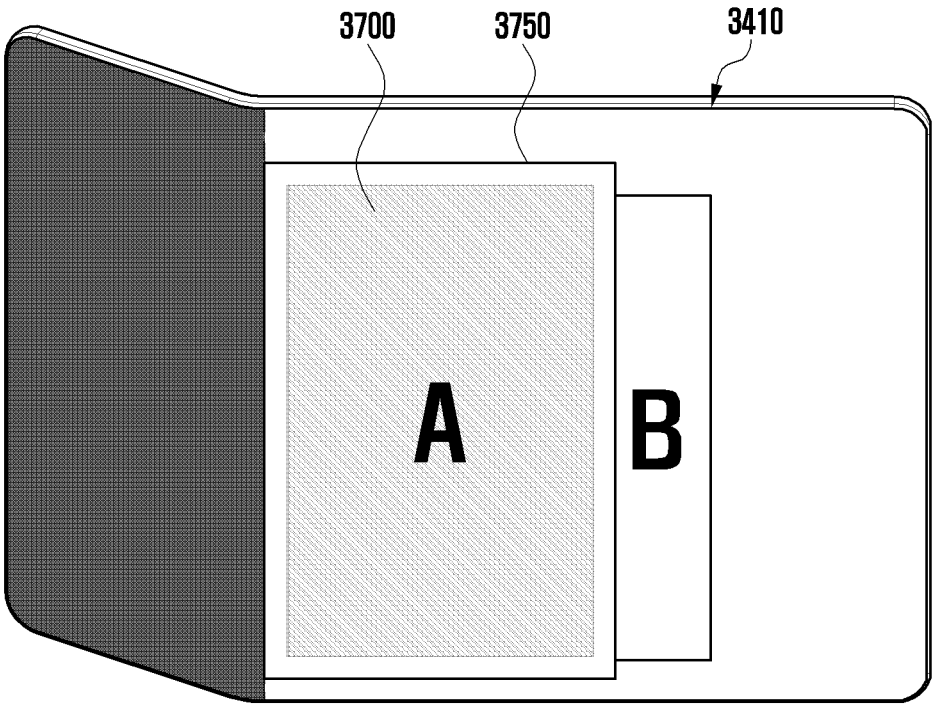


FIG. 38

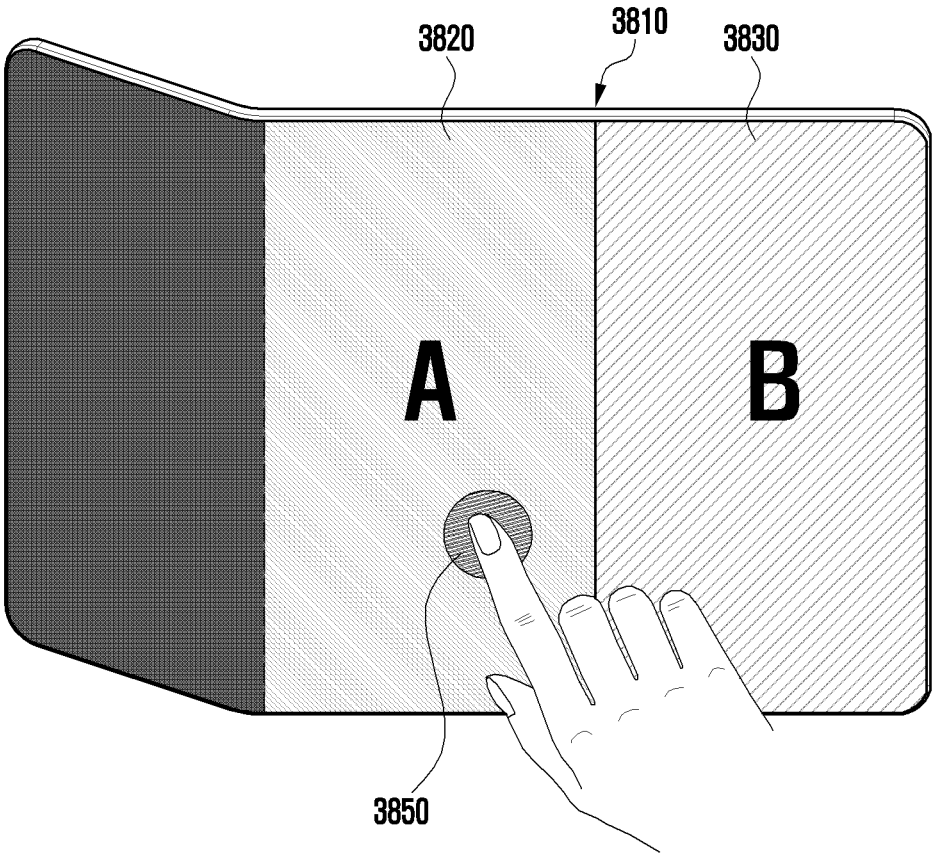


FIG. 39

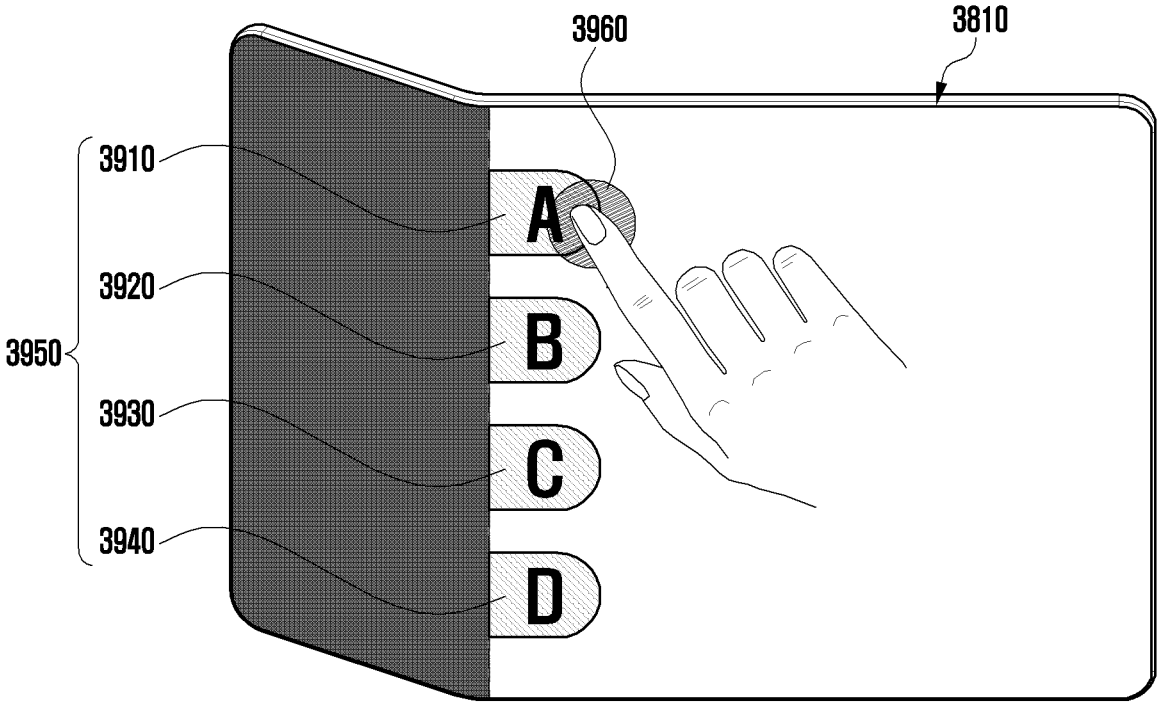


FIG. 40

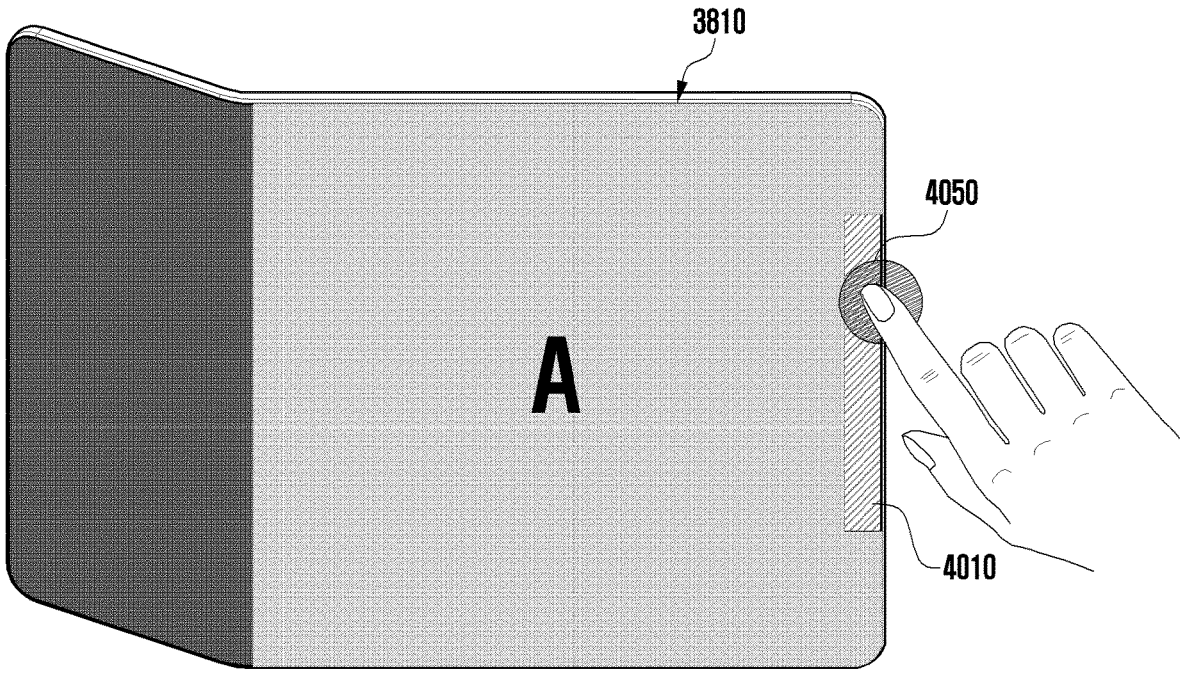


FIG. 41

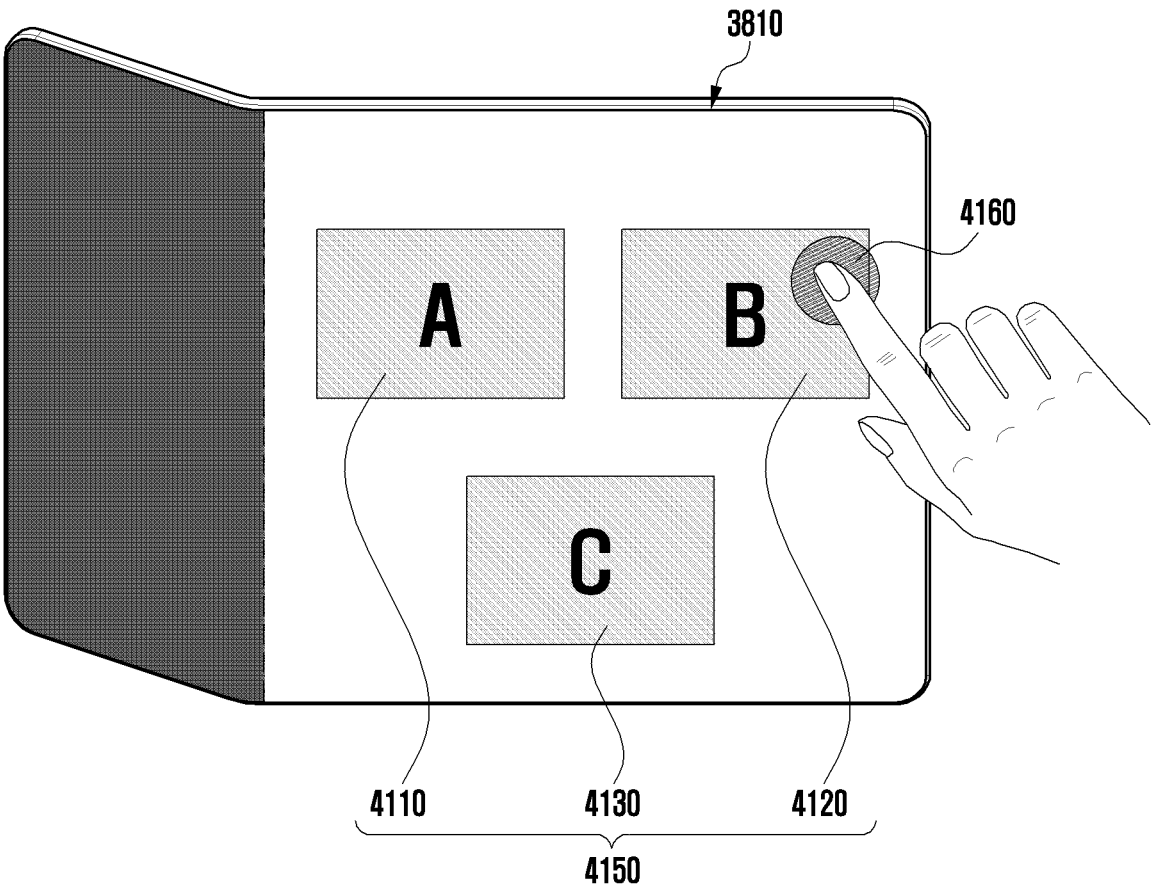
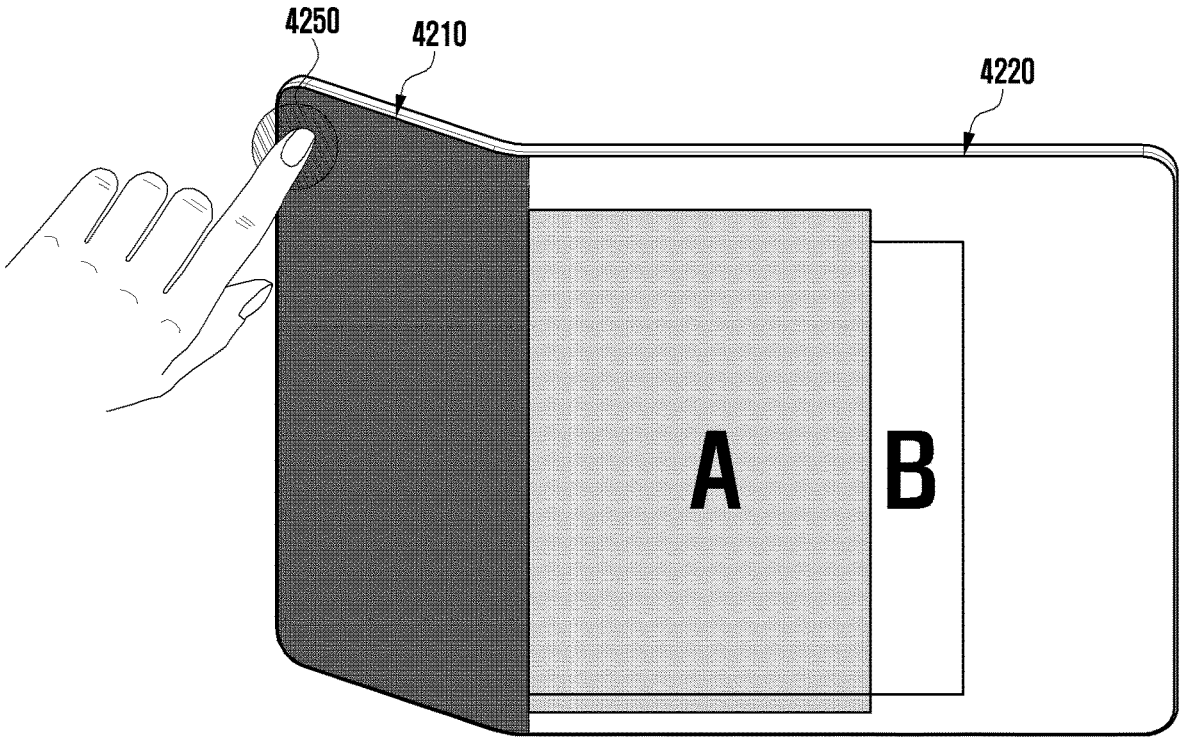


FIG. 42



METHOD AND DEVICE FOR PROVIDING USER INTERFACE IN ELECTRONIC DEVICE HAVING FOLDABLE DISPLAY

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application is based on and claims priority under 35 U.S.C. § 119 to Korean Patent Application No. 10-2019-0148394, which was filed in the Korean Intellectual Property Office on Nov. 19, 2019, the entire disclosure of which is incorporated herein by reference.

BACKGROUND

1. Field

[0002] The disclosure relates generally to an electronic device having a foldable display (or a flexible display) and a method of operating the same.

2. Description of Related Art

[0003] Various types of electronic devices, such as mobile communication terminals, smart phones, tablet personal computers (PCs), notebook computers, or wearable devices, are widely used.

[0004] An electronic device may have a limited size for portability, and thus the size of a display is also limited. In recent years, various types of electronic devices have been developed with an expanded screen using a multi-display. For example, a plurality of displays are provided to provide an expanded screen by a multi-display. As another example, electronic devices are designed such that the sizes of screens gradually increase in the displays, and such that various services are provided to users through larger screens.

[0005] An electronic device may have a new form factor, such as a multi-display (e.g., a dual-display) device (e.g., a foldable device). The foldable device may be equipped with a foldable (or flexible) display so that the foldable device can be used while folded or unfolded.

[0006] According to the implementation of a multi-display, there is a need to develop a user interface (UI) corresponding to the multi-display and the operation thereof.

SUMMARY

[0007] The disclosure has been made to address the above-mentioned problems and disadvantages, and to provide at least the advantages described below.

[0008] An aspect of the disclosure is to provide a method and device capable of freely adjusting a software window size and providing optimal screen division based on a physical characteristic that makes an electronic device foldable.

[0009] Another aspect of the disclosure is to provide a method and device capable of providing a UI in response to a change in the shape of a display.

[0010] Another aspect of the disclosure is to provide a method and device for operating a display in an electronic device (e.g., a foldable device) having at least two display surfaces.

[0011] Another aspect of the disclosure is to provide a method and device for adaptively operating a display to correspond to a folded state or an unfolded state in an electronic device including a first display surface and a second display surface.

[0012] Another aspect of the disclosure is to provide a method and device capable of dividing, in an electronic device including a foldable display, the display region of the foldable display based on an operation event (or trigger), in which the electronic device is unfolded or folded in a designated range, and capable of rearranging (relocating) UIs according to the divided regions.

[0013] Another aspect of the disclosure is to provide a method and device capable of automatically adjusting and providing, in an electronic device including a foldable display, the position and/or the size of an object (e.g., a window, a pop-up window, an icon, or a widget) depending on the position where the foldable display is folded.

[0014] In accordance with an aspect of the disclosure, an electronic device is provided, which includes a display, a processor operatively connected to the display, and memory operatively connected to the processor. The memory may store instructions that cause, when executed, the processor to: display one or more objects through the display; detect an operation event in which the display is switched from a first state to a second state; monitor a state change of the display based on the operation event; detect a state in which the display is folded to a designated angle; divide the display into a first display surface and a second display surface based on the state of being folded to the designated angle; and rearrange and display the one or more objects based on at least the first display surface or the second display surface.

[0015] In accordance with another aspect of the disclosure, an electronic device is provided, which includes a foldable display, a processor operatively connected to the foldable display, and memory operatively connected to the processor. The memory may be configured to store instructions that cause, when executed, the processor to: detect an operation event in which a state of the foldable display is changed; monitor a state change of the foldable display based on the operation event; display at least one object including an object included in a target region for a first state in a range greater than or equal to a designated range, and rearrange and display a remaining object in a main region when there is a first state change; and restore at least one object including an object included in a target region for a second state based on state information, and rearrange and display the at least one object through the target region and the main region when there is a second state change.

[0016] In accordance with another aspect of the disclosure, a method is provided for operating an electronic device. The method includes displaying one or more objects through a display; detecting an operation event in which the display is switched from a first state to a second state; monitoring a state change of the display based on the operation event; detecting a state in which the display is folded to a designated angle; dividing the display into a first display surface and a second display surface based on the state of being folded to the designated angle; and rearranging and displaying the one or more objects based on at least the first display surface or the second display surface.

BRIEF DESCRIPTION THE DRAWINGS

[0017] The above and other aspects, features, and advantages of certain embodiments of the disclosure will be more apparent from the following description taken in conjunction with the accompanying drawings, in which:

[0018] FIG. **1** illustrates an electronic device in a network environment according to an embodiment;

[0019] FIG. **2** illustrates a display device according to an embodiment;
[0020] FIG. **3** illustrates an electronic device according to an embodiment;
[0021] FIG. **4** illustrates an electronic device according to an embodiment;
[0022] FIG. **5** illustrates an electronic device according to an embodiment;
[0023] FIG. **6** illustrates an electronic device according to an embodiment;
[0024] FIG. **7** illustrates an electronic device according to an embodiment;
[0025] FIG. **8** illustrates an operation of a display based on a state of a display in an electronic device according to an embodiment;
[0026] FIG. **9** is a flowchart illustrating a method of operating a display in an electronic device according to an embodiment;
[0027] FIG. **10** illustrates an operation of a display in an electronic device according to an embodiment;
[0028] FIG. **11** illustrates an operation of a display in an electronic device according to an embodiment;
[0029] FIG. **12** illustrates an operation of a display in an electronic device according to an embodiment;
[0030] FIG. **13** is a flowchart illustrating a method of operating an electronic device according to an embodiment;
[0031] FIG. **14** illustrates screen division in an electronic device according to an embodiment;
[0032] FIG. **15** is a flowchart illustrating a method of operating an electronic device according to an embodiment;
[0033] FIG. **16** illustrates screen division in an electronic device according to an embodiment;
[0034] FIG. **17** illustrates screen division in an electronic device according to an embodiment;
[0035] FIG. **18** is a flowchart illustrating a method of operating an electronic device according to an embodiment;
[0036] FIG. **19** is a flowchart illustrating method of operating an electronic device according to an embodiment;
[0037] FIG. **20** illustrates a visual guide in an electronic device according to an embodiment;
[0038] FIG. **21** illustrates a visual guide in an electronic device according to an embodiment;
[0039] FIG. **22** illustrates a visual guide in an electronic device according to an embodiment;
[0040] FIG. **23** illustrates a visual guide in an electronic device according to an embodiment;
[0041] FIG. **24** illustrates a visual guide in an electronic device according to an embodiment;
[0042] FIG. **25** illustrates a visual guide in an electronic device according to an embodiment;
[0043] FIG. **26** illustrates a visual guide in an electronic device according to an embodiment;
[0044] FIG. **27** illustrates a visual guide in an electronic device according to an embodiment;
[0045] FIG. **28** illustrates canceling screen division in an electronic device according to an embodiment;
[0046] FIG. **29** is a flowchart illustrating a method of operating an electronic device according to an embodiment;
[0047] FIG. **30** illustrates an operation of a display in an electronic device according to an embodiment;
[0048] FIG. **31** illustrates an operation of a display in an electronic device according to an embodiment;
[0049] FIG. **32** illustrates an operation of a display in an electronic device according to an embodiment;
[0050] FIG. **33** is a flowchart illustrating a method of operating an electronic device according to an embodiment;
[0051] FIG. **34** illustrates a visual guide in an electronic device according to an embodiment;
[0052] FIG. **35** illustrates a visual guide in an electronic device according to an embodiment;
[0053] FIG. **36** illustrates a visual guide in an electronic device according to an embodiment;
[0054] FIG. **37** illustrates a visual guide in an electronic device according to an embodiment;
[0055] FIG. **38** illustrates a visual guide in an electronic device according to an embodiment;
[0056] FIG. **39** illustrates a visual guide in an electronic device according to an embodiment;
[0057] FIG. **40** illustrates a visual guide in an electronic device according to an embodiment;
[0058] FIG. **41** illustrates a visual guide in an electronic device according to an embodiment; and
[0059] FIG. **42** illustrates canceling screen division in an electronic device according to an embodiment.

DETAILED DESCRIPTION

[0060] Various embodiments of the disclosure will now be described in detail with reference to the accompanying drawings. In the following description, specific details such as detailed configuration and components are merely provided to assist the overall understanding of these embodiments of the disclosure. Therefore, it should be apparent to those skilled in the art that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the disclosure. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

[0061] An electronic device according to an embodiment and a method of operating the same automatically adjust and provide a UI including at least one object to correspond to a change in a display shape (e.g., a change between a folded shape and an unfolded shape). When a display is unfolded, it is possible to provide a UI through the entire display surface (or region) of the display, and when the display is folded, it is possible to provide UIs divided according to at least two divided display surfaces.

[0062] According to an embodiment, in an electronic device including a first display surface and a second display surface, it is possible to adaptively operate the display to correspond to a folded state or an unfolded state.

[0063] According to an embodiment, it is possible to divide a screen and to automatically provide UIs corresponding to the screen division by changing the shape of the display (e.g., a physical gesture of folding the electronic device) without a cumbersome process of setting the electronic device through a separate setting process in order for the user to use the electronic device through screen division.

[0064] According to an embodiment, in an electronic device including a foldable display, it is possible to provide a method and device capable of dividing a display region of a foldable display based on an operation event (or trigger) in which the electronic device is unfolded or folded in a designated range and capable of rearranging (relocating) UIs according to the divided regions. It is also possible to automatically adjust the position and/or the size of an object (e.g., a window, a pop-up window, an icon, or a widget) and provide the same according to the position where the fold-

able display is folded. Accordingly, it is possible to improve usability; convenience, and competitiveness of the electronic device.

[0065] FIG. **1** illustrates an electronic device **101** in a network environment **100** according to an embodiment.

[0066] Referring to FIG. **1**, the electronic device **101** in the network environment **100** may communicate with an electronic device **102** via a first network **198** (e.g., a short-range wireless communication network), with an electronic device **104** or a server **108** via a second network **199** (e.g., a long-range wireless communication network), or with the electronic device **104** via the server **108**, and may include a processor **120**, a memory **130**, an input device **150**, a sound output device **155**, a display device **160**, an audio module **170**, a sensor module **176**, an interface **177**, a haptic module **179**, a camera module **180**, a power management module **188**, a battery **189**, a communication module **190**, a subscriber identification module (SIM) card **196**, and an antenna module **197**. At least one the display device **160** or the camera module **180**) of the components may be omitted from the electronic device **101**, or one or more other components may be added in the electronic device **101**. Some of the components may be implemented as single integrated circuitry. For example, the sensor module **176** (e.g., a fingerprint sensor, an iris sensor, or an illuminance sensor) may be implemented as embedded in the display device **160** (e.g., a display).

[0067] The processor **120** may execute, for example, software (e.g., a program **140**) to control at least one other component (e.g., a hardware or software component) of the electronic device **101** coupled with the processor **120**, and may perform various data processing or computation. The processor **120** may load a command or data received from another component (e.g., the sensor module **176** or the communication module **190**) in the volatile memory **132**, process the command or the data stored in the volatile memory **132**, and store resulting data in non-volatile memory **134**. The processor **120** may include a main processor **121** a central processing unit (CPU) or an application processor (AP)), and an auxiliary processor **123** (e.g., a graphics processing unit (GPU), an image signal processor (ISP), a sensor hub processor, or a communication processor (CP)) that is operable independently from, or in conjunction with, the main processor **121**. Additionally or alternatively, the auxiliary processor **123** may be adapted to consume less power than the main processor **121**, or to be specific to a function. The auxiliary processor **123** may be implemented as separate from, or as part of the main processor **121**.

[0068] The auxiliary processor **123** may control at least some of functions or states related to at least one component (e.g., the display device **160**, the sensor module **176**, or the communication module **190**) among the components of the electronic device **101**, instead of the main processor **121** while the main processor **121** is in an inactive (e.g., sleep) state, or together with the main processor **121** while the main processor **121** is in an active state (e.g., executing an application). The auxiliary processor **123** (e.g., an ISP or a CP) may be implemented as part of another component (e.g., the camera module **180** or the communication module **190**) functionally related to the auxiliary processor **123**.

[0069] The memory **130** may store various data used by at least one component (e.g., the processor **120** or the sensor module **176**) of the electronic device **101** and may include software (e.g., the program **140**) and input data or output data for a command related thereto. The memory **130** may include the volatile memory **132** or the non-volatile memory **134**.

[0070] The program **140** may be stored in the memory **130** as software, and may include an operating system (OS) **142**, middleware **144**, or an application **146**.

[0071] The input device **150** may receive a command or data to be used by another component (e.g., the processor **120**) of the electronic device **101**, from the outside (e.g., a user) of the electronic device **101**, and may include a microphone, a mouse, a keyboard, or a digital pen (e.g., a stylus pen).

[0072] The sound output device **155** may output sound signals to the outside of the electronic device **101** and may include a speaker or a receiver. The speaker may be used for general purposes, such as playing multimedia or playing record, and the receiver may be used for incoming calls and may be implemented as separate from, or as part of the speaker.

[0073] The display device **160** may visually provide information to the outside (e.g., a user) of the electronic device **101** and may include a display, a hologram device, or a projector and control circuitry to control a corresponding one of the display, hologram device, and projector. The display device **160** may include touch circuitry adapted to detect a touch, or sensor circuitry (e.g., a pressure sensor) adapted to measure the intensity of force incurred by the touch.

[0074] The audio module **170** may convert a sound into an electrical signal and vice versa, and may obtain the sound via the input device **150**, or output the sound via the sound output device **155** or a headphone of an external electronic device (e.g., an electronic device **102**) directly (e.g., over wires) or wirelessly coupled with the electronic device **101**.

[0075] The sensor module **176** may detect an operational state (e.g., power or temperature) of the electronic device **101** or an environmental state a state of a user) external to the electronic device **101**, and generate an electrical signal or data value corresponding to the detected state, and may include a gesture sensor, a gyro sensor, an atmospheric pressure sensor, a magnetic sensor, an acceleration sensor, a grip sensor, a proximity sensor, a color sensor, an infrared (IR) sensor, a biometric sensor, a temperature sensor, a humidity sensor, or an illuminance sensor.

[0076] The interface **177** may support one or more specified protocols to be used for the electronic device **101** to be coupled with the external electronic device (e.g., the electronic device **102**) directly (e.g., over wires) or wirelessly, and may include a high definition multimedia interface (HDMI), a universal serial bus (USB) interface, a secure digital (SD) card interface, or an audio interface.

[0077] A connecting terminal **178** may include a connector via which the electronic device **101** may be physically connected with the external electronic device (e.g., the electronic device **102**), and may include an HDMI connector, a USB connector, an SD card connector, or an audio connector (e.g., a headphone connector).

[0078] The haptic module **179** may convert an electrical signal into a mechanical stimulus (e.g., a vibration or a movement) or electrical stimulus which may be recognized by a user via his tactile sensation or kinesthetic sensation, and may include a motor, a piezoelectric element, or an electric stimulator.

[0079] The camera module **180** may capture a still image or moving images and may include one or more lenses, image sensors, ISPs, or flashes.

[0080] The power management module **188** may manage power supplied to the electronic device **101**, and may be implemented as at least part of a power management integrated circuit (PMIC).

[0081] The battery **189** may supply power to at least one component of the electronic device **101**, and may include a primary cell which is not rechargeable, a secondary cell which is rechargeable, or a fuel cell.

[0082] The communication module **190** may support establishing a direct (e.g., wired) communication channel or a wireless communication channel between the electronic device **101** and the external electronic device (e.g., the electronic device **102**, the electronic device **104**, or the server **108**) and performing communication via the established communication channel. The communication module **190** may include one or more CPs that are operable independently from the processor **120** (e.g., the AP) and supports a direct (e.g., wired) communication or a wireless communication. The communication module **190** may include a wireless communication module **192** (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module **194** (e.g., a local area network (LAN) communication module or a power line communication (PLC) module). A corresponding one of these communication modules may communicate with the external electronic device via the first network **198** (e.g., a short-range communication network, such as Bluetooth™, wireless-fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or the second network **199** (e.g., a long-range communication network, such as a cellular network, the Internet, or a computer network (e.g., a LAN or a wide area network (WAN)). These various types of communication modules may be implemented as a single component (e.g., a single chip), or may be implemented as multi components (e.g., multi chips) separate from each other.

[0083] The wireless communication module **192** may identify and authenticate the electronic device **101** in a communication network, such as the first network **198** or the second network **199**, using subscriber information (e.g., international mobile subscriber identity (IMSI)) stored in the SIM **196**.

[0084] The antenna module **197** may transmit or receive a signal or power to or from the outside (e.g., the external electronic device) of the electronic device **101** and may include an antenna including a radiating element composed of a conductive material or a conductive pattern formed in or on a substrate (e.g., a printed circuit board (PCB)). The antenna module **197** may include a plurality of antennas. In such a case, at least one antenna appropriate for a communication scheme used in the communication network, such as the first network **198** or the second network **199**, may be selected by the communication module **190** (e.g., the wireless communication module **192**) from the plurality of antennas. The signal or the power may then be transmitted or received between the communication module **190** and the external electronic device via the selected at least one antenna. Another component (e.g., a radio frequency integrated circuit (RFIC)) other than the radiating element may be additionally formed as part of the antenna module **197**.

[0085] At least some of the above-described components may be coupled mutually and communicate signals (e.g., commands or data) therebetween via an inter-peripheral communication scheme (e.g., a bus, general purpose input and output (GPIO), serial peripheral interface (SPI), or mobile industry processor interface (MIPI)).

[0086] Commands or data may be transmitted or received between the electronic device **101** and the external electronic device **104** via the server **108** coupled with the second network **199**. Each of the electronic devices **102** and **104** may be a device of a same type as, or a different type, from the electronic device **101**.

[0087] All or some of operations to be executed at the electronic device **101** may be executed at one or more of the external electronic devices **102**, **104**, or **108**. For example, if the electronic device **101** should perform a function or a service automatically, or in response to a request from a user or another device, the electronic device **101**, instead of, or in addition to, executing the function or the service, may request the one or more external electronic devices to perform at least part of the function or the service. The one or more external electronic devices receiving the request may perform the at least part of the function or the service requested, or an additional function or an additional service related. to the request, and transfer an outcome of the performing to the electronic device **101**. The electronic device **101** may provide the outcome, with or without further processing, as at least part of a reply to the request. To that end, a cloud, distributed, or client-server computing technology may be used, for example.

[0088] FIG. **2** is a block diagram **200** illustrating the display device **160** according to an embodiment.

[0089] Referring to FIG. **2**, the display device **160** may include a display **210** and a display driver integrated circuit (DDI) **230** to control the display **210**. The DDI **230** may include an interface module **231**, memory **233** (e.g., buffer memory), an image processing module **235**, or a mapping module **237**.

[0090] The DDI **230** may receive image information that contains image data or an image control signal corresponding to a command to control the image data from another component of the electronic device **101** via the interface module **231**. For example, according to an embodiment, the image information may be received from the processor **120** (e.g., the main processor **121** (e.g., an AP)) or the auxiliary processor **123** (e.g., a GPU) operated independently from the function of the main processor **121**. The DDI **230** may communicate, for example, with touch circuitry **350** or the sensor module **176** via the interface module **23 1**. The DDI **230** may also store at least part of the received image information in the memory **233**, for example, on a frame by frame basis.

[0091] The image processing module **235** may perform pre-processing or post-processing (e.g., adjustment of resolution, brightness, or size) with respect to at least part of the image data. According to an embodiment, the pre-processing or post-processing may be performed, for example, based at least in part on one or more characteristics of the image data or one or more characteristics of the display **210**.

[0092] The mapping module **237** may generate a voltage value or a current value corresponding to the image data pre-processed or post-processed by the image processing module **235**. According to an embodiment, the generating of the voltage value or current value may be performed, for

example, based at least in part on one or more attributes of the pixels (e.g., an array, such as a red, green, blue (RGB) stripe or a pentile structure, of the pixels, or the size of each subpixel). At least some pixels of the display **210** may be driven, for example, based at least in part on the voltage value or the current value such that visual information (e.g., a text, an image, or an icon) corresponding to the image data may be displayed via the display **210**.

[0093] According to an embodiment, the display device **160** may further include the touch circuitry **250**. The touch circuitry **250** may include a touch sensor **251** and a touch sensor integrated circuit (IC) **253** to control the touch sensor **251**. The touch sensor IC **253** may control the touch sensor **251** to sense a touch input or a hovering input with respect to a certain position on the display **210**. To achieve this, for example, the touch sensor **251** may detect (e.g., measure) a change in a signal (e.g., a voltage, a quantity of light, a resistance, or a quantity of one or more electric charges) corresponding to the certain position on the display **210**. The touch circuitry **250** may provide input information (e.g., a position, an area, a pressure, or a time) indicative of the touch input or the hovering input detected via the touch sensor **251** to the processor **120**. According to an embodiment, at least part (e.g., the touch sensor IC **253**) of the touch circuitry **250** may be formed as part of the display **210** or the DDI **230**, or as part of another component (e.g., the auxiliary processor **123**) disposed outside the display device **160**.

[0094] According to an embodiment, the display device **160** may further include at least one sensor (e.g., a fingerprint sensor, an iris sensor, a pressure sensor, or an illuminance sensor) of the sensor module **176** or a control circuit for the at least one sensor. In such a case, the at least one sensor or the control circuit for the at least one sensor may be embedded in one portion of a component (e.g., the display **210**, the DDI **230**, or the touch circuitry **250**)) of the display device **160**. For example, when the sensor module **176** embedded in the display device **160** includes a biometric sensor (e.g., a fingerprint sensor), the biometric sensor may obtain biometric information (e.g., a fingerprint image) corresponding to a touch input received via a portion of the display **210**. As another example, when the sensor module **176** embedded in the display device **160** includes a pressure sensor, the pressure sensor may obtain pressure information corresponding to a touch input received via a partial or whole area of the display **210**. According to an embodiment, the touch sensor **251** or the sensor module **176** may be disposed between pixels in a pixel layer of the display **210**, or over or under the pixel layer.

[0095] The electronic device **101** according to embodiments may be one of various types of electronic devices, such as a portable communication device (e.g., a smartphone), a computer device, a portable multimedia device, a portable medical device, a camera, a wearable device, or a home appliance. However, the electronic devices are not limited to those described above.

[0096] It should be appreciated that various embodiments of the disclosure and the terms used therein are not intended to limit the technological features set forth herein to particular embodiments and include various changes, equivalents, or replacements for a corresponding embodiment. With regard to the description of the drawings, similar reference numerals may be used to refer to similar or related elements. It is to be understood that a singular form of a noun corresponding to an item may include one or more of the things, unless the relevant context clearly indicates otherwise.

[0097] As used herein, each of such phrases as "A or B," "at least one of A and B," "at least one of A or B," "A, B, or C," "at least one of A, B, and C," and "at least one of A, B, or C," may include any one of, or all possible combinations of the items enumerated together in a corresponding one of the phrases. As used herein, such terms as "1st" and "2nd," or "first" and "second" may be used to simply distinguish a corresponding component from another, and does not limit the components in other aspect (e.g., importance or order). It is to be understood that if an element (e.g., a first element) is referred to, with or without the term. "operatively" or "communicatively", as "coupled with," "coupled to," "connected with," or "connected to" another element (e.g., a second element), it means that the element may be coupled with the other element directly (e.g., over wires), wirelessly, or via a third element.

[0098] As used herein, the term "module" may include a unit implemented in hardware, software, or firmware, and may interchangeably be used with other terms, for example, "logic," "logic block," "part," or "circuitry". A module may be a single integral component, or a minimum unit or part thereof, adapted to perform one or more functions. For example, according to an embodiment, the module may be implemented in a form of an application-specific integrated circuit (ASIC).

[0099] Various embodiments as set forth herein may be implemented as software (e.g., the program **140**) including one or more instructions that are stored in a storage medium (e.g., internal memory **136** or external memory **138**) that is readable by a machine (e.g., the electronic device **101**). For example, a processor (e.g., the processor **120**) of the machine (e.g., the electronic device **101**) may invoke at least one of the one or more instructions stored in the storage medium, and execute it, with or without using one or more other components under the control of the processor. This allows the machine to be operated to perform at least one function according to the at least one instruction invoked. The one or more instructions may include a code generated by a complier or a code executable by an interpreter. The machine-readable storage medium may be provided in the form of a non-transitory storage medium. Wherein, the term "non-transitory" simply means that the storage medium is a tangible device, and does not include a signal (e.g., an electromagnetic wave), but this term does not differentiate between where data is semi-permanently stored in the storage medium and where the data is temporarily stored in the storage medium.

[0100] A method according to various embodiments of the disclosure may be included and provided in a computer program product. The computer program product may be traded as a product between a seller and a buyer. The computer program product may be distributed in the form of a machine-readable storage medium (e.g., compact disc read only memory (CD-ROM)), or be distributed (e.g., downloaded or uploaded) online via an application store (e.g., PlayStore™), or between two user devices (e.g., smart phones) directly. If distributed online, at least part of the computer program product may be temporarily generated or at least temporarily stored in the machine-readable storage medium, such as memory of the manufacturer's server, a server of the application store, or a relay server.

[0101] According to various embodiments, each component (e.g., a module or a program) of the above-described components may include a single entity or multiple entities. According to various embodiments, one or more of the above-described components may be omitted, or one or more other components may be added. Alternatively or additionally, a plurality of components (e.g., modules or programs) may be integrated into a single component. In such a case, according to various embodiments, the integrated component may still perform one or more functions of each of the plurality of components in the same or similar manner as they are performed by a corresponding one of the plurality of components before the integration. According to various embodiments, operations performed by the module, the program, or another component may be carried out sequentially, in parallel, repeatedly, or heuristically, or one or more of the operations may be executed in a different order or omitted, or one or more other operations may be added.

[0102] FIG. **3** illustrates an electronic device according to an embodiment, FIG. **4** illustrates an electronic device according to an embodiment, FIG. **5** illustrates an electronic device according to an embodiment, and FIG. **6** illustrates an electronic device according to an embodiment. More specifically, FIGS. **3**, **4**, **5**, and **6** illustrate examples in which the shape of a foldable (or flexible) display is changed according to the type of the display. The display may be folded and unfolded in various ways according to the implemented shape of the electronic device **101**.

[0103] Referring to FIGS. **3** and **4**, the electronic devices **101** have one folding axis. In FIGS. **3** and **4**, the electronic devices **101** include two display surfaces (e.g., a first display surface and a second display surface).

[0104] Referring to FIGS. **5** and **6**, the electronic devices **101** have two folding axes. In FIGS. **5** and **6**, the electronic device **101** includes three display surfaces (e.g., a first display surface, a second display surface, and a third display surface).

[0105] The number of folding axes in the electronic devices **101** is not limited to the examples illustrated in FIGS. **3-6**.

[0106] The electronic device **101** may be a foldable device which can be folded and unfolded. The electronic device **101** may be equipped with a foldable (or flexible) device, and can be used in the folded state or the unfolded state. For example, when an in-folding-type electronic device **101** is folded (e.g., as illustrated in FIG. **3** or FIG. **5**), the electronic device **101** may be in the state in which a first display surface (or a first region) and a second display surface (or a second region) of a display are at least partially in contact with each other so as to be closed about a folded point (e.g., a folding axis or a hinge axis). As another example, when an out-folding-type electronic device **101** is folded (e.g., as illustrated in FIG. **4**), the electronic device **101** may be in the state in which a first portion and a second portion of a housing (or a cover) are at least partially in contact with each other so as to be closed about a folded point (e.g., a folding axis or a hinge axis). As another example, when an in/out-folding-type electronic device **101** is folded (e.g., as illustrated in FIG. **6**), the electronic device **101** may be in a state in which a first portion and a second portion of a housing are at least partially in contact with each other so as to be closed about a first folded point (e.g., a first folding axis), and a first display surface (or a first region) and a second display surface (or a second region) of a display are at least partially in contact with each other so as to be closed about a second folded point (e.g., a second folding axis). As another example, when the electronic device **101** is unfolded (e.g., in the unfolded state), all display surfaces (or regions) of the display are provided as one surface (or the entire surface) so that the display can be used in a relatively large size. Each of FIG. **3**, **4**, **5**, and **6** illustrate a state in which the electronic device **101** is unfolded at a predetermined angle.

[0107] The electronic device **101** illustrated in FIG. **3**, **4**, **5**, or **6** may include a processor and one DDI operatively or electrically connected to the display. For example, the first display surface and the second display surface may be connected to one DDI. The disclosure, however, is not limited thereto, and the electronic device **101** may include a first DDI operatively or electrically connected to the first display surface and a second DDI operatively or electrically connected to the second display surface. The first display surface and the second display surface may be operatively or electrically connected to each other, and may be formed by one display (e.g., a foldable display or a flexible display).

[0108] In the electronic device **101**, the display may be folded or unfolded in various ways (e.g., in-folding, out-folding, or in/out-folding) depending on the implemented form of the electronic device **101**.

[0109] Referring to FIG. **3**, the electronic device **101** includes a housing **350** that fixes the display including a first display surface **310** (or a first region) and a second display surface **320** (or a second region). The housing **350** may include a foldable structure (e.g., a hinge structure), and may be configured such that the first portion **301** and the second portion **303** are oriented in opposite directions in the folded state and are oriented in the same direction in the unfolded state.

[0110] The electronic device **101** includes a vertical folding axis **390** passing through the center of the electronic device **101** (e.g., the center of the display or the portion between the first display surface **310** and the second display surface **320**). The electronic device **101** may be folded, unfolded, or bent about the folding axis **390**. FIG. **3** illustrates the form in which the first display surface **310** and/or the second display surface **320** of the electronic device **101** are folded inwards such that the display is not exposed to the outside.

[0111] In the electronic device **101** illustrated in FIG. **3**, when the electronic device **101** is fully folded (e.g., the folded state), any two portions included in the display (e.g., the first display surface **310** and the second display surface **320**) in the electronic device **101** face each other such that the two portions are completely or substantially parallel to each other. For example, when the electronic device **101** is fully folded, the two portions of the electronic device **101** are not necessarily in contact with each other, but are disposed in close proximity. In the electronic device **101** illustrated in FIG. **3**, when the electronic device **101** is fully unfolded (e.g., in the unfolded state), the first display surface **310** and the second display surface **320** of the electronic device **101** are exposed and may form a flat surface like a single display, and that the area of the display exposed to the outside is the largest or approaches the largest possible area.

[0112] Referring to FIG. **4**, the electronic device **101** includes a housing **450** that fixes the display including a first display surface **410** (or a first region) and a second display surface **420** (or a second region). The housing **450** may

include a foldable structure (e.g., a hinge structure), and may be configured such that a first portion **401** and a second portion **403** are oriented in opposite directions in the folded state and are oriented in the same direction in the unfolded state.

[0113] The electronic device **101** includes a vertical folding axis **490** passing through the center of the electronic device **101**. The electronic device **101** may be folded, unfolded, or bent about the folding axis **490**. FIG. **4** illustrates the form in which the first display surface **410** and the second display surface **420** of the electronic device **101** is folded outwards such that the display is exposed to the outside.

[0114] In the electronic device **101** illustrated in FIG. **4**, when the electronic device **101** is fully folded, two portions (e.g., the housing) included in one surface (e.g., the rear surface) of the electronic device **101** on which the display is not implemented face each other such that the two portions are completely or substantially parallel to each other. For example, when the electronic device **101** is fully folded, the two portions included in the one surface of the electronic device **101** are not necessarily in contact with each other, but are disposed in close proximity. In the electronic device **101** illustrated in FIG. **4**, when the electronic device **101** is fully unfolded, the first display surface **410** and the second display surface **420** of the display **210** of the electronic device **101** are exposed to the outside in the state of forming a flat surface like a single display, and that the area of the display exposed to the outside is the largest or approaches the largest possible area.

[0115] In FIGS. **3** and **4**, the folding axes **390** are **490** is illustrated at the centers of the electronic devices **101**, but are not limited thereto. For example, the folding axis **390** or **490** may be present at an arbitrary position in the electronic device **101**. For example, the electronic device **101** may be asymmetrically folded or bent with respect to the folding axis **390** or **490**, and in the state in which the electronic device **101** is folded, the facing sizes of two display surfaces (or two regions) divided by the folding axis **390** or **490** (or the sizes of respective display surfaces divided after being folded) may be different from each other. In addition, depending on the degree of folding of the electronic device **101**, the electronic device **101** may take the fully folded form, or may take an intermediate form between the fully folded form and the fully unfolded form.

[0116] The electronic device **101** may detect the folded state or the degree of folding of the electronic device **101**. The electronic device **101** may detect the folded state or the degree of folding, and may activate or deactivate a portion of the display surface (or a partial region) of the display adopted in the electronic device **101**. In FIG. **3**, when the electronic device **101** detects the folded state of the electronic device **101**, all of the display surfaces (i.e., the first display surface **310** and the second display surface **320**) may be deactivated. In FIG. **4**, when the electronic device **101** detects the folded state thereof, the electronic device **101** may determine which of the first display surface **410** or the second display surface **420** is being used, and, based on the result of the determination, may activate the surface that is being used in the display and may deactivate the other surface that is not being used in the display.

[0117] Referring to FIG. **5**, the electronic device **101** includes a housing **550** that fixes the display including a first display surface **510** (or a first region), a second display surface **520** (or a second region), and a third display surface **530** (or a third region). The housing **550** may include a foldable structure (e.g., a hinge structure), and may be configured such that in the folded state, the first portion **501** and the third portion **505** are oriented in a direction opposite a direction in which the second portion **503** is oriented and the first portion **501** and the third portion **503** are oriented in the same direction, and in the unfolded state, the first portion **501**, the second portion **503**, and the third portion **503** are oriented in the same direction.

[0118] In FIG. **5**, the electronic device **101** includes two folding axes **590** and **595**. The two folding axes **590** and **595** may be adopted in a vertical direction so as to divide the electronic device **101** into three equal portions. The electronic device **101** may be folded, unfolded, or bent about the folding axes **595** and **595**. For example, FIG. **5** illustrates an electronic device **101** of a G-fold type, in which the electronic device **101** viewed from the front side in the unfolded state and the electronic device **101** viewed from the rear side in the folded state are illustrated in the drawing.

[0119] The electronic device **101** illustrated in FIG. **5** may have different folding or bending directions with respect to the folding axes **590** and **595**. However, this is an example, and the electronic device **101** may be folded or bent in the same direction about each of the folding axes **590** and **595**. The electronic device **101** may be folded such that the first display surface **510** and the second display surface **520** of the display face each other and such that the second display surface **520** and the third display surface **530** face each other. Various embodiments are not limited thereto.

[0120] When the electronic device **101** illustrated in FIG. **5** is folded in an out-folding type, the electronic device **101** may be folded such that the first display surface **510**, the second display surface **520**, and the third display surface **520** are exposed to the outside, the rear surface of the first display surface **510** and the rear surface of the second display surface **520** face each other, and the rear surface of the second display surface **520** and the rear surface of the third display surface **530** face each other.

[0121] Depending on the positions at which the two folding axes **590** and **595** are adopted on the electronic device **101**, the electronic device **101** may be asymmetrically folded or bent with respect to each of the folding axes **590** and **595**. Even when the electronic device **101** is fully folded with respect to the folding axes **590** and **595**, respective display surfaces (or respective regions) of the electronic device **101**, which are divided by the folding axes **590** and **595**, may not fully overlap each other. Even when the electronic device **101** as illustrated in FIG. **5** includes the folding axes **590** and **595**, the display may be adopted on the front surface and/or the rear surface of the electronic device **101**. The display used in the electronic device **101** may be activated or deactivated in a similar manner to that described above with reference to FIGS. **3** and **4**.

[0122] Referring to FIG. **6**, the electronic device **101** includes a housing **650** that fixes the display **210** including a first display surface **610** (or a first region), a second display surface **620** (or a second region), and a third display surface **630** (or a third region). The housing **650** may include a foldable structure (e.g., a hinge structure), and may be configured such that, in the folded state, the first portion **601** and the third portion **605** are oriented in a direction opposite the direction in which the second portion **603** is oriented and the first portion **601** and the third portion **603** are oriented in

the same direction, and in the unfolded state, the first portion **601**, the second portion **603**, and the third portion **605** are all oriented in the same direction.

[0123] In FIG. **6**, the electronic device **101** includes two folding axes **690** and **695**. The two folding axes **690** and **695** may be adopted in a vertical direction so as to divide the electronic device **101** into three equal portions. The electronic device **101** may be folded, unfolded, or bent about the folding axes **690** and **695**. For example, FIG. **6** illustrates an electronic device **101** of an S-fold type, in which the electronic device **101** viewed from the front side in the unfolded state and the electronic device **101** viewed from the rear side in the folded state are illustrated in the drawing.

[0124] The electronic device **101** illustrated in FIG. **6** may have different folding or bending directions with respect to the folding axes **690** and **695**. For example, the electronic device **101** may be folded or bent in the same direction about each of the folding axes **690** and **695**. The electronic device **101** may be folded such that the first display surface **610** of the display is exposed to the outside, the rear surface of the first display surface **610** and the rear surface of the second display surface **620** face each other, and the second display surface **620** and the third display surface **630** of the display face each other.

[0125] Depending on the positions at which the two folding axes **690** and **695** are adopted on the electronic device **101**, the electronic device **101** may be asymmetrically folded or bent with respect to each of the folding axes **690** and **695**. Even when the electronic device **101** is fully folded with respect to the folding axes **690** and **695**, respective display surfaces (or respective regions) of the electronic device **101**, which are divided by the folding axes **690** and **695** may not fully overlap each other. Even when the electronic device **101** in FIG. **6** includes the folding axes **690** and **695**, the display may be adopted on the front surface and/or the rear surface of the electronic device **101**. The display used in the electronic device **101** may be activated or deactivated in a manner similar to that described above with reference to FIGS. **3** and **4**.

[0126] The electronic device **101** may detect a shape change (e.g., folding or unfolding) of the display based on various methods.

[0127] The electronic device **101** may include a state detection sensor based on at least one sensor. The state detection sensor may include at least one of a proximity sensor, an illuminance sensor, a magnetic sensor, a hall sensor, a gesture sensor, a bending sensor, an infrared sensor, a touch sensor, a pressure sensor, or an infrared camera. The state detection sensor may be located on any one portion of the electronic device **101** (e.g., a folding axis, a housing end, the lower end of the display (e.g., under the panel or on the bezel of the display)) so as to measure the unfolding or folding) angle of the electronic device **101**. The unfolding angle may mean the angle between two display surfaces divided by each folding axis of the electronic device **101**. The electronic device **101** may determine whether the electronic device **101** is fully folded, fully unfolded, or unfolded (or folded) by a predetermined angle based on the unfolding angle measured by the state detection sensor. For example, when the unfolding angle measured by the state detection sensor is about 180 degrees or an angle close thereto, the electronic device **101** may determine that the display thereof is fully unfolded (e.g., in the unfolded state). For example, when the unfolding angle measured by the state detection sensor is about 0 degrees or an angle close thereto, the electronic device **101** may determine that the display thereof is fully folded (e.g., in the folded state). When the measured unfolding angle is within a predetermined angular range based on data acquired from at least one sensor of the state detection sensor, the electronic device **101** may determine that the display thereof is folded, bent, or unfolded by a predetermined degree.

[0128] FIG. **7** illustrates an electronic device according to an embodiment. Specifically, FIG. **7** illustrates a rollable device including a roll-up-type (or rollable) display.

[0129] Referring to FIG. **7**, when the electronic device **101** is implemented in the form of a rollable device, depending on the degree to which the user unrolls the electronic device **101** rolled in a cylindrical shape, the display of the electronic device **101** may be exposed to the outside in a relatively narrow area, as in Example <701>, or may be exposed to the outside in a relatively wide area, as in Example <703>. For example, when the display is exposed to the outside in a relatively narrow area, as in Example <701>(e.g., when the display is unrolled in a first set range), the electronic device **101** may be used in a first type (e.g., in a rolled state or in a bar type). As another example, when the display is exposed to the outside in a relatively wide area, as in Example <703> when the display is unrolled in a second set range), the electronic device **101** may be used in a second type (e.g., in an unrolled state or in a tablet type or expanded-display type).

[0130] The electronic device **101** may acquire information related to the size of the region of the display exposed to the outside based on the degree of unrolling curvature of the display **210** (e.g., the radius of curvature). For example, the electronic device **101** may measure the unrolling curvature of the display (or the electronic device **101**) using the state detection sensor. In the electronic device **101**, a threshold curvature may be predetermined in order to measure the degree of unrolling curvature. Accordingly, the electronic device **101** may acquire information on the size of the region of the display unrolled with a curvature greater than the threshold curvature. Based on the acquired information on the size, the electronic device **101** may determine whether the electronic device **101** is used in the first form (e.g., in the rolled state), as in Example <701>, or in the second form (e.g., in the unrolled state), as in Example <703>.

[0131] The electronic device **101** may have a virtual threshold line **790** provided on the display in order to acquire information on the size of the region of the display exposed to the outside in the electronic device **101**. For example, the electronic device **101** may acquire information on a difference in curvature between two adjacent portions located in opposite directions with respect to the threshold line **790** on the display using the state detection sensor. When the difference in curvature is greater than a predetermined value, the electronic device **101** may determine that the display is exposed to the outside by an area exceeding the threshold line **790**. Based on the acquired information on the size, the electronic device **101** may determine whether the electronic device **101** is used in the first form (e.g., in the rolled state) as in Example <701> or in the second form (e.g., in the unrolled state) as in Example <703>.

[0132] As described above with reference to FIGS. **3** to **7**, the electronic devices **101** may include a foldable, flexible, or rollable display, which can be folded, bent, rolled, unfolded, or unrolled. For example, the electronic devices

101 may be folded, bent, or unfolded with respect to one or more folding axes, as illustrated in FIGS. **3**, **4**, **5**, and **6**, or may be rolled in a cylindrical shape or unrolled therefrom, as illustrated in FIG. **7**. The electronic devices **101** may have various shapes depending on whether the electronic devices **101** are folded, bent, rolled, unfolded, or unrolled, or the degree of being folded, bent, rolled, unfolded, or unrolled.

[0133] Although the embodiments above include a display that is foldable about a vertical axis by way of example, the embodiments are not limited thereto. The disclosure may he applied to a display that is foldable about a horizontal axis, and the electronic devices **101** may have displays having various shapes. Accordingly, an electronic device **101** may be folded or unfolded about one or more folding axes.

[0134] FIG. **8** illustrates an operation of a display based on a state of a display in an electronic device according to an embodiment. Specifically, FIG. **8** illustrates an example in which in an electronic device provides a UI according to a state change of the display.

[0135] Referring to FIG. **8**, the electronic device includes two folding axes (or hinge axes). However, the embodiment is illustrative, and is not limited to two axes. Accordingly, the electronic device the display **210** of the electronic device is divided into multiple portions (e.g., three equal portions or four equal portions).

[0136] The electronic device includes two vertical folding axes **890** and **895** (or hinge axes) in the display **210**. The electronic device may be folded (or bent) or unfolded about the folding axes **890** and **895**. In FIG. **8**, the display **210** includes two folding axes **890** and **895**, with a first region **810** (or a first display surface), a second region **820** (or a second display surface), and a third region **830** (or a third display surface). The display **210** may be folded inwards such that the display **210** is not exposed to the outside of the electronic device (e,g., an in-fold type).

[0137] Although the screen of the display **210** in FIG. **8** is divided into three regions, such as the first region **810**, the second region **820**, and the third region **830**, depending on the state of being folded about the two folding axes **890** and **895**, the disclosure is not limited thereto, and the electronic device may take a form in which at least one of the first region **810**, the second region **820**, and the third region **830** of the display **210** is folded outwards so as to be exposed to the outside of the electronic device (e.g., an out-folding or in/out-folding type).

[0138] The electronic device may identify the folded state of the display **210** (e.g., the fully folded state), the unfolded state of the display **210** (e.g., the fully unfolded state), or a partially folded (or unfolded) state) (e.g., a degree of folding). The electronic device may identify the state of the display **210**, and may activate or deactivate at least one region included in the display **210** (e.g., the first region **810**, the second region **820**, or the third region **830**). When the electronic device identifies the folded state of the display **210**, the display **210** may be deactivated.

[0139] In Example <801> of FIG. **8**, three objects (e.g., a first object **850**, a second object **860**, and a third object **870**) (e.g., UIs (or windows) of application execution screens) are displayed in the unfolded state. In the unfolded state, the electronic device may respectively display the first object **850** (e.g., the UI of application A execution screen), the second. object **860** (e.g., the UI of application B execution screen), and the third object **870** (e.g., the UI of application C execution screen) through arbitrary regions of the display **210**. The first object **850** is displayed aver the first region **810**, the second region **820**, and the third region **830** of the display **210**, in which the greatest portion thereof is included in the second region **820**. The second object **860** is displayed over the first region **810** and the second region **820** of the display **210**, and is at least partially covered by the first object **850** (or the state in which the first object **850** is overlaid or superimposed on the second object **860**). For example, the second object **860** may be disposed in a lower layer than the layer for the first object **850**. The third object **870** is displayed over the second region **820** and the third region **820** of the display **210** and is at least partially covered by the first object **850** (or the state in which the first object **850** is overlaid or superimposed on the third object **870**). For example, the third object **870** may be disposed in a lower layer than the layer in which the first object **850** is disposed.

[0140] In Example <803> of FIG. **8**, the electronic device is in a state in which the first portion including the first region **810** and the third portion including the third region **830** are folded at a predetermined angle between the folded state and the unfolded state of Example <801>. As illustrated in Example <803>, when the electronic device is folded within a designated range (or by a designated angle) from the unfolded state, the display **210** may be divided into at least two regions (e.g., screen division) based on folded target regions (or the number of target regions). When the portion of the first region **810** is folded by a predetermined angle about the first folding axis **890** or when the portion of the third region **830** is folded by a predetermined angle about the second folding axis **895**, the display **210** may be divided into two regions (e.g., screen division). As another example, when the portion of the first region **810** is folded by a predetermined angle about the first folding axis **890** and when the portion of the third region **830** is folded by a predetermined angle about the second folding axis **895**, the display **210** may be divided into three regions (e.g., screen division).

[0141] In Example <803>, the portion of the first region **810** and the portion of the third region **830** are folded by a predetermined angle about the first folding axis **890** and the second folding axis **895**, respectively, so as to divide the display **210** into three regions **810**, **820**, and **830**. For example, in Example <803>, the folded target regions include two regions, namely, the first region **810** and the third region **830**.

[0142] When the electronic device is folded within a designated range (or by a designated angle) from the unfolded state, the electronic device may identify this operation as an operation event (or trigger) for screen division. In a specific state (e.g., the unfolded state), the electronic device identifies the corresponding state of the display **210** based on the operation event in which the state of the display **210** is changed, and may differently operate UIs related to respective objects **850**, **860**, and **870** provided on the display **210** based on the identified state of the display **210**.

[0143] The electronic device may identify at least one target region and at least one object included in the target region based on the operation event. In Examples <801>and <803>, the electronic device may identify the first region **810** and the third region **830** as target regions, and may identify that the second object **860** is included in the first region **810** and the third object **870** is included in the third region **830**.

[0144] The electronic device may divide the display into respective regions **810**, **820**, and **830** based on the folding axes **890** and **895**, and may set the positions of the objects **850**, **860**, and **870** corresponding to the respective divided regions **810**, **820**, and **830**. For example, the electronic device may set the first area **810**, which is a first target region, as a region for the second object **860**, may set the third region **830**, which is a second target region, as a third object, and may set the second region **820**, which is a main region (e.g., a remaining region other than the target regions or an unfolded region) as a region for the first object **850**.

[0145] The electronic device may move the second object **860** to the first region **810** and may adjust the size of the second object **860** (e.g., the window size) through the first region **810** (e.g., the first display surface) so as to display the second object **860** as a full screen **865**, may move the third object **870** to the third region **830** and may adjust the size of the third object **870** the window size) through the third region **830** (e.g., the third display surface) so as to display the third object **870** on the full screen **875**, and may adjust the size of the first object **850** (e.g., the window size) through the second region **820** (or the second display surface) so as to display the first object **950** as a full screen **855**. For example, based on a user's action of folding the display **210** by a predetermined angle (e.g., a physical gesture), the electronic device may move a corresponding object according to the folded region (or position), and may automatically adjust the window size of the object so as to display the object. Accordingly, it is possible to freely adjust a software window size of using a physical characteristic of the display **210** (e.g., the foldable or flexible characteristic), and it is also possible to provide the effect of using a multi-display through multiple division of the screen of the display **210** based on the physical gesture of the user (e.g., an action of folding the display **210** by a predetermined angle).

[0146] When moving an object and/or adjusting the window size corresponding to the object, the electronic device may provide a designated guide (e.g., a screen division guide), and based on a user interaction (or user input) for the guide (e.g., an action of additionally folding by a predetermined angle, designated touch input, or object selection input), the electronic device may rearrange the position and/or size corresponding to each object (a user interaction of the object) so as to display respective objects as illustrated in Example <803>.

[0147] Although FIG. **8** illustrates that when the display **210** is folded by a designated angle from the unfolded state, the objects **850**, **860**, and **870** are respectively provided as full screens **855**, **864**, and **875** of the regions **810**, **820**, and **830**, as in Example <803>, the disclosure is not limited thereto. For example, the electronic device may operate a target region and a main region differently on the electronic device based on set information related to display operation. When the object in the target region is moved, the size of the object may be adjusted so as to provide the object as a full screen, the object in the main region may be provided in its original state without adjusting the size, and the object may be moved into the main region when necessary. As another example, the objects in the target region and the main region may be provided based on the original sizes thereof without adjusting the sizes.

[0148] The electronic device may be changed from the state (e.g., the state of being folded by a predetermined angle) as in Example <803> to the unfolded state as in Example <801>. The electronic device may provide the positions, sizes, and/or overlapping states corresponding to respective objects **850**, **860**, and **870** in the previous state based on the unfolded target regions (e.g., the first region **810** and/or the third area **830**). The electronic device may provide UIs of the respective objects **850**, **860**, and **870** in the state before being folded based at least on state information (e.g., position information, size information, and/or priority information) of the respective objects **850**, **860**, and **870**.

[0149] In the state in which the display **210** is folded within a designated range (or by a designated angle), the electronic device may restore the UIs related to the respective objects **860**, **860**, and **870** provided to the display **210** to the previous state (or the original state) and may provide the restored UIs based on an operation event in which the state of the display **210** is changed (e.g., unfolded). Based on the state information corresponding to the respective objects **850**, **860**, and **870**, the electronic device may identify the restored positions, the restored sizes, and/or the overlapping state (or the displayed order) of the respective objects **850**, **860**, and **870**.

[0150] As illustrated in Example <801>, based on position information, the electronic device may display the first object **850** over the first region **810**, the second region **820**, and the third region **830** of the display **210**, may display the second object **860** over the first region **810** and the second region **820** of the display **210**, and may display the third object **870** over the second area **820** and the third area **830** of the display **210**. When providing each of the object **850**, **860**, and **870** to a corresponding region, the electronic device may restore the sizes of the respective objects **850**, **860**, and **870** (e.g., window sizes) to the previous sizes (e.g., based on a pop-up window) and display the restored objects **850**, **860**, and **870** based on size information. Based on priority information (e.g., e.g., the overlapping state), the electronic device may provide the state in which the second object **860** and the third object **870** are at least partially covered by the first object **850** (or the state in which the first object **850** is overlaid on the second object **860** and/or the third object **870**).

[0151] Based on a user's action (e.g., a physical gesture) of unfolding the display **210**, the electronic device may move the respective objects **850**, **860**, and **870**, may automatically adjust the window sizes of the respective objects **850**, **860**, and **870**, and may provide the adjusted windows according to the priorities thereof. Accordingly, it is possible to freely adjust a software window size using a physical characteristic of the display **210** (e.g., the foldable or flexible characteristic), and, based on the user's physical gesture (e.g., an action of unfolding the display **210**), it is also possible to use a single screen (or a full screen) in which the respective regions **810**, **820**, and **830** of the display **210** are connected to each other.

[0152] According to an embodiment, an electronic device may include a display, a processor operatively connected to the display, and memory operatively connected to the processor. The memory is configured to store instructions that cause, when executed, the processor to: display one or more objects through the display; detect an operation event in which the display is switched from a first state to a second state; monitor a state change of the display based on the operation event; detect a state in which the display is folded to a designated angle; divide the display into a first display

surface and a second display surface based on the state of being folded to the designated angle; and rearrange and display the one or more objects based on at least the first display surface or the second display surface,

[0153] The first display surface may include a display surface, which is folded about a folding axis in the display, and the second display surface may include a fixed display surface, which is not folded in the display.

[0154] The instructions may cause the processor to display a target object of at least one of the displayed objects on the first display surface of the display based on the state of being folded to the designated angle; and display a remaining object other than the target object on the second display surface of the display.

[0155] The instructions may cause the processor to determine, when a plurality of target objects related to the first display surface are present, priorities of the plurality of target objects; and determine an object to be displayed on the first display surface based on the priorities.

[0156] The instructions may cause the processor to identify a target object to be included in the first display surface; and store state information related to restoration of the identified target object.

[0157] The instructions may cause the processor to restore the target object to an original state based on at least the first display surface and/or the second display surface based on the state information, and provide the restored target object when the display is switched to an unfolded state.

[0158] The instructions may cause the processor to detect a trigger related to screen division at a first designated angle, and conduct an action for the trigger related to the screen division based on a designated trigger.

[0159] The instructions may cause the processor to provide a guide related to the screen division at the first designated angle, and execute the screen division based on the designated trigger in the state in which the guide is displayed.

[0160] The designated trigger may include at least one of a second designated angle, different from the first designated angle, for executing the screen division or a designated user interaction.

[0161] The instructions may cause the processor to identify the designated user interaction at the designated angle; and execute the screen division based on the identification of the user interaction.

[0162] According to an embodiment, an electronic device may also include a foldable display, a processor operatively connected to the foldable display, and memory operatively connected to the processor. The memory may be configured to store instructions that cause, when executed, the processor to detect an operation event in which the state of the foldable display is changed; monitor a state change of the foldable display based on the operation event; display at least one object included in a target region for a first state in a range greater than or equal to a designated range, and rearrange and display a remaining object in a main region when there is a first state change; and restore at least one object including an object included in a target region for a second state based on state information, and rearrange and display the at least one object through the target region and the main region when there is a second state change.

[0163] According to an embodiment, operations performed by an electronic device, as described below, may be executed by at least one processor of the electronic device (The operations performed by the electronic device may be executed by instructions that are stored in a memory and that cause, when executed, the processor to operate.

[0164] FIG. **9** is a flowchart illustrating a method of operating a display in an electronic device according to an embodiment.

[0165] Referring to FIG. **9**, in step **901**, the electronic device **101** detects an operation event (or trigger). For example, a processor of the electronic device may detect an operation event in which the state of the display is changed using at least one sensor. The states of the display may include a first state in which the display is changed from the unfolded state to a folded state by a designated angle, or a second state in which the display is changed from a folded state to an unfolded state.

[0166] In step **903**, the electronic device identifies the operation state of the display, i.e., the first state or the second state. For example, when the operation event in which the state of the display is changed is detected, the electronic device may determine whether the state of the display is the first state or the second state. The processor may acquire data (e.g., sensor data) associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data. The at least one sensor may include a sensor (e.g., a smart hall sensor) that determines the state (e.g., the folded state or the unfolded state) of the electronic device (or the display of the electronic device), and/or a sensor (e.g., an acceleration sensor or a gyro sensor) that determines the rotation and orientation of the electronic device. That at least one sensor may include a touch sensor and/or a pressure sensor.

[0167] Based on a determination of the first state in step **903**, in step **905**, the electronic device identifies an object included in a target region according to the first state (e.g., a folded region (or a display surface) among the regions of the display or a region folded about the folding axis (or the hinge)) in a range greater than or equal to a designated range. The processor may identify at least one object included in a range greater than or equal to the designated range among the one or more objects included in the target region while maintaining the state of the main region (e.g., a fixed region (or a display surface), which is not folded, among the regions of the display). For example, the target region may be the first region **810** and/or the third region **830**, which is folded by a predetermined angle by the user in the display, as illustrated in FIG. **8**, and the main region may be the second region **820**, which is maintained without being folded in the display as illustrated in FIG. **8**.

[0168] In performing step **905**, the processor may execute an operation of identifying an area folded in a designated range and identifying the region folded in the designated range as a target region (or a target display surface); an operation of identifying an object (e.g., a candidate object) including at least one partial region included in the target region; an operation of identifying state information (e.g., restoration positions, restoration sizes, and/or a display (or arrangement) order (or a priority)) related to (or corresponding to) objects in the target region and the main region; an operation of storing the identified state information in a memory; an operation of identifying an object included in the target region in a range greater than or equal to the designated range among the objects including at least one partial region; and/or an operation of identifying an opera-

tion time associated with folding. The operation time associated with folding may be identified based on the folding angle of the display.

[0169] While the electronic device **101** is changed from a fully unfolded state to a folded state, the processor may acquire data associated with the angle between the first region of the first portion of the housing and the second region of the second portion of the housing using at least one sensor. The processor may compare the acquired data and preset first reference data for identifying a first operation time at which the second state is changed to the first state, and when the acquired data corresponds to the first reference data, the processor **120** may determine that it is time to execute screen division of the display. The first reference data may be about 5 degrees, or may include an angle close thereto, but is not limited thereto. For example, the first reference data may include a predetermined angle between about 180 degrees, at which the display is fully unfolded, and about 0 degrees, at which the display is fully folded (e.g., about 10 degrees, about 15 degrees, or about 20 degrees).

[0170] In step **907**, the electronic device provides a graphic effect of including (e.g., moving and/or size-adjusting) the identified object in the target region based on the detection of the first state change of the display. For example, the processor of the electronic device may provide a graphic effect of moving the identified object to the target region and displaying the object as a full screen within the target region by adjusting the size of the object (or the window size) according to a setting.

[0171] In step **909**, the electronic device provides a graphic effect of rearranging and displaying a remaining object in the main region based on the detection of the first state change of the display. The processor may provide a graphic effect of moving the object of the main region into the main region according to a first setting (e.g., moving the object located over the target region into the main region) and adjusting the size (e.g., resizing) of the object (or the window size) so that the object is displayed within the main region. The processor may provide a graphic effect of displaying the object as a full screen within the main region by adjusting the size of the object (or the window size) in the main region according to a second setting.

[0172] Steps **907** and **909** are not limited to the order illustrated in FIG. **9**, and may be performed sequentially, in parallel (or almost simultaneously), or in the reverse order.

[0173] In step **911**, the electronic device provides a UI based on completion of the state change, e.g., as illustrated in Example <803> in FIG. **8**.

[0174] The processor of the electronic device may provide a first UI of a first object as a full screen based on the target region folded by a predetermined angle, and may provide a second UI of a second object as a full screen based on the main region. The processor may provide objects in the target region and the main region in different ways depending on the operating method of the display set in the electronic device. For example, based on a first designated method, the processor may provide objects corresponding to the target region and the main region as a full screen based on a second designated method, the processor may provide the object in the target region as a full screen and may provide the object in the main region in the state in which the existing form (e.g., based on a pop-up window) is maintained, or, based on a third designated method, the processor may provide the object in the target region in the state in which the existing form (e.g., based on a pop-up window) is maintained, and may provide the object of the main region as a full screen.

[0175] However, based on the determination of the second state in step **903**, in step **913**, the electronic device identifies an object included in the target region according to the second state (e.g., an unfolded region among the regions of the display. For example, the processor may identify at least one object included in the target region while maintaining the state of the main region (e.g., a fixed region, which is not folded, among the regions of the display). The target region may be the first region **810** and/or the third region **830**, which is unfolded by the user in the display, as illustrated in FIG. **8**, and the main region may be the second region **820**, which is maintained without being folded in the display, as illustrated in FIG. **8**.

[0176] In step **913**, the processor may perform an operation of identifying an unfolded region and identifying the unfolded region as a target region (or a target display surface), an operation of identifying at least one object included in the target region, and/or an operation of identifying an operation time associated with unfolding. The operation time associated with folding may be identified based on the unfolding angle of the display.

[0177] While the electronic device is changed from a folded state to an unfolded state, the processor may acquire data associated with the angle between the first region of the first portion of the housing and the second region of the second portion of the housing using at least one sensor. The processor may compare the acquired data and preset second reference data (e.g., reference data for identifying a second operation time, at which the first state is changed to the second state), and when the acquired data corresponds to the second reference data, the processor may determine that it is time to execute screen integration (e.g., to cancel screen division) of the display. The second reference data may be about 175 degrees, or may include an angle close thereto, but is not limited thereto. For example, the second reference data may include a predetermined angle between about 0 degrees, at which the display is fully folded, and about 180 degrees, at which the display is fully unfolded about 170 degrees, about 165 degrees, or about 160 degrees).

[0178] In step **915**, the electronic device identifies state information associated with restoration of an object to a previous state. For example, the processor may identify state information (e.g., restoration positions, restoration sizes, and/or a display order (or a priority)) associated with (or corresponding to) the objects in the target region and the main region. The state information for restoration to the previous state may be information that is identified when the display changes to the first state and is stored in a memory.

[0179] In step **917**, the processor provides a graphic effect of rearranging objects. For example, based on state information corresponding to the object, the processor may identify the restoration position, restoration size, and/or overlapping state (or display order) of each object based on position information, the processor may move the position of at least one object based on size information, the processor may restore the size of the at least one object (e.g., the window size) to the previous size (e.g., based on a pop-up window), and, based on priority information (e.g., overlapping state), the processor may provide a graphic effect of overlapping objects.

[0180] The processor may provide each UI corresponding to each object in the previous state based on the unfolded target region and the main region. The processor may provide a UI of each object in the state before folding (e.g., based on the full window and/or based on a pop-up window) based on the restoration position of each object.

[0181] When providing the UI of each object, the processor may identify the order of an object to be displayed based on the priority of each object. Based on the identified priority of each object, the processor may set the UI of the object having the highest priority as the highest level, and may provide UIs of other objects in the sequentially overlapping state.

[0182] The processor may provide a first object, which has been displayed at the highest level in the target region, and a second object, which has been displayed at the highest level in the main region, but when the UI of the first object and the UI of the second object overlap each other, the processor may assign a weight to the second object of the main region and may provide the UI of the second object such that the U**1** of the second object overlaps the UI of the second object at a higher level than the UI of the first object. Additionally, objects other than the first object and the second object may be sequentially disposed on layers under the UI of the first object and/or the UI of the second object according to the positions and/or priorities thereof.

[0183] In step **911**, the electronic device provides a UI based on completion of the state change, e.g., as illustrated in Example <801> of FIG. **8**.

[0184] The processor may restore the UI of each object to the state before folding and provide the same through a full screen in which the target region and the main region are connected as a single screen.

[0185] FIG. **10** illustrates a display in an electronic device according to an embodiment. More specifically, FIG. **10** illustrates an example in which, in an operation of folding at least one region (or a display surface) in the state in which the display is unfolded, a UI may be provided based on the priority of an object included in the folded region (e.g., the target region).

[0186] Referring to FIG. **10**, multiple objects **1010** and **1020** or portions thereof are included in the target region **1000**, and the object **1020** having the greatest area included in the target region **1000** has the highest priority.

[0187] For example, in FIG. **10**, the first object **1010** and the second object **1020** are at least partially included in the target region **1000** and the second object **1020** has a greater area thereof included in the target region **1000** than the first object **1010**. The electronic device may assign the highest priority to the second object **1020**, among the first object **1010** and the second object **1020** included in the target region **1000**, and may provide the second object **1020** as a full screen **1025** through the target region **1000**.

[0188] The electronic device may identify an object included in the target region **1000** in a region greater than or equal to a designated range as a target object to be included in the target region **1000**, and in FIG. **10**, the first object **1010** may not be included in the target object. With respect to the first object **1010** and the third object **1030**, the electronic device may maintain the state of being displayed through the main region, or may provide the first object **1010**, which has a portion included in the target region **1000**, in the state of being moved into the main region. The electronic device may provide the object having the highest priority (e.g., the first object **1010**) as a full screen according to the priorities of the first object **1010** and the third object **1030** in the main region.

[0189] FIG. **11** illustrates an operation of a display in an electronic device according to an embodiment. More specifically, FIG. **11** illustrates an operation in which at least one region (or display surface) is folded in the state in which the electronic device is unfolded, and a UI may be provided based on the priority of an object included in the folded region (e.g., the target region).

[0190] Referring to FIG. **11**, when all of multiple objects **1110** and **1120** are included in the target region **1100** (e.g when multiple objects **1110** and **1120** overlap each other in the target region **1100**), the object **1110** located at the highest level in the target region **1100** has the highest priority.

[0191] For example, all portions of the first object **1110** and the second object **1120** may be included in the target region **1100**. When all portions of the first object **1110** and the second object **1120** are included in the target region **1100** and have the same priority, the electronic device may assign the highest priority to the first object **1110**, provided at the highest level among the first object **1110** and the second object **1120**, which overlap each other in the target region **1100**, and may provide the first object **1110** as a full screen **1115** through the target region **1100**.

[0192] The electronic device may identify an object included in the target region **1100** in a range greater than or equal to a designated range as a target object to be included in the target region **1100**, and in FIG. **11**, both the first object **1110** and the second object **1120** may be included in a target object. Because the electronic device provides the first object **1110** as a full screen **11115** through the target region **1100**, the second object **1120** included in the target region **1100** may not be displayed, but may be covered by the first object **1110**. The electronic device may maintain the state in which the third object **1130** is displayed through the main region. The electronic device may provide the third object **1130** of the main region as a full screen.

[0193] FIG. **12** illustrates an operation of a display in an electronic device according to an embodiment. More specifically, FIG. **12** illustrates an operation of changing at least one region to an unfolded state from the state in which the at least one region (or a display surface) of the display **210** has been folded in a designated range (e.g., the state in which screen division has been performed), an object included in the unfolded region (e.g., the target region) and an object included in a fixed region (e.g., the main region) are restored to the original state, and UIs for the objects are provided.

[0194] Referring to FIG. **12**, at least one object **1220** is provided as a full screen **1225** in a target region **1200**, and the at least one object **1220** of the target region **1200** is restored based on the original position, the size, and the priority thereof according to an operation of unfolding the display.

[0195] For example, FIG. **12** illustrates an example in which a second object **1220** is provided as a full screen **1225** in the target region **1200**, a first object **1210** and a third object **1230** are provided in the main region **1205**, and the first object **1210**, the second object **1220**, and the third object **1230** have higher priorities in that order. When there is no change in the state information (e.g., the positions, the sizes, and/or the priorities) of respective objects **1210**, **1220**, and **1230** during the switching from the folded state to the state unfolded in a designated range, the electronic device may

restore respective objects **1210**, **1220**, and **1230** to the previous state so as to provide the restored objects **3210**, **3220**, and **3230**.

[0196] The electronic device may identify the positions, the sizes, and/or the priorities of the second object **1220** of the target region **1200** and the first object **1210** and the third object **1230** of the main region **1205**. Based on the positions, the sizes, and/or the priorities of respective objects **1210**, **1220**, and **1230**, the electronic device may move the second object **1220** of the target region **1200** to the original position, and the electronic device may provide the first object **1210** at the highest level according to the priority thereof, and may sequentially arrange the second object **1220** and the third object **1230** under the first object **1210** according to the priorities thereof.

[0197] When there is a change in state information related to at least one of the objects **1210**, **1220**, and **1230** in the state of being folded within the specified range, the electronic device **101** may arrange the first object **1210**, the second object **1220**, and the third object **1230** and may provide the same based on the changed state information changed while being changed to the unfolded state. For example, when the folded state in the designated range is changed to the unfolded state in the state in which the user selects the third object **1230** of the main region **1205** and uses the third object **1230** at the highest level, the electronic device **101** may provide the third object **3230** at the highest level based on the changed priority thereof, and may sequentially arrange the first object **1210** and the second object **1220** under the third object **3230** according to the priorities thereof.

[0198] FIG. **13** is a flowchart illustrating a method of operating an electronic device according to an embodiment. More specifically, FIG. **13** illustrates an operation of executing screen division when the display of the electronic device is folded from the unfolded state (e.g., a screen division method according to setting of a first method). The setting of the first method may include setting to automatically execute screen division when switching from the unfolded state to a folded state of a designated angle. For example, the first method may the user automatically executing screen division based on a physical gesture of folding (or bending) a portion (e.g., a hinge portion) of the display by a predetermined angle.

[0199] Referring to FIG. **13**, in step **1301**, a processor of the electronic device detects an operation event (or trigger) in the unfolded state of the display. The processor may detect an operation event in which the state of the display is changed using at least one sensor.

[0200] In step **1303**, the processor monitors a state change of the display. The processor may monitor the state change in which the display is folded (e.g., monitoring the change in a hinge angle) based on the operation event, and may monitor whether the state change corresponds to a designated angle for dividing the screen into a target region and a main region. The processor may acquire data (e.g., sensor data) associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data.

[0201] In step **1305**, the processor detects the designated angle. While the display is changed from an unfolded state to a folded state, the processor may acquire data associated with the angle between the target region and the main region using at least one sensor. The processor may compare the acquired data and preset reference data (e.g., reference data for identifying a screen division execution time), and when the acquired data corresponds to the reference data, the processor may determine that it is time to execute screen division of the display. The reference data may be about M degrees, or may include an angle close thereto. The M degrees may include a predetermined angle designated (or set) by the user between 180 degrees, at which the display **210** is fully unfolded, and about 0 degrees, at which the display **210** is fully folded, such as about 10 degrees, about 15 degrees, or about 20 degrees,

[0202] In step **1307**, the processor executes screen division. For example, the processor may execute screen division for dividing the display into a target region and a main region based on the designated angle, and may provide a corresponding object based on each region. When performing the screen division, the processor may provide a visual guide for screen division (or a screen division guide) at a designated angle.

[0203] FIG. **14** illustrates executing screen division in an electronic device according to an embodiment. More specifically, FIG. **14** illustrates an example in which screen division is executed based on setting of the first method when at least one region (or display surface) of the display of the electronic device is folded from the unfolded state.

[0204] Referring to FIG. **14**, a first object **1410** and a second object **1420** are provided through the display, and the first object **1410** may be a target object to be provided through a target region **1400**. The electronic device may monitor an angle designated in an operation in which the target region **1400** is folded from the unfolded state of the display. Based on the time at which the target region **1400** is folded by a designated angle, the electronic device may provide the first object **1410** as a full screen **1415** through the target region **1400**, and may provide the second object **1420** through the main region.

[0205] FIG. **15** is a flowchart illustrating a method of operating an electronic device according to an embodiment. More specifically FIG. **15** illustrates an operation of executing screen division when the display of the electronic device is folded from the unfolded state (e.g., a screen division method according to setting of a second method). The setting of the second method may include setting to provide a visual guide associated with screen division, e.g., when the display is switched from the unfolded state to the folded state of a first designated angle, and to execute screen division based on a designated trigger for execution of screen division (e.g., switching to a state of being folded to a second designated angle and/or a designated user interaction (or user input)). The second method may include executing screen division based on the user commands execution of screen division (e.g., the user's explicit intention (or input)). In FIG. **15**, the electronic device may detect a trigger associated with screen division at a first designated angle, and may execute an action for the trigger associated with the screen division (e.g., execution of screen division) based on a designated trigger (e.g., a second designated angle or designated user input).

[0206] Referring to FIG. **15**, in step **1501**, a processor of the electronic device detects an operation event (or trigger) in the unfolded state of the display. For example, the processor may detect an operation event in which the state of the display is changed using at least one sensor.

[0207] In step **1503**, the processor **120** monitors a state change of the display. For example, the processor may monitor a state change in which the display is folded (e.g., monitoring the change in a hinge angle) based on the operation event, and may monitor whether the state change corresponds to a designated angle (e.g., the first designated angle) for providing a guide associated with the screen division (e.g., a visual guide or a screen division guide). The processor may acquire data associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data.

[0208] In step **1505**, the processor identifies whether the designated angle is detected (or reached). During the operation in which the display is changed from an unfolded state to a folded state, the processor may acquire data associated with the angle between the target region and the main region using at least one sensor. The processor may compare the acquired data and preset reference data, and when the acquired data corresponds to the reference data, the processor may determine that it is time to provide the visual guide. The reference data may be about N degrees, or may include an angle close thereto. The N degrees may include a predetermined angle designated (or set) by the user between 180 degrees, at which the display **210** is fully unfolded, and about 0 degrees, at which the display **210** is fully folded, such as about 3 degrees, about 5 degrees, or about 10 degrees.

[0209] When a designated angle is not detected in step **1505**, the processor continues to monitor in step **1503**.

[0210] However, when a designated angle is detected in step **1505**, the processor provides a guide associated with screen division in step **1507**. The processor may provide the visual guide associated with screen division to a user without executing screen division at the designated angle, and may perform an interaction with the user for executing screen division based on the visual guide.

[0211] In step **1509**, the processor identifies whether a designated trigger is detected. While the guide for screen division is displayed, the processor may identify whether a designated trigger associated with the user's explicit intention (or input) to determine whether to execute screen division is input. The designated trigger may include a trigger in which the display is additionally folded from a designated angle (e.g., a first designated angle) and is changed by another designated angle (e.g., a second designated angle) or less, and/or a designated user interaction (or user input) input by the user based on the guide.

[0212] When a designated trigger is detected in step **1509**, the processor executes screen division in step **1511**. The processor may execute screen division for dividing the display into a target region and a main region based on the designated trigger, and may provide a corresponding object based on each region.

[0213] However, when a designated trigger is not detected in step **1509**, the processor identifies whether cancellation of screen division is detected in step **1513**. The cancellation of screen division may include first-type cancellation of completely canceling a screen division operation (e.g., not executing screen division), and second-type cancellation of maintaining the screen division operation state and waiting for detection of the designated trigger.

[0214] The first-type cancellation may include cancellation based on the explicit intention (or selection) of the user, who does not execute screen division. For example, the processor may provide a designated item (or object) for canceling screen division through a guide, and may perform the first-type cancellation based on user input on the designated item.

[0215] The second-type cancellation may include temporary cancellation, which causes the state for executing screen division to be continuously monitored when there is no user's explicit intention of not executing screen division. For example, the processor may perform the second-type cancellation when the display is changed by a designated angle or more (e.g., unfolding operation) from a designated angle (e.g., the first designated angle). When the user changes the display to the folded state, the user may select screen division based on input of a specific trigger (or interaction).

[0216] When cancellation of screen division is not detected in step **1513**, the processor continues to provide the guide in step **1507**.

[0217] When cancellation of screen division is detected in step **1513**, the processor removes the guide in step **1515**. For example, the processor may remove (or may not display) the guide provided through the display. The processor may identify a type associated with the cancellation of screen division, and in the case of the first-type cancellation, the processor may maintain the displayed state of objects on the display the positions, sizes, and/or priorities of the objects) without screen division after removing the displayed guide. The processor may identify the type associated with the cancellation of screen division, and in the case of the second-type cancellation, the processor may return to step **1503**, after removing the displayed guide.

[0218] As illustrated in FIGS. **13** and **15**, the automatic screen division method (e.g., FIG. **13**) and the manual screen division method (e.g., FIG. **15**) may be different methods. In the electronic device, one of the methods may be set (or selected) by the user, and the processor thereof may process the screen division operation based on the corresponding method set in the electronic device by the user.

[0219] FIG. **16** illustrates executing screen division in an electronic device according to an embodiment. More specifically FIG. **16** illustrates an example in which, when at least one region (or display surface) of the display of the electronic device is folded from the unfolded state, additional folding is performed from a first designated angle (e.g., a screen division guide provision angle, and screen division is executed based on a second designated angle (e.g., a screen division execution angle).

[0220] Referring to FIG. **16**, a first object **1610** and a second object **1620** are provided through the display, and the first object **1610** may be a target object to be provided through a target region **1600**. The electronic device may monitor the first designated angle (e.g., N degrees) in the operation in which the target region **1600** is folded from the unfolded state of the display. Based on the time at which the target region **1600** is folded by the first designated angle, the electronic device may provide a guide **1650** associated with screen division through the target region **1600**. The guide **1650** associated with screen division may include various types of visual guides, such as a first guide that graphically provides a line corresponding to a divided region (e.g., a line visual guide), a second guide that graphically provides a shape corresponding to a divided region (e.g., a shape visual guide), a third guide that graphically provides an icon (or an image (e.g., a thumbnail image)) corresponding to a target object in a divided region (e.g., an icon visual guide), and/or

a fourth guide that graphically provides an image (e.g., a virtual image and/or a captured image) corresponding to a target object with a predetermined margin in a divided region (e.g., a margin visual guide).

[0221] The electronic device may monitor the second designated angle (e.g., about M degrees) in an operation in which the target region **1600** is additionally folded from the state in which the display is folded by the first designated angle. The second designated angle (e.g., about M degrees) for executing screen division is may be set to a value (or angle) smaller than the first designated angle (e.g., about N degrees) for providing a visual guide (e.g., M<N). Based on the time at which the target region **1600** is folded by the second designated angle, the electronic device may determine execution of screen division. Thereafter, the electronic device may provide the first object **1610** as a full screen **1615** through the target region **1600**, and may provide the second object **1620** through the main region.

[0222] FIG. **17** illustrates executing screen division in an electronic device according to an embodiment. More specifically FIG. **17** illustrates an example in which, when at least one region (or display surface) of the display of the electronic device is folded from the unfolded state, screen division is executed based on a designated user interaction (e.g., user input) at a designated angle (e.g., a screen division guide provision angle or a screen division angle selected by the user).

[0223] Referring to FIG. **17**, a first object **1710** and a second object **1720** are provided through the display, and the first object **1710** may be a target object to be provided through a target region **1700**. The electronic device may monitor the designated angle (e.g., N degrees) in the operation in which the target region **1700** is folded from the unfolded state of the display. Based on the time at which the target region **1700** is folded by the designated angle, the electronic device may provide a guide **1750** associated with screen division through the target region **1700**. The guide **1750** associated with screen division may include various visual guides for providing information associated with a target region and an object to be provided through the target region, such as a first guide (e.g., a line visual guide), a second guide (e.g., a shape visual guide), a third guide (e.g., an icon visual guide), and/or a fourth guide (e.g., a margin visual guide) as described above with reference to FIG. **16**.

[0224] The electronic device may monitor a designated user interaction based on the target region **1700** in the state in which the display is folded by a designated angle. The designated user interaction for executing screen division may be input through the target region **1700**, and may be performed through a designated type of input (e.g., touch, long touch, double tap, and/or drawing (e.g., drawing forming a closed curve)) in a designated region **1770** of the target region **1700**. Based on the time at which the designated user interaction is detected through the target region **1700** and/or the time at which an additional folding operation is detected after the designated user interaction, the electronic device may determine execution of screen division. Thereafter, the electronic device may provide the first object **1710** as a full screen **1715** through the target region **1700**, and may provide the second object **1720** through the main region.

[0225] FIG. **18** is a flowchart illustrating a method of operating an electronic device according to an embodiment. More specifically, FIG. **18** illustrates an operation of executing screen division when the display of the electronic device is folded from the unfolded state a screen division method according to setting of a third method). The setting of the third method may include setting not to provide a visual guide associated with screen division, e.g., when the display is switched from the unfolded state to being folded to a designated angle, and to automatically execute screen division based on a designated trigger for execution of screen division (e.g., switching to the folded state of a second designated angle and/or a designated user interaction (or user input)). The third method may include a method of executing screen division based on the user's command to execute screen division (e.g., the user's explicit intention (or input)).

[0226] Referring to FIG. **18**, in step **1801**, a processor of the electronic device detects an operation event (or trigger) in the unfolded state of the display **210**. The processor may detect an operation event in which the state of the display is changed using at least one sensor.

[0227] In step **1803**, the processor monitors a state change of the display. The processor may monitor the state change in which the display is folded (e.g., monitoring the change in a hinge angle) based on the operation event, and may monitor whether the state change corresponds to a designated angle for executing screen division. The processor may acquire data (e.g., sensor data) associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data.

[0228] In step **1805**, the processor identifies whether the designated angle is detected (or reached). While the display is changed from an unfolded state to a folded state, the processor may acquire data associated with the angle between the target region and the main region using at least one sensor. The processor may compare the acquired data with preset reference data (e.g., reference data for identifying a time for executing screen division or for waiting for (or standing by for) execution thereof), and when the acquired data corresponds to the reference data, the processor may determine that it is time to wait for execution of screen division. The reference data may be about N degrees, or may include an angle close thereto. The N degrees may include a predetermined angle designated (or set) by the user between 180 degrees, at which the display is fully unfolded, and about 0 degrees, at which the display is fully folded, such as about 3 degrees, about 5 degrees, or about 10 degrees.

[0229] When a designated angle is not detected in step **1805**, the processor continues monitoring in step **1803**.

[0230] When a designated angle is detected in step **1805**), the processor identifies whether a designated trigger is detected in step **1807**. The processor may not provide a guide for screen division at a designated angle, and may identify whether a designated trigger associated with the user's explicit intention (or input) to determine whether to execute screen division is input. The designated trigger may include a designated user interaction (or user input) input by the user at a designated angle of the display. The designated trigger may be input before the designated angle is detected. The user may fold the target region to a designated angle while inputting the designated trigger based on the target region.

[0231] When a designated trigger is detected in step **1807**, the processor executes screen division in step **1809**. The processor may execute screen division for dividing the display into a target region and a main region based on the

designated angle and the designated trigger, and may provide a corresponding object based on each region.

[0232] However, when a designated trigger is not detected in step **1807**, the processor identifies whether cancellation of screen division is detected in step **1811**. The cancellation of screen division may include first-type cancellation of completely canceling screen division operation (e.g., not executing screen division), and second-type cancellation of maintaining the screen division standby state and waiting for detection of the designated trigger.

[0233] The first-type cancellation may include cancellation based on the explicit intention of (or selection by) the user who does not execute screen division. The processor may perform the first-type cancellation based on user input for cancellation of screen division.

[0234] The second-type cancellation may include an operation of additionally folding the display **210** in the state in which a designated trigger is not detected. When the display is folded from a designated angle without a designated trigger, the processor may perform the first-type cancellation.

[0235] The second-type cancellation may include temporary cancellation, which causes the state for executing screen division to be continuously monitored when there is no user's explicit intention of not executing screen division. The processor may perform the second-type cancellation when the display is changed by a designated angle or more (e.g., an unfolding operation) from a designated angle. When the user changes the display to the folded state, the user may select screen division based on input of a specific trigger (or interaction).

[0236] When cancellation of screen division is not detected in step **1811**, the processor continues monitoring in step **1803**.

[0237] When cancellation of screen division is detected in step **1811**, the processor performs the corresponding operation in step **1813**. The processor may cancel execution of screen division, and may maintain the displayed state of objects on the display (e.g., the positions, sizes, and/or priorities of the objects), regardless of folding/unfolding of the display.

[0238] The user-selection-based screen division method as illustrated in FIG. **18** may correspond to an operation performed based on a designated trigger without providing a guide associated with screen division at a designated angle, e.g., as illustrated in FIG. **17**. The user-selection-based screen division method illustrated in FIG. **18** may be provided to the electronic device according to a user's setting (or selection), and the processor may process the screen division operation based on a corresponding method according to a setting made in the electronic device by the user.

[0239] FIG. **19** is a flowchart illustrating a method of operating an electronic device according to an embodiment. Specifically, FIG. **19** illustrates providing a visual guide, in which a guide based on a single object or a guide based on multiple objects is provided based on the number of objects included in the target region of the electronic device.

[0240] Referring to FIG. **19**, in step **1901**, a processor of the electronic device detects a designated angle based on the folding of the display. The processor may monitor the state change of the display based on the operation event, and may identify whether the state change corresponds to a designated angle for executing screen division. The processor may acquire data (e.g., sensor data) associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data.

[0241] In step **1903**, the processor identifies an object to be included in the target region based on detection of the designated angle. The processor may identify an object included in the target region in a range greater than or equal to a designated range as a target object to be included in the target region.

[0242] In step **1905**, the processor identifies whether the object to be included in the target region corresponds to a single object or multiple objects. The processor may identify the number of objects identified as target objects to be included in the target region, and may determine whether the target object is a single object or multiple objects based on the identification result.

[0243] When the target object is a single object in step **1905**, the processor provides a designated first guide through the display (e.g., a target region and/or a main region) in step **1907**. The first guide may include various guides that can be provided for a single object.

[0244] When the target object is multiple objects in step **1905**, the processor provides a designated second guide through the display (e.g., a target region and/or a main region) in step **1909**. The second guide may be any of various guides that can be provided for multiple objects, and may include a function capable of setting (or selecting) priorities of the multiple objects.

[0245] FIG. **20** illustrates a visual guide in an electronic device according to an embodiment, FIG. **21** illustrates a visual guide in an electronic device according to an embodiment, FIG. **22** illustrates a visual guide in an electronic device according to an embodiment, and FIG. **23** illustrates a visual guide in an electronic device according to an embodiment.

[0246] The electronic device may provide various guides for screen division based on an angle change (e.g., a change in a hinge angle) of the display of the electronic device. FIGS. **20**, **21**, **22**, and **23** illustrate examples in which, when a target object to be included (or included) in a target region **2010** is a single object, a visual guide (e.g., a screen division guide) is provided to the user based on a first guide associated with the single object.

[0247] Referring to FIG. **20**, a visual guide is displayed that graphically provides a line **2000** corresponding to a target object (or the window corresponding to the target object). Based on the operation in which the user folds the display (e.g., when the user bends the hinge), the electronic device may provide a visual guide for screen division to the user by displaying a line corresponding the size of a window, in which the target object is to be provided, at an edge of the target region **2010** or at a position closest to the edge through the target region **2010**. The electronic device may graphically provide a line based on a designated color and/or a random color for ease of line identification by the user.

[0248] Referring to FIG. **21**, a visual guide is displayed that graphically provides a shape **2100** corresponding to a target object. The electronic device may provide a visual guide for screen division to the user by displaying a UI associated with the target object, or an image having a shape corresponding thereto, through the target region **2010** based on the operation in which the user folds the display.

[0249] Referring to FIG. **22**, a visual guide is displayed that graphically displays an icon **2200** (or an image (e.g., a thumbnail image)) corresponding to a target object in the

target region **2010**. The electronic device may provide a visual guide for screen division to the user by displaying an icon **2200** associated with the target object through the target region **2010** based on the operation in which the user folds the display.

[0250] Referring to FIG. **23**, a visual guide is displayed that graphically displays an image **2300** (e.g., a virtual image and/or a captured image) corresponding to a target object with a predetermined margin in the target region **2010**. The electronic device may provide a visual guide for screen division to the user by displaying a line corresponding to a window, in which a target object is to be provided and which is inwardly spaced apart from the edge of the target region **2010** by a predetermined interval, a UI associated with the target object, or an image having a shape corresponding to the UI, through the target region **2010**, based on the operation in which the user folds the display.

[0251] FIG. **24** illustrates a visual guide in an electronic device according to an embodiment, FIG. **25** illustrates a visual guide in an electronic device according to an embodiment, FIG. **26** illustrates a visual guide in an electronic device according to an embodiment, and FIG. **27** illustrates a visual guide in an electronic device according to an embodiment.

[0252] The electronic device may provide various guides for screen division based on an angle change (e.g., a change in a hinge angle) of the display of the electronic device. FIGS. **24**, **25**, **26**, and **27** illustrate examples in which, when a target object to be included (or included) in the target region **2410** is multiple objects, a visual guide (e.g., a screen division guide) is provided to the user based on a second guide, which makes it possible to set priorities of the multiple objects.

[0253] Referring to FIG. **24**, a visual guide is displayed, which makes it possible to set priorities of multiple objects based on windows **2420** and **2430** (e.g., lattice windows) corresponding to the number of objects to be included (or included) in the target region **2410**. The electronic device may identify multiple objects to be included in the target region **2410** and/or the number thereof based on the operation in which the user folds the display (e.g., when the user bends the hinge). The electronic device may provide windows **2420** and **2430** corresponding to respective objects by performing screen division on the target region **2410** based on the number of identified objects. The electronic device may provide a visual guide, which makes it possible to select the object to be displayed with the highest priority through the target region **2410** among the multiple objects based on the windows **2420** and **2430**, to the user. The user may select (e.g., touch) one of the windows **2420** and **2430** in order to set the object to be displayed with the highest priority through the target region **2410**.

[0254] Referring to FIG. **25**, a visual guide is displayed, which makes it possible to set priorities of multiple objects based on a list **2550** (e.g., an icon list) corresponding to the number of objects to be included (or included) in the target region **2410**. The electronic device may identify multiple objects to be included in the target region **2410** and/or the number thereof based on an operation in which the user folds the display, and may generate object icons **2510**, **2520**, **2530**, and **2540** corresponding to the multiple identified objects. The electronic device may generate a list **2550** for multiple objects based on the object icons **2510**, **2520**, **2530**, and **2540**, and may provide the list **2550** through at least one of the top, bottom, left, right, and central regions of the target region **2410**. The electronic device may provide a visual guide, which makes it possible to select the object to be displayed with the highest priority through the target region **2410**, among the multiple objects based on the list **2550**, to the user. The user may set the object to be displayed with the highest priority through the target region **2410** by selecting (e.g., touching) one object icon **2560** in the list **2550**.

[0255] Referring to FIG. **26**, a visual guide is displayed, which makes it possible to set priorities of multiple objects using a scroll bar **2610** (e.g., a vertical scroll bar or a horizontal scroll bar), which makes it possible to search for multiple objects included (or to be included) in the target region **2410** based on scrolling. The electronic device may generate the scroll bar **2610**, which makes it possible to scroll (e.g., to vertically scroll and/or horizontally scroll) multiple objects to be included in the target region **2410** in a scrolling manner based on the operation in which the user folds the display. The electronic device may provide the scroll bar **2610** through at least one of the top, bottom, left, right, and central regions of the target region **2410**. The electronic device may provide a visual guide, which makes it possible for the user to select the object to be displayed with the highest priority through the target region **2410** among the multiple objects by searching for multiple objects using the scroll bar **2610**, to the user. The user may set the object to be displayed with the highest priority through the target region **2410** by scrolling objects through input **2650** using the scroll bar **2610** and selecting one object among the multiple objects. The electronic device may provide, through the target region **2410**, a previous or next object (or information about the object), which has not been visible in the target region **2410**, by scrolling (e.g., vertically moving or horizontally moving) an object or information about the object displayed through the target region **2410** in response to the user's scrolling.

[0256] Referring to FIG. **27**, a visual guide is displayed, which makes it possible to set priorities of multiple objects based on multiple tiles **2750** (or pop-up windows, mini windows, or tile windows) corresponding to the number of objects included (or to be included) in the target region **2410**. The electronic device may identify multiple objects to be included in the target region **2410** and/or the number thereof based on an operation in which the user folds the display, and may generate multiple windows **2710**, **2720**, and **2730** corresponding to the multiple identified objects. The electronic device may randomly arrange and provide the multiple windows **2710**, **2720**, and **2730** in a tile format at random positions in the target region **2410**. The multiple windows **2710**, **2720**, and **2730** may be arranged in order to not overlap each other, or may be arranged such that at least some of them overlap each other. The electronic device may provide a visual guide, which makes it possible to select the object to be displayed with the highest priority through the target region **2410**, among the multiple objects based on the multiple tiles **2750**, to the user. The user may set the object to be displayed with the highest priority through the target region **2410** by selecting (e.g., touching) one object window **2760** from the multiple tiles **2750**.

[0257] FIG. **28** illustrates canceling screen division in an electronic device according to an embodiment.

[0258] Referring to FIG. **28**, while providing a visual guide for screen division, the electronic device may cancel

the screen division based on receiving designated user input from the user while providing a visual guide through a target region **2810**.

[0259] When a designated user input **2850** is detected in the while a visual guide is provided through the target region **2810**, the electronic device may cancel the screen division. The designated user input **2850** may include input (e.g., touch) through a region designated for cancellation of the screen division in the target region **2810**, input (e.g., drawing (e.g., drawing forming a closed curve), long touch, or double tap) designated for canceling screen division based on an arbitrary region of the target region **2810**, or unfolding input of the display through the target region **2810**. When the user input **2850** is detected while a visual guide is being provided, the electronic device may cancel screen division, and may remove the displayed visual guide based on the target region **2810**. The electronic device may restore an object to an original state through the target region **2810** and the main region, and may provide the restored object.

[0260] As described above, an electronic device may be of a type in which the display is folded inwards such that the display is not exposed to the outside of the electronic device (e.g., an in-folding type). However, the various embodiments are not limited thereto, and the electronic device may be of a type in which the display is folded outwards such that the display is exposed to the outside of the electronic device (e.g., an out-folding type).

[0261] FIG. **29** is a flowchart illustrating a method of operating an electronic device according to an embodiment.

[0262] Referring to FIG. **29**, in step **2901**, a processor of the electronic device detects an operation event (or trigger). The processor may detect an operation event in which the state of the display is changed using at least one sensor. The states of the display may include a first state, in which the state of the display is changed from the unfolded state to a state of being folded by a designated angle, or a second state, in which the state of the display is changed from a state of being folded by a designated angle to the unfolded state.

[0263] In step **2903**, the processor identifies the operation state of the display. For example, when the operation event in which the state of the display is changed is detected, the processor determines whether the state of the display is the first state or the second state. The processor may acquire data (e.g., sensor data) associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data. The at least one sensor may include a sensor (e.g., a smart hall sensor) that determines the state (e.g., the folded state or the unfolded state) of the electronic device (or a display of the electronic device), and/or a sensor (e.g., an acceleration sensor or a gyro sensor) that determines the rotation and orientation of the electronic device. The at least one sensor may include at least one of a touch sensor and a pressure sensor.

[0264] In response to identifying the first state in step **2903**, the processor identifies at least one object having at least one partial region included in the target region according to the first state (e.g., a folded region, among the regions of the display) in step **2905**. The processor may execute an operation of identifying an area folded in a designated range and identifying the area folded in the designated range as a target region (or a target display surface); an operation of identifying an object including at least one partial region included in the target region as a target object; an operation of identifying state information (e.g., restoration positions, restoration sizes, and/or a display (or arrangement) order (or a priority)) related to (or corresponding to) objects in the target region and the main region; an operation of storing the identified state information in memory; an operation of deactivating the target region; and/or an operation of identifying an operation time associated with folding.

[0265] The operation of deactivating the target region may include an operation of determining the target region as an unused display surface, and cutting off power to the display surface so as to turn off the display surface. The operation time associated with unfolding may be identified based on the folding angle of the display. During the operation in which the electronic device is changed from a fully unfolded state (e.g., an unfolded state) to a folded state, the processor may acquire data (e.g., detected data) associated with the angle between the first region (or the first display surface) of the first portion of the housing and the second region (or the second display surface) of the second portion of the housing using at least one sensor. The processor may compare the acquired data and preset first reference data (e.g., reference data for identifying a first operation time at which the second state is changed to the first state), and when the acquired data corresponds to the first reference data, the processor may determine that it is time to execute screen division of the display.

[0266] In step **2907**, the processor provides a graphic effect including (e.g., moving and/or size-adjusting) the identified object in the main region based on the detection of the first state change of the display. The processor may provide a graphic effect of moving the identified object to the main region and displaying the object by adjusting the size of the object (or the window size) according to a setting.

[0267] In step **2909**, the processor provides a graphic effect of rearranging and displaying an object through the main region based on the detection of the first state change of the display. The processor may provide a graphic effect of moving the object of the target region into the main region (e.g., moving the object having at least one partial region included in the target region (and/or located over the target region) into the main region), adjusting the size (e.g., resizing) of the object (or the window size), and causing the object to be displayed in the main region according to a designated priority (e.g., maintaining the priorities of the objects).

[0268] Alternatively, steps **2907** and **2909** may be performed sequentially, in parallel (or almost simultaneously), or in the reverse order.

[0269] In step **2911**, the processor provides (e.g., display) a UI based on completion of the state change. The processor may provide a first UI of at least one first object in the target region and a second UI of at least one second object in the main region in the state of being arranged (e.g., overlapped) in the main region according to designated priorities thereof.

[0270] The processor may provide objects in the main region in different ways depending on the operating method of the display set in the electronic device. The processor may provide the object having the highest priority in the main region as a full screen based on a first designated method, or may provide the object by maintaining the existing form (e.g., based on a pop-up window) and changing the arrangement according to the priority thereof based on a second designated method. When providing the UI of each object, the processor may identify the order of objects to be displayed based on the priority of each object. Based on the

identified priority of each object, the processor may set the UI of the object having the highest priority as the highest level, and may provide UIs of other objects in the sequentially overlapping state.

[0271] The processor may provide a first object, which has been displayed at the highest level in the target region, and a second object, which has been displayed at the highest level in the main region, but when the UI of the first object and the UI of the second object overlap each other, the processor may assign a weight to the first object of the target region and may provide the UI of the first object such that the UI of the second object overlaps the UI of the first object at a higher level than the UI of the second object. Objects other than the first object and the second object may be sequentially disposed on layers under the UI of the first object and/or the UI of the second object according to the positions and/or priorities thereof.

[0272] Based on the determination of the second state in step **2903**, the processor identifies an object to be included in the target region according to the second state (e.g., an unfolded region, among the regions of the display) in step **2913**. The processor may perform an operation of identifying an unfolded region and identifying the unfolded region as a target region (or a target display surface), an operation of activating the target region, an operation of identifying at least one object to be included in the target region, and/or an operation of identifying an operation time associated with unfolding.

[0273] The operation of activating the target region may include an operation of determining, e.g., the target region as a reused display surface, and supplying power to the display surface so as to turn on the display surface. The operation time associated with folding may be identified based on the unfolding angle of the display. While the electronic device is changed from a folded state to an unfolded state, the processor may acquire data associated with the angle between the first region (or the first display surface) of the first portion of the housing and the second region (or the second display surface) of the second portion of the housing using at least one sensor. The processor may compare the acquired data with preset second reference data (e.g., reference data for identifying a second operation time at which the first state is changed to the second state), and when the acquired data corresponds to the second reference data, the processor may determine that it is time to execute screen integration (e.g., to cancel screen division) of the display.

[0274] In step **2915**, the processor identifies state information associated with restoration of an object to a previous state. The processor may identify state information (e.g., restoration positions, restoration sizes, and/or a display order (or a priority)) associated with (or corresponding to) the objects in the target region and the main region. The state information for restoration to the previous state may be information that is identified when the display changes to the first state and is stored in a memory.

[0275] In step **2917**, the processor provides a graphic effect of rearranging objects. Based on state information corresponding to the object, the processor may identify the restoration position, restoration size, and/or overlapping state (or display order) of each object based on position information, the processor may move the position of at least one object based on size information, the processor may restore the size of the at least one object (e.g., the window size) to the previous size (e.g., based on a pop-up window), and, based on priority information (e.g., overlapping state), the processor may provide a graphic effect of overlapping objects.

[0276] The processor may provide each corresponding to each object in the previous state based on the unfolded target region and the main region. The processor may provide a UI of each object in the state before folding (e.g., based on the full window and/or based on a pop-up window) based on the restoration position of each object. When providing the U**1** of each object, the processor may identify the order of the objects to be displayed based on the priority of each object. Based on the identified priority of each object, the processor may set the UI of the object having the highest priority as the highest level, and may provide UIs of other objects in the sequentially overlapping state.

[0277] In step **2911**, the processor provides (e.g., displays) a UI based on the completion of the state change. The processor may restore the UI of each object to the state before folding and provide the same in a full screen in which the target region and the main region are connected as a single screen.

[0278] FIG. **30** illustrates operation of a display in an electronic device according to an embodiment. Specifically, FIG. **30** illustrates an example in which, in an operation of folding (e.g., out folding) at least one region (or a display surface), an object included in the folded region (e.g., a target region **3000** as an unused region) is provided while being moved to a fixed region (e.g., a main region **3001**).

[0279] Referring to FIG. **30**, when portions of objects **3010** and **3020** are included in the target region **3000**, the object **3020** included in the target region **3000** in a range that is greater than or equal to a designated range is determined to be a target object to be moved to the main region **3001**, and is moved to the main region **3001**. The first object **3010** and the second object **3020** are at least partially included in the target region **3000** and a third object **3030** is not included in the target region **3000**. The first object **3010** is included in the target region in a range less than a designated region, the second object **3020** is included in the target region **3000** in a range greater than or equal to the designated range, and the third object **3030** is not included in the target region **3000**, but is included in the main region **3001**.

[0280] The electronic device may process the target region **3000** as an unused region (e.g., an inactive region) based on an operation event (e.g., a deactivation process), and may identify a target object to be moved to the main region **3001** among one or more objects included in the target region **3000**.

[0281] Among the first object **3010** and the second object **3020** included in the target region **3000**, the electronic device may determine the second object included, in the target region **3000** in a range greater than or equal to the designated range to be the target object to be moved to the main region **3001**, and may provide the second object **3020** in the state of being moved to the main region **3001**. The electronic device may not move the first object **3010** included in the target region **3000** in a range less than the designated range to the main region **3001**.

[0282] The electronic device may identify an object included in the target region **3000** in a range greater than or equal to the designated range to be a target object to be moved to the main region **3001**, and the first object **3010** may not be included in the target object, e.g., as illustrated in FIG. **10**.

[0283] The electronic device may maintain the displayed state of the first object **3010** and the third object **3030** through the main region **3001**. The electronic device may provide the first object **3010**, the second object **3020**, and the third object **3030** in the main region **3001** in the state in which the priorities thereof are maintained. The electronic device may provide the object having the highest priority (e.g., the first object **3010**) as a full screen in the main region **3001**.

[0284] Regardless of the included ranges of the first object **3010** and the second object **3020**, which are included in the target range **3000**, the electronic device may determine all of the objects which are at least partially included in the target region **3000** (e.g., the first object **3010** and the second object **3020**) as target objects to be moved to the main region **3001**, and may provide the first object **3010** and the second object **3020** in the state of having been moved into the main region **3001**.

[0285] When at least a portion of a target is included in the target region **3000** and at least another portion of the target is included in the main region **3001** in a range greater than or equal to a designated range, like the first object **3010** and the second object **3020**, the electronic device may not move the target object. For example, the electronic device may provide the window of the target object in the state of being resized (e.g., reduced) with reference to a folding surface (or a folding axis or a hinge axis) between the target region **3000** and the main region **3001**. For example, the electronic device may fix and set a first portion included in the main region **3001**, among the portions of the target object, as a reference point, and may provide the window of the target object in the state of being reduced in size by an amount corresponding to the interval between the portions included in the target region **3000**.

[0286] FIG. **31** illustrates operation of a display in an electronic device according to an embodiment. Specifically, FIG. **31** illustrates an example in which, in an operation of folding (e.g., out-folding) at least one region (or a display surface) in the state in which the electronic device is unfolded, an object included in the folded region (e.g., a target region **3100** as an unused region) is provided while being moved to a fixed region (e.g., a main region **3001**).

[0287] Referring to FIG. **3** when all the portions of the objects **3110** and **3120** are included in the target region **3100**, the objects **3010** and **3020** included in the target region **3100** as target objects to be moved to the main region **3101**, and the target objects **3010** and **3020** are moved while maintaining the priorities thereof (e.g., the object **3110** located at the highest level in the target region **3100** has the highest priority).

[0288] For example, all portions of the first object **3110** and the second object **3120** may be included in the target region **3100**. When all portions of the first object **3110** and the second object **3120** are included in the target region **3100**, the electronic device may assign the highest priority to the first object **3110** provided at the highest level among the first object **3110** and the second object **3120**, which overlap in the target region **3100**. The electronic device may provide the first object **3110** at the highest level through the main region **3101**, and may sequentially arrange other objects **3120** and **3130** on the layers under the first object **3110** according to the positions and/or priorities thereof.

[0289] The electronic device may process the target region **3100** as an unused region (e.g., an inactive region) based on an operation event (e.g., a deactivation process), and may determine the objects **3110** and **3120** included in the target region **3100** as target objects. Thereafter, the electronic device may provide the target objects **3110** and **3120** while being moved to the main region **3101**. The electronic device may provide the third object **3130** included in the main region **3101** in the state in which the position, size, and/or priority thereof in the main region **3101** are maintained.

[0290] The electronic device may identify priorities of the first object **3110**, the second object **3120**, and the third object **3130** based on the movement of the target objects **3110** and **3120** to the main region **3101**. The electronic device may provide the first object **3110**, the second object **3120**, and the third object **3130** in the state of being sequentially arranged in the main region **3001** based on the priorities thereof. In FIG. **31**, the first object **3110** of the target region **3100** has the highest priority, the second object **3120** and the third object **3130** are provided in the state of being covered by the first object **3110**, and the second object **3120** and the third object **3130** are sequentially arranged in the layers under the first object **3110** according to the priorities thereof. The electronic device may provide the object having the highest priority (e.g., the first object **3110**) as a full screen in the main region **3101**.

[0291] The electronic device may provide the first object **3110**, which has been displayed at the highest level in the target region **3100**, and the third object **3130**, which has been displayed at the highest level in the main region **3101**, at the highest level. However, when the first object **3110** and the third object **3130** overlap each other, a weight may be assigned to the first object **3110**, and the first object **3110** and the third object **3130** may be provided in the state in which the first object **3110** overlaps the third object **3130** at a higher level.

[0292] FIG. **32** illustrates operation of a display in an electronic device according to an embodiment. Specifically, FIG. **32** illustrates an example in which, in an operation of changing at least one region to an unfolded state from the state in which the at least one region (or a display surface) of the display has been folded in a designated range (e.g., the state in which screen division has been performed), an object to be included in the unfolded region (e.g., the target region **3200**) and an object to be included in a fixed region (e.g., the main region **3201**) are restored to the original state, and UIs for the objects are provided.

[0293] Referring to FIG. **32**, a first object **3210**, a second object **3220**, and a third object **3230** are provided in the main region **3201**, and one or more objects (e.g., the first object **3210** and the second object **3220**) of the main region **3201** are restored based on the original positions, sizes, and priorities thereof according to the unfolding operation of the display. The first object **3210**, the second object **3220**, and the third object **3230** are in an overlapping state in the main region **3201**, and the first object **3210**, the second object **3220**, and the third object **3230** have higher priorities in that order. When there is no change in the state information the positions, the sizes, and/or the priorities) of respective objects **3210**, **3220**, and **3230** during the switching from the folded state to the state unfolded in a designated range, the electronic device may restore respective objects **3210**, **3220**, and **3230** to the previous state in order to provide the restored objects **3210**, **3220**, and **3230**.

[0294] The electronic device may process the target region **3200** as a used region (e.g., an active region) based on an

operation event (e.g., an activating process), and may identify a target object to be displayed through the target region **3200** among one or more objects included in the main region **3201**.

[0295] The electronic device may identify the positions, sizes, and/or priorities of the first object **3210**, the second object **3220**, and the third object **3230** of the main region **3201**. Based on the positions, sizes, and/or priorities of respective objects **3210**, **3220**, and **3230**, the electronic device may move the first object **3210** and the second object **3220** of the main region **3200** to the original positions based on the target region **3200** and the main region **3201**, and the electronic device may provide the first object **3210** at the highest level according to the priority thereof and may sequentially arrange the second object **3220** and the third object **3230** under the first object **3210** according to the priorities thereof.

[0296] When there is a change in state information related to at least one of the objects **3210**, **3220**, and **3230** in the state of being folded within the designated range, the electronic device may arrange the first object **3210**, the second object **3220**, and the third object **3230** and may arrange the same based on the changed state information. For example, when the folded state in the designated range is changed to the unfolded state while the user selects the third object **3230** of the main region **3205** and uses the third object **3230** at the highest level, the electronic device **101** may provide the third object **3230** at the highest level based on the changed priority thereof, and may sequentially arrange the first object **3210** and the second object **3220** under the third object **3230** according to the priorities thereof.

[0297] FIG. **33** is a flowchart illustrating a method of operating an electronic device according to an embodiment. Specifically, FIG. **33** illustrates a method of providing a visual guide, in which a guide based on a single object or a guide based on multiple objects is provided based on the number of target objects of the electronic device.

[0298] Referring to FIG. **33**, in step **3301**, a processor of the electronic device detects a designated angle based on the folding of the display. The processor may monitor the state change of the display based on the operation event, and may identify whether the state change corresponds to a designated angle for executing screen division. The processor may acquire data associated with the state change of the display from at least one sensor, and may identify the state of the display based on the acquired data.

[0299] In step **3303**, the processor identifies a target object to be moved to the main region based on detection of the designated angle. The processor may identify an object included in the target region in a range greater than or equal to a designated range or at least partially included in the target region as a target object to be moved from the target region to the main region.

[0300] In step **3305**, the processor identifies whether the target object corresponds to a single object or multiple objects. The processor may identify the number of objects identified as target objects to be moved to the main region, and may determine whether the target object is a single object or multiple objects based on the identification result.

[0301] When the target object is a single object in step **3305**, the processor provides a designated first guide through the display (e.g., the main region) in step **3307**. The processor may process the target area as an unused area (e.g., an inactive region) (e.g., a deactivation process), and may provide a designated visual guide based on the main region. The first guide may include various guides that can be provided for a single object.

[0302] When the target object is multiple objects in step **3305**, the processor provides a designated second guide through the display (e.g., a main region) in step **3309**. The processor may process the target area as an unused area (e.g., an inactive region) (e.g., a deactivation process), and may provide a designated visual guide based on the main region. The second guide may be various guides that can be provided for multiple objects, and may include a function of setting (or selecting) at least one object to be moved to the main region, among the multiple target objects, and/or a function of setting (or selecting) priorities of the multiple objects.

[0303] When setting the priorities based on a visual guide, the objects for which a priority is to be set may include all objects in the target region and the main region. In this case, in step **3305**, the processor may identify the target object and all objects in the target area and the main region, in order to identify whether there are multiple objects.

[0304] FIG. **34** illustrates a visual guide in an electronic device according to an embodiment, FIG. **35** illustrates a visual guide in an electronic device according to an embodiment, FIG. **36** illustrates a visual guide in an electronic device according to an embodiment, and FIG. **37** illustrates a visual guide in an electronic device according to an embodiment.

[0305] The electronic device may provide various guides for screen division based on an angle change (e.g., a change in a hinge angle) of the display of the electronic device. FIGS. **34**, **35**, **36**, and **37** illustrate examples in which, when a target object to be included in (or to be moved to) the main region **3410** from the target region is a single object, a visual guide (e.g., a screen division guide) is provided to the user based on a first guide associated with the single object.

[0306] Referring to FIG. **34**, a visual guide is displayed that graphically provides a line **3400** corresponding to a target object (or the window of the target object). Based on an operation in which the user folds the display (e.g., when the user bends the hinge), the electronic device may provide a visual guide for screen division to the user by displaying a line corresponding the size of the window in which the target object is to be provided, on a folded surface between the target region and the main region **3410** or at a position closest to the folded surface through the main region **3410**. The electronic device may graphically provide a line based on a designated color and/or a random color for ease of line identification by the user. When a line visual guide is provided, the electronic device may provide only a line (e.g., a border line) corresponding to the region occupied by a target object, and the inside of the line may be provided to be transparent such that an object included in the main region **3410** is visible therethrough and thus displayed.

[0307] Referring to FIG. **35**, a visual guide is displayed that graphically provides a shape **3500** corresponding to a target object. The electronic device may provide a visual guide for screen division to the user by displaying a UI associated with the target object or an image having a shape corresponding thereto, through the main region **3410** based on the operation in which the user folds the display.

[0308] Referring to FIG. **36**, a visual guide is displayed that graphically displays an icon **3600** (or an image (e.g., a thumbnail image)) corresponding to a target object. The

electronic device may provide a visual guide for screen division to the user by displaying an icon **3600** associated with the target object through the main region **3410** based on the operation in which the user folds the display. When providing an icon visual guide, the electronic device may provide only an icon **3600** associated with the target object on the main region **3410** or an object in the main region **3410**. Alternatively, a region occupied by the target object may be drawn, and the icon **3600** associated with the target object may be provided in the drawn region.

[0309] Referring to FIG. **37** a visual guide is displayed that graphically displays an image **3700** (e.g., a virtual image and/or a captured image) corresponding to a target object with a predetermined margin in a region **3750** occupied by a target object. The electronic device may provide a visual guide for screen division to the user by displaying a line corresponding to a window in which a target object is to be provided and which is inwardly spaced apart from the edge of the region occupied by the target object by a predetermined interval, a UI associated with the target object, or an image having a shape corresponding to the UI, through the main region **3410** based on the operation in which the user folds the display.

[0310] FIG. **38** illustrates a visual guide in an electronic device according to an embodiment, FIG. **39** illustrates a visual guide in an electronic device according to an embodiment, FIG. **40** illustrates a visual guide in an electronic device according to an embodiment, and FIG. **41** illustrates a visual guide in an electronic device according to an embodiment.

[0311] The electronic device may provide various guides for screen division based on an angle change (e.g., a change in a hinge angle) of the display of the electronic device. FIGS. **38**, **39**, **40**, and **41** illustrate examples in which, when a target object to be included in (or to be moved to) a main region **3810** is multiple objects, a visual guide (e.g., a screen division guide) is provided to the user based on a second guide, which makes it possible to set priorities of the multiple objects and/or at least one target object to be moved to the main region **3810**, among the multiple objects. FIGS. **38**, **39**, **40**, and **41** illustrate an example in which, based on the second guide, at least one target object to be moved to the main region **3810** is set, among the multiple objects identified based on the target region.

[0312] When setting the priorities based on a visual guide (e.g., the second guide), the objects for priority setting may include all objects of the target region and the main region. For example, in setting the priorities of objects displayed through the main region **3810**, the electronic device may provide all the objects of the target region and the main region so that the user can set the priorities.

[0313] Referring to FIG. **38**, a visual guide is displayed that makes it possible to set a target object to be moved to a main region **3810** among the multiple objects based on windows **3820** and **3830** (e.g., lattice windows) corresponding to the number of target objects. The electronic device may identify multiple objects to be moved to the main region **3810** and/or the number thereof based on the operation in which the user folds the display **210** (e.g., when the user bends the hinge). The electronic device may provide windows **3820** and **3830** corresponding to respective objects by performing screen division on the main region **3810** based on the number of identified objects. The electronic device may provide a visual guide, which makes it possible to select an object to be moved to the main region **3810** (or to be displayed with the highest priority through the main region **3810**) among the multiple objects based on the windows **3820** and **3830**, to the user. The user may select (**3850**) (e.g., touch) at least one of the windows **3820** and **3830** in order to set at least one object to be moved to the main region **3810**.

[0314] Referring to FIG. **39**, a visual guide is displayed, which makes it possible to set a target object to be moved to the main region **3810**, among multiple objects based on a list **3950** (e.g., an icon list) corresponding to the number of target objects. The electronic device **101** may identify multiple objects to be moved to the main region **3810** and/or the number thereof based on an operation in which the user folds the display, and may generate object icons **3910**, **3920**, **3930**, and **3940** corresponding to the multiple identified objects. The electronic device may generate a list **3950** for multiple objects based on the object icons **3910**. **3920**, **3930**, and **3940**, and may provide the list **3950** through at least one of the top, bottom, left, right, and central regions of the main region **3810**.

[0315] The electronic device may provide a visual guide that makes it possible to select an object to be moved to the main region **3810** (or to be displayed with the highest priority through the main region **3810**), among the multiple objects based on the list **3950**, to the user. The user may select (e.g., touch) at least one object icon **3960** in order to set at least one object to be moved to the main region **3810** in the list **3950**.

[0316] Referring to FIG. **40**, a visual guide is displayed, which makes it possible to set a target object to be moved to the main region **3810** among the multiple objects using a scroll bar **4010** (e.g., a vertical scroll bar or a horizontal scroll bar), which makes it possible to search for the target object based on scrolling. The electronic device may generate the scroll bar **4010**, which makes it possible to scroll (e.g., to vertically scroll and/or horizontally scroll) multiple objects to be moved to the main region **3810** in a scroll manner based on the operation in which the user folds the display. The electronic device may provide the scroll bar **4010** through at least one of the top, bottom, left, right, and central regions of the main region **3810**.

[0317] The electronic device may provide a visual guide, which makes it possible for the user to select an object to be moved to the main region **3810** (or to be displayed with the highest priority through the main region **3810**) among the multiple objects by searching for multiple objects using the scroll bar **4010** in a scroll manner, to the user. The user may set an object to be moved to the main region **3810** by scrolling objects through input **4050** using the scroll bar **4010** and selecting one object among the multiple objects. The electronic device may provide, through the main region **3810**, a previous or next object (or information about the object), which has not been visible in the main region **3810**, by scrolling (e.g., vertically or horizontally moving) an object or information about the object displayed through the main region **3810** in response to the user's scrolling.

[0318] Referring to FIG. **41**, a visual guide is displayed, which makes it possible to set a target object to be moved to the main region **3810** among the multiple objects based on multiple tiles **4150** (or pop-up windows, mini windows, or tile windows) corresponding to the number of target objects. The electronic device may identify multiple objects to be moved to the main region **3810** and/or the number thereof

based on an operation in which the user folds the display, and may generate multiple windows **4110**, **4120**, and **4130** corresponding to the multiple identified objects. The electronic device may randomly arrange and provide the multiple windows **4110**, **4120**, and **4130** in a tile format at random positions in the main region **3810**.

[0319] The multiple windows **4110**, **4120**, and **4130** may be arranged in order to not overlap each other, or may be arranged such that at least some of them overlap each other. The electronic device may provide a visual guide, which makes it possible to select an object to be moved to the main region **3810** (or to be displayed with the highest priority through the main region **3810**), among the multiple objects based on the multiple tiles **4150**, to the user. The user may select (e.g., touch) at least one window **4160** in the multiple tiles **4150** in order to set at least one object to be moved to the main region **3810**.

[0320] FIG. **42** illustrates canceling screen division in an electronic device according to an embodiment.

[0321] While providing a visual guide for screen division, the electronic device may cancel the screen division based on designated user input. FIG. **42** illustrates an example of canceling screen division based on reception of user input designated based on a target region **4210** and/or a main region **4220** from the user while providing a visual guide through the main region **4220**.

[0322] Referring to FIG. **42**, when designated user input **4250** is detected while a visual guide is provided through the main region **4220**, the electronic device may cancel the screen division. The designated user input **4250** may include input (e.g., a touch input) through a region designated for cancellation of screen division in the target region **4210** or the main region **4220**, input (e.g., drawing (e.g., drawing forming a closed curve), long touch, or double tap) designated for canceling screen division based on an arbitrary region of the target region **4210** or the main region **4220**, or unfolding input of the display through the target region **4210**. When user input **4250** is detected while a visual guide is being provided, the electronic device may cancel screen division, and may remove the displayed visual guide based on the main region **4220**. The electronic device may restore an object to the original state thereof through the target region **4810** and the main region **4220**, and may provide the restored object.

[0323] According to an embodiment, a method of operating an electronic device includes displaying one or more objects through a display; detecting an operation event in which the display is switched from a first state to a second state; monitoring a state change of the display based on the operation event; detecting a state in which the display is folded to a designated angle; dividing the display into a first display surface and a second display surface based on the state of being folded to the designated angle; and rearranging and displaying the one or more objects based on at least the first display surface or the second display surface.

[0324] The first display surface may include a display surface, which is folded about a folding axis in the display, and the second display surface may include a fixed display surface, which is not folded in the display.

[0325] Displaying the one or more objects may include displaying a target object of at least one of the displayed objects on the first display surface of the display based on the state of being folded to the designated angle; and displaying a remaining object other than the target object on the second display surface of the display.

[0326] Displaying the one or more objects may include determining, when a plurality of target objects related to the first display surface are present, priorities of the plurality of target objects; and determining an object to be displayed on the first display surface based on the priority.

[0327] Displaying the one or more objects may include identifying a target object to be included in the first display surface; and storing state information related to restoration of the identified target object.

[0328] The method may further include restoring the target object to an original state based on at least the first display surface and/or the second display surface based on the state information, and providing the restored target object when the display is switched to an unfolded state.

[0329] The method may further include detecting a trigger related to screen division in the state of being folded to the designated angle, and conducting an action for the trigger related to the screen division based on a designated trigger, wherein the designated trigger may include a designated angle different from the designated angle for executing the screen division or a designated user interaction.

[0330] The method may further include providing a guide related to the screen division at the designated angle; and executing the screen division based on the designated trigger in the state in which the guide is displayed.

[0331] The method may further include identifying the designated user interaction at the designated angle; and executing the screen division based on the identification of the user interaction.

[0332] While the disclosure has been particularly shown and described with reference to certain embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the disclosure as defined by the appended claims and their equivalents.

What is claimed is:

1. An electronic device, comprising:

a display;

a processor; and

a memory configured to store instructions that, when executed, cause the processor to:

display one or more objects through the display,

detect an operation event in which the display is switched from a first state to a second state,

monitor a state change of the display based on the operation event,

detect the display being folded to a designated angle,

divide the display into a first display surface and a second display surface based on the display being folded to the designated angle, and

rearrange and display the one or more objects based on at least one of the first display surface or the second display surface.

2. The electronic device of claim **1**, wherein the first display surface comprises a display surface, which is folded about a folding axis in the display, and

wherein the second display surface comprises a fixed display surface, which is not folded in the display.

3. The electronic device of claim **1**, wherein the instructions, when executed, further cause the processor to:

display a target object of at least one of the displayed one or more objects on the first display surface of the display based on the display being folded to the designated angle, and

display a remaining object other than the target object on the second display surface of the display.

4. The electronic device of claim **1**, wherein the instructions, when executed, further cause the processor to:

determine, when a plurality of target objects related to the first display surface are present, priorities of the plurality of target objects, and

determine an object to be displayed on the first display surface based on the priorities.

5. The electronic device of claim **1**, wherein the instructions, when executed, further cause the processor to:

identify a target object to be included in the first display surface, and

store, in the memory, state information related to restoration of the identified target object.

6. The electronic device of claim **5**, wherein the instructions, when executed, further cause the processor to:

restore the target object to an original state based on at least one of the first display surface and the second display surface, based on the state information and provide the restored target object, when the display is switched to an unfolded state.

7. The electronic device of claim **1**, wherein the instructions, when executed, further cause the processor to:

detect a trigger related to screen division at a first designated angle, and

conduct an action for the trigger related to the screen division based on a designated trigger.

8. The electronic device of clams **7**, wherein the instructions, when executed, further cause the processor to:

provide a guide related to the screen division at the first designated angle, and

execute the screen division based on the designated trigger in a state in which the guide is displayed.

9. The electronic device of claim **7**, wherein the designated trigger comprises at least one of a second designated angle, different from the first designated angle, for executing the screen division or a designated user interaction.

10. The electronic device of claim **1**, wherein the instructions, when executed, further cause the processor to:

identify the designated user interaction at the designated angle, and

execute the screen division based on identification of the user interaction.

11. An electronic device, comprising:

a foldable display;

a processor; and

a memory configured to store instructions that, when executed, cause the processor to:

detect an operation event in which a state of the foldable display is changed, monitor a state change of the foldable display based on the operation event,

display at least one object including a first object included in a first target region for a first state in a range greater than or equal to a designated range, and rearrange and display a remaining object in a main region when there is the first state change, and

restore at least one object including a second object included in a second target region for a second state based on state information, and rearrange and display the at least one object through the second target region and the main region when there is the second state change.

12. A method of operating an electronic device, the method comprising:

displaying one or more objects through a display;

detecting an operation event in which the display is switched from a first state to a second state;

monitoring a state change of the display based on the operation event;

detecting the display being folded to a designated angle;

dividing the display into a first display surface and a second display surface based the display being folded to the designated angle; and

rearranging and displaying the one or more objects based on at least one of the first display surface or the second display surface,

13. The method of claim **12**, wherein the first display surface includes a display surface, which is folded about a folding axis in the display, and

wherein the second display surface includes a fixed display surface, which is not folded in the display.

14. The method of claim **12**, wherein displaying the one or more objects comprises:

displaying a target object of at least one of the displayed objects on the first display surface of the display based on the display being folded to the designated angle; and

displaying a remaining object other than the target object on the second display surface of the display.

15. The method of claim **12**, wherein displaying the one or more objects comprises:

determining, when a plurality of target objects related to the first display surface are present, priorities of the plurality target objects; and

determining an object to be displayed on the first display surface based on the priorities.

16. The method of claim **12**, wherein displaying the one or more objects comprises:

identifying a target object to be included in the first display surface; and

storing state information related to restoration of the identified target object.

17. The method of claim **16**, further comprising restoring the target object to an original state based on at least one of the first display surface and the second display surface, based on the state information and providing the restored target object, when the display is switched to an unfolded state.

18. The method of claim **12**, further comprising:

detecting a trigger related to screen division at a first designated angle; and

conducting an action for the trigger related to the screen division based on a designated trigger,

wherein the designated trigger includes a designated angle different from the designated angle for executing the screen division or a designated user interaction.

19. The method of claim **18**, further comprising:

providing a guide related to the screen division at the designated angle; and

executing the screen division based on the designated trigger while the guide is displayed.

20. The method of claim **12**, further comprising:
identifying the designated user interaction at the designated angle; and
executing the screen division based on identification of the user interaction.

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