Description

Title of Invention: METHOD AND APPARATUS FOR DISPLAYING APPLICATION

Technical Field

[1] One or more embodiments of the present invention relate to a method and apparatus for displaying applications on windows.

Background Art

[2] When a terminal device can perform multitasking in which two or more applications are simultaneously executed, the terminal device may display execution screens of the applications on at least two windows. The at least two windows capable of displaying the execution screens of the applications may be referred to as multi-windows.

[3] A user may control the terminal device to simultaneously perform tasks that the user wants to execute in the terminal device by using the multi-windows. Therefore, if the multi-windows are easily controlled, the user may easily perform the multitasking in the terminal device.

Disclosure of Invention

Solution to Problem

[4] One or more embodiments of the present invention include a method and apparatus for displaying applications on windows. Additional aspects will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the presented embodiments.

Advantageous Effects of Invention

[5] According to one or more exemplary embodiments, display areas of applications displayed on a full-sized window and a sub-window may be easily changed.

[6] As described above, according to the one or more of the above exemplary embodiments, an application displayed on a full-sized window and applications displayed on sub-windows.

Brief Description of Drawings

[7] These and/or other aspects will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings in which:

[8] FIGS. 1A and 1B are examples of a display screen of a terminal device according to an exemplary embodiment;

[9] FIGS. 2A and 2B are flowcharts of a method of displaying applications, according to an exemplary embodiment;

[10] FIG. 3 illustrates a method of displaying applications, according to an exemplary embodiment;

[11] FIG. 4 is a flowchart of a method of displaying applications by changing a sub-window and a full-sized window;

[12] FIG. 5 illustrates a method of displaying applications by changing a sub-window and a full-sized window, according to an exemplary embodiment;

[13] FIG. 6 is a flowchart of a method of displaying a sub-window in a hide mode, according to an exemplary embodiment;

[14] FIGS. 7A through 7D illustrate a method of displaying a sub-window in a hide mode, according to an exemplary embodiment;

[15] FIG. 8 is a flowchart of a method of controlling a sub-window according to areas where gestures are detected, according to an exemplary embodiment;

[16] FIGS. 9A and 9B illustrate a method of controlling a sub-window according to areas where gestures are detected, according to an exemplary embodiment;

[17] FIGS. 10A and 10B illustrate a method of displaying an application list on a sub-window, according to an exemplary embodiment;

[18] FIG. 11 is a flowchart of a method of displaying an application list on a sub-window, according to an exemplary embodiment;

[19] FIG. 12 illustrates examples of displaying an application list on a sub-window in a list mode, according to an exemplary embodiment;

[20] FIG. 13 is a flowchart of a method of changing a list item in a sub-window, according to an exemplary embodiment;

[21] FIGS. 14A through 15B are examples of a method of displaying an application list in a stack mode on a sub-window, according to embodiments of the present invention;

[22] FIG. 16 is a flowchart of a method of moving list groups of a sub-window, according to an exemplary embodiment;

[23] FIG. 17 illustrates examples of moving list groups of a sub-window displayed in a list mode, according to an exemplary embodiment;

[24] FIG. 18 illustrates an example of moving list groups of a sub-window displayed in a stack mode, according to an exemplary embodiment;

[25] FIG. 19 is a flowchart of a method of changing an orientation of a sub-window, according to an exemplary embodiment;

[26] FIG. 20 is illustrates an example of a method of changing an orientation of a sub-window, according to an exemplary embodiment;

[27] FIG. 21 is a flowchart of a method of displaying applications when terminating the applications, according to an exemplary embodiment;

[28] FIGS. 22A and 22B are examples of a method of displaying applications when terminating the applications, according to an exemplary embodiment;

[29] FIG. 23 is a flowchart of a method of displaying applications, according to an exemplary embodiment;

[30] FIG. 24 illustrates examples of a method of displaying applications, according to an exemplary embodiment; and

[31] FIGS. 25A and 25B are block diagrams showing an internal structure of a device displaying applications, according to an exemplary embodiment.

Best Mode for Carrying out the Invention

[32] According to one or more embodiments of the present invention, a method of displaying an application, the method includes: displaying an execution screen of a first application on a first area when the first application is executed; displaying the execution screen of the first application on a second area instead of on the first area when a second application is executed while the first application is executed; and displaying an execution screen of a second application on the first area.

[33] The method may further include: detecting a user gesture in the second area; displaying the execution screen of the first application on the first area instead of the second area in response to the detected user gesture; and displaying an execution screen of any one of applications being executed in a terminal device on the second area.

[34] The method may further include displaying the second area in a hide mode.

[35] The displaying of the second area in the hide mode may include: displaying at least one of alternative images indicating the second area, a transparent portion of the second area and some portion of the second area instead of displaying the second area; and displaying the second area in the hide mode when no user gesture is input for requesting hiding of the sub-window or no user gesture is input with regard to the second area.

[36] The displaying of the second area in the hide mode may include: detecting a user gesture requesting release of an automatic hide mode that is set for the second area; releasing the automatic hide mode that is set for the second area in response to the detected user gesture; and when no input regarding the second area is detected for a predetermined amount of time, displaying the second area in the hide mode according to whether the automatic hide mode is set for the second area.

[37] The displaying of the sub-window in the hide mode may include: detecting a user gesture for requesting a release of an automatic hide mode that is set for the second area; releasing the automatic hide mode that is set for the second area in response to the gesture; when no input with regard to the second area is detected for a predetermined amount of time, displaying the second area in the hide mode according to whether the second area is in the automatic hide mode.

[38] The first area may be an entire area of a display screen of a terminal device, an execution screen of an application, which is decreased in size while maintaining a certain proportion and which overlaps with the first area, may be displayed on the second area, and the second area may be a portion of the entire area of the display screen of the terminal device.

[39] The method may further include: detecting a user gesture with regard to the second area; and changing a size of the second area and displaying the second area according to the changed size in response to the gesture.

[40] The method may further include: detecting a user gesture with regard to the second area; and moving the second area in response to the gesture.

[41] The method may further include: detecting a user gesture for displaying a list; and displaying an execution screen of at least one application being executed in a terminal device on the second area in a sub-window displaying manner in response to the gesture. The sub-window displaying manner may be in one of a stack mode and a list mode.

[42] The displaying of the execution screen of the at least one application on the second area in the sub-window displaying manner may include: selecting one of applications displayed on the second area; and displaying the selected application on the first area.

[43] The displaying of the execution screen of the at least one application on the second area in the sub-window displaying manner may include: displaying a plurality of execution screens of applications from among applications being executed in the terminal device, wherein the plurality of execution screens overlap one another and are displayed in a predetermined order; detecting a user gesture for changing an item; and displaying an execution screen of a next application in response to the user gesture for changing the item.

[44] The second area may include sub-window list groups including at least one sub-window displaying an execution screen of an application being executed in the terminal device, and the method of displaying the application may further include: detecting a user gesture with regard to the sub-window list groups; determining whether an area where the user gesture is detected is set as an area where the sub-window list groups are to be moved; and moving the sub-window list groups according to a result of the determination.

[45] The method may further include: receiving an input for requesting termination of an application; terminating display of the application on the first area in response to the received input; and displaying an application, which was displayed on the second area, on the first area.

[46] A user gesture detected in the second area may be processed as a gesture for controlling the display of the execution screen of the second application on the second

area.

[47] The method may further include: detecting a user gesture for changing a sub-window orientation; and changing an orientation of an execution screen of an application displayed on the second area and displaying the execution screen having the changed orientation in response to the detected user gesture for changing the sub-window orientation.

Mode for the Invention

[48] This application claims the benefit of Korean Patent Application No. 10-2013-0091174, filed on July 31, 2013, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

[49] Reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings. In this regard, the present embodiments may have different forms and should not be construed as being limited to the descriptions set forth herein. Accordingly, the embodiments are merely described below, by referring to the figures, to explain aspects of the present description. As used herein, expressions such as "at least one of", when preceding a list of elements, modify the entire list of elements and do not modify the individual elements of the list.

[50] The present invention will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. In the description of the present invention, if it is determined that a detailed description of commonly-used technologies or structures related to the invention may unnecessarily obscure the subject matter of the invention, the detailed description will be omitted. Also, since later-described terms are defined in consideration of the functions of the present invention, they may vary according to users' intentions or practice. Hence, the terms must be interpreted based on the contents of the entire specification.

[51] It will be further understood that the terms "comprises" and/or "comprising" used herein specify the presence of stated features or components, but do not preclude the presence or addition of one or more other features or components. Also, the terms "... unit", "... module", etc. are units for processing at least one function or operation and may be executed as hardware, software, or a combination of hardware and software.

[52] The touch gesture of the user may include a tap gesture, a touch & hold gesture, a double tap gesture, a drag gesture, a panning gesture, a flick gesture, a drag & drop gesture, or the like.

[53] "Tapping" is a user's motion of touching a screen by using a finger or a touch tool such as an electronic pen and then instantly lifting the finger or touch tool from the screen without moving.

[54] "Touching & holding" is a user's motion of touching a screen by using a finger or a

touch tool such as an electronic pen and then maintaining the above touching motion over a critical time (e.g., 2 seconds), after touching the screen. For example, a time difference between a touch-in time and a touch-out time is greater than or equal to the critical time, for example, 2 seconds. When a touch input lasts more than the critical time, in order to remind the user whether the touch input is tapping or touching & holding, a feedback signal may be provided in a visual, acoustic, or tactile manner. The critical time may vary according to embodiments.

[55] "Double tapping" is a user's motion of touching the screen twice by using the finger or touch tool (such as a stylus pen).

[56] "Dragging" is a user's motion of touching the screen by using the finger or touch tool and moving the finger or touch tool to another position on the screen while keeping the touching motion. The dragging motion may enable the moving or panning motion of an object.

[57] "Panning" is a user's motion of performing a dragging motion without selecting an object. Since no object is selected in the panning motion, no object is moved in a page but the page itself is moved on the screen or a group of objects may be moved within a page.

[58] "Flicking" is a user's motion of performing a dragging motion over a critical speed, for example, 100 pixel/s, by using the finger or touch tool. The dragging (panning) motion or the flicking motion may be distinguished based on whether the moving speed of the finger or touch tool is over the critical speed, for example, 100 pixel/s, or not.

[59] "Dragging & Dropping" is a user's motion of dragging an object to a predetermined position on the screen by using the finger or touch tool and then dropping the object at that position.

[60] Throughout the specification, when a portion is “connected” to another portion, the portion may be “directly connected” to the other portion, and also the portion may be “electrically connected” to the other portion by interposing a device therebetween. Also, when a portion “includes” an element, another element may be further included, rather than excluding the existence of the other element, unless otherwise described.

[61] Hereinafter, the present invention will be described in detail by explaining exemplary embodiments of the invention with reference to the attached drawings. Like reference numerals in the drawings denote like elements, and repeated descriptions will be omitted.

[62] FIGS. 1A and 1B are examples of a display screen 110 of a terminal device 100, according to an exemplary embodiment.

[63] Referring to FIG. 1A, the terminal device 100 may be executed as various types of devices having a display screen 110. The terminal device 100 described herein is a

device used by a user, for example, a mobile phone, a smartphone, a laptop computer, a digital broadcasting device, a personal digital assistant (PDA), a portable multimedia player (PDA), a navigation device, a table personal computer (PC), etc. However, the terminal device 100 is not limited thereto and the terminal device 100 may be a device that is already commercialized or developed in the future.

[64] As shown in FIG. 1A, the terminal device 100 may include the display screen 110 capable of displaying thereon an execution screen of an application being executed in the terminal device 100.

[65] The terminal device 100 may display one or more applications, which are being executed, on the display screen 110. In particular, execution screens of the applications being executed in the terminal device 10 may be simultaneously displayed on multiple areas of the display screen 110.

[66] For example, the display screen 110 includes a sub-window 111 and a full-sized window 112 where execution screens of applications are displayed. The terminal device 100 may simultaneously display the execution screens of the applications on the sub-window 111 and the full-sized window 112.

[67] In the present embodiment, the full-sized window 112 may be an entire area of the display screen 110. In addition, the sub-window 111 may be a pop-up window that may overlap the full-sized window 112 of the display screen 110.

[68] When the execution screens of the applications are respectively displayed on sub-window 111 or the full-sized window 112, controlling the sub-window 111 and the full-sized window 112 where the execution screens are displayed may be easier than controlling vertical areas that are determined by vertically dividing an entire area of the display screen 110.

[69] For example, moving the sub-window 111 or adjusting a size thereof may be easier than moving one of the vertical areas or adjusting a size thereof.

[70] The terminal device 100 may be in a Window-on-Window (WOW) mode in which the execution screens of the applications are displayed on the sub-window 111 and the full-sized window 112. In the WOW mode, the terminal device 100 may display execution screens of applications on the sub-window 111 or the full-sized window 112. When the WOW mode is inactive, the terminal device 100 may display an execution screen of an application on the full-sized window 112.

[71] Hereinafter, a method of displaying execution screens of applications on the sub-window 111 or the full-sized window 112 is described as shown in FIG. 1A.

[72] In the present embodiment, the areas where the execution screens of the applications are displayed are not limited to the full-sized window 112 and the sub-window 111, the entire area of the display screen 110 may be divided into areas according to desired area type, area shape, or a dividing method. For example, the display screen 110 may

be roughly divided into top, bottom, left, and right areas. In the present specification, the areas into which the display screen 110 is divided are the sub-window 111 and the full-sized window 112.

[73] Also, applications capable of being displayed on the terminal device 100 are not limited to applications being executed in the terminal device 100. For example, as shown in FIG. 1B, applications being executed in an external device 200 may be displayed on the display screen 110 of the terminal device 100. That is, the applications are executed in the external device 200, and execution results are transmitted from the external device 200 to the terminal device 100, thus displaying the execution results of the applications on the display screen 110 of the terminal device 100. Referring to FIG. 1B, the terminal device 100 receives the execution results of the applications from the external device 200 and displays the same on the display screen 110 of the terminal device 100.

[74] The terminal device 100 may be a cloud computing device that may connect to a cloud computing system. For example, when control signals are generated in the terminal device 100, the external device 200 receives and processes the generated control signals and may transmit a processing result to the terminal device 100. In addition, the terminal device 100 may display the processing result on the display screen 110. The control signals that may be generated in the terminal device 100 may include user input signals used to execute applications.

[75] Hereinafter, a method of displaying one or more applications executed in the terminal device 100 will be described. However, the applications may be executed in other devices as well. That is, as described above, the displayed applications may be applications executed in the external device 200.

[76] FIGS. 2A and 2B are flowcharts of a method of displaying an application, according to an exemplary embodiment.

[77] Referring to FIG. 2A, the terminal device 100 may display an execution screen of a first application on a first area when the first application is executed in operation S201. In this case, the first area may be the full-sized window 112. For example, in operation S201, the execution screen of the first application including an execution result thereof may be displayed on the full-sized window 112.

[78] In operation S203, the terminal device 100 may display the execution screen of the first application onto a second area instead of the first area when a second application is executed. In this regard, a second area may be the sub-window 111. For example, in operation S203, the execution screen of the first application including an execution result thereof may be displayed on the sub-window 111.

[79] An effect indicating that the execution screen of the first application is displayed onto the sub-window 111 instead of the full-sized window 112 may also be output. The

effect may include a visual effect and an auditory effect.

[80] For example, the visual effect may include an effect via which the execution screen of the first application, which is displayed on the full-sized window 112, is gradually decreased and displayed on the sub-window 111. Moreover, the auditory effect may include an effect in which a 'click' sound is output when the execution screen of the first application is gradually decreased and displayed on the sub-window 111. A user of the terminal device 100 may easily recognize that the execution screen of the first application is displayed on the sub-window 111 instead of on the full-sized window 112 based on the simultaneous output of a visual effect and an auditory effect when the execution screen of the first application is displayed onto the sub-window 111 instead of the full-sized window 112.

[81] When the execution screen of the first application is displayed on the sub-window 111 instead of on the full-sized window 112, the execution screen of the first application may be gradually decreased while maintaining a certain proportion and may be displayed on the sub-window 111.

[82] In operation S205, the terminal device 100 may display an execution screen of the second application, which is executed in operation S203, on the first area. The first area may be the full-sized window 112.

[83] In other words, when a new application is executed while an execution screen of an application is displayed on the full-sized window 112, an execution screen of the new application may be displayed on the full-sized window 112. In addition, the execution screen of the application, which is displayed on the full-sized window 112 before the execution screen of the new application is displayed on the full-sized window 112, may instead be displayed on the sub-window 111.

[84] Therefore, when a new application is executed while another application is executed, since the execution screen of the application, which is displayed on the full-sized window 112, is displayed on the sub-window 111, the execution screen of the application may continue to be displayed on the display screen 110.

[85] For example, when the terminal device 100 executes a web browser while the terminal device 100 displays an execution screen of a calculator application on the full-sized window 112, the execution screen of the calculator application is displayed on the sub-window 111 instead of on the full-sized window 112, and an execution screen of the web browser may be displayed on the full-sized window 112. Since the execution screen of the calculator application may overlap the execution screen of the web browser and be displayed on the sub-window 111, the user may use the web browser while checking results calculated by the calculator application displayed on the sub-window 111.

[86] For example, when the terminal device 100 executes a new application while the

terminal device 100 displays a video on the full-sized window 112, the video is displayed on the sub-window 111 instead of the full-sized window 112, and an execution screen of the new application may be displayed on the full-sized window 112. Thus, the user may continue to watch the video displayed on the sub-window 111 while controlling the new application displayed on the full-sized window 112. In this case, the video may be continuously reproduced even though the video is displayed onto the sub-window 111 instead of the full-sized window 112. Thus, the terminal device 100 may execute the new application and may continue to reproduce the video without temporarily pausing the same.

[87] Unlike FIG. 2A, FIG. 2B is a flowchart of a method of displaying applications on a full-sized window or sub-windows based on the execution order of the applications.

[88] A case where the second application is executed while the first application is displayed on the full-sized window 112 is described with reference to FIG. 2A, and a case where an nth application is executed while an n-1th application is displayed on the full-sized window 112 will be described with reference to FIG. 2B. In this case, the first and second applications in FIG. 2A may correspond to the n-1th and nth applications in FIG. 2B.

[89] Referring to FIG. 2B, the terminal device 100 may display an execution screen of the n-1th application on the full-sized window 112 in operation S207. An execution screen of an n-2th application may be displayed on the sub-window 111 of the terminal device 100. When no application other than the n-1th application is being executed in the terminal device 100, the sub-window 111 may not appear.

[90] The terminal device 100 may execute an nth application in operation S209. In the present embodiment, an execution order of applications may be an order in which the applications are executed in the terminal device 100 or may be a requested display order of execution screens of the applications. Therefore, the nth application, which is executed in operation S209, may be an application of which an nth request for displaying an execution screen is made. For example, the terminal device 100 selects one of the applications being executed in operation S209 and receives a request for displaying an execution screen of the selected application. The application of which the request for displaying the execution screen may be considered as the application which is executed nth.

[91] In operation S211, the terminal device 100 may display the execution screen of the application executed nth on the full-sized window 112.

[92] In operation S213, the terminal device 100 displays an execution screen of the n-1th application onto the sub-window 111 instead of the full-sized window 112.

[93] In the present embodiment, the terminal device 100 may display execution screens of applications on the full-sized window 112 or the sub-window 111 according to an

execution order of the applications or a requested display order of the execution screen of the applications. In particular, the terminal device 100 displays an execution screen of an application, which is recently executed or for which a display request is made, on the full-sized window 112 and may display an execution screen of an application, which is displayed on the full-sized window 112 before the above application is displayed on the full-sized window 112, on the sub-window 111.

[94] FIG. 3 illustrates a method of displaying applications, according to an exemplary embodiment. In particular, display screens 310 through 350 are exemplary views of displaying applications according to the method of displaying the applications.

[95] Referring to FIG. 3, the display screen 310 shows that an execution screen of an application A is displayed on a full-sized window 10. A button 11 for displaying an application list used to execute a new application may be selected. The display screen 310 may correspond to the first area on which the first application is displayed in operation S201 of FIG. 2A or the full-sized window 112 on which the n-1th application is displayed in operation S207 of FIG. 2B.

[96] An application list 20, which may be executed when the button 11 is selected, may be displayed on the display screen 320. The application list 20 may include an application displayed in the WOW mode. An icon 21 of an application B included in the application list 20 may be selected to execute the application B. The operation of the display screen 320 may correspond to operation S203 of FIG. 2A or operation S209 of FIG. 2B.

[97] The application A on the display screen 320 may correspond to the first application or the n-1th application. In addition, the application B may correspond to the second application or the nth application.

[98] As a result of selecting the icon 21 of the application B on the display screen 330, the application B is displayed on the full-sized window 10, and the application A may be displayed on a sub-window 40. That is, the application B is not yet displayed on the display screens 310 and 320, and the application A displayed on the full-sized window 10 of the display screens 310 and 320 may be displayed on the sub-window 40 of the display screen 330 due to the execution of the application B. The display screen 330 may correspond to a case where the execution screen of the second application or the nth application is displayed on the first area or the full-sized window 10 as in operations S203 through S205 of FIG. 2A and the execution screen of the first application or the n-1th application is displayed on the second area or the sub-window 40 instead of the first area or the full-sized window 10 as in operations S211 through S213 of FIG. 2B.

[99] The button 11 for displaying the application list 20 used to execute a new application may be selected on the display screen 330 as shown in the display screen 310. The

display screen 330 may correspond to a case where the execution screen of the first application is displayed as in operation S201 of FIG. 2A or the execution screen of the n-1th application is displayed as in operation S207 of FIG. 2B.

[100] The application list 20, which may be executed on the display screen 320 as the button 11 is selected, may be displayed on the display screen 340. An icon 22 of an application C included in the application list 20 may be selected to execute the application C. The display screen 340 may correspond to a case where the second application is executed as in operation S203 of FIG. 2A or the nth application is executed as in operation S209 of FIG. 2B.

[101] The application B on the display screen 340 may correspond to the first application or the n-1th application. In addition, the application C may correspond to the second application or the nth application.

[102] As a result of selecting the icon 22 of the application C on the display screen 350, the application C is displayed on the full-sized window 10, and the application B may be displayed on a sub-window 50. That is, on the display screens 330 and 340 on which the application C is not yet displayed, the application B displayed on the full-sized window 10 may be displayed on the sub-window 50 due to the execution of the application C. The display screen 350 may correspond to a case where the execution screen of the second application or the nth application is displayed on the first area or the full-sized window 112 as in operations S203 through S205 of FIG. 2A and the execution screen of the first application or the n-1th application is displayed on the second area or the sub-window 111 instead of the first area or the full-sized window 112 as in operations S211 through S213 of FIG. 2B.

[103] As a method of displaying applications, there is described a method of displaying a new application by pressing the button 11 requesting the display of an application list. However, the method is not limited thereto and the applications may be executed through various methods.

[104] For example, in the case of an alarm clock application, the alarm clock application may be automatically executed at a preset time without receiving an input signal for executing the alarm clock application from a user. Therefore, an execution screen of the alarm clock application is displayed on the full-sized window 10 at the preset time and another application that has been executed is displayed on the sub-window 40.

[105] FIG. 4 is a flowchart of a method of displaying an application by changing a sub-window and a full-sized window.

[106] Referring to FIG. 4, in operation S401, the terminal device 100 may receive an input that requests a change of a display area of an execution screen of an application, which is displayed on the sub-window 111.

[107] For example, the terminal device 100 may receive an input, which requests a change

of a display area of an execution screen of an application that is displayed on the sub-window 111, from the user through an input unit.

[108] The input unit may include a key pad, a dome switch, a touch pad (constant pressure/ electrostatic types), a jog wheel, a jog switch, and an H/W button.

[109] Alternatively, the terminal device 100 may detect a tapping gesture on an area of the sub-window 111 on which an execution screen of an application is displayed. The display screen 110 of the terminal device 100 on which the execution screen of the application may be displayed may include a touch screen capable of detecting user gestures. The tapping gesture on an area of the sub-window 111 may be processed as the input which requests the change of the display area of an execution screen of the application. Gestures of touching and holding, double tapping, dragging, panning, flicking, and dragging and dropping may be processed as the input which requests the change of an execution screen of the display area of the application that is displayed on the sub-window 111 according to preset information.

[110] In operation S403, the terminal device 100 displays the execution screen of the first application, which has been displayed on the sub-window 111, on the full-sized window 112 and displays the execution screen of the second application, which has been displayed on the full-sized window 112, on the sub-window 111 in response to the input received in operation S401.

[111] For example, the visual effect may include an effect in which the execution screen of the first application displayed on the full-sized window 112 is gradually decreased and is displayed on the sub-window 111. In addition, the visual effect may include an effect in which the execution screen of the second application displayed on the sub-window 111 is gradually increased and is displayed on the full-sized window 112. Furthermore, the visual effect may include an effect in which the execution screen of the second application gradually expands and a notification of expansion completion when the execution screen of the second application finishes expanding. For example, when the execution screen of the second application finishes expanding, a shaking effect may be applied to the window. This effect may be referred to as a split effect.

[112] Also, the auditory effect may include an effect of outputting a 'click' sound when the execution screen of the first application is gradually decreased and then displayed on the sub-window 111 and when the execution screen of the second application is gradually increased and then displayed on the full-sized window 112.

[113] When the execution screen of the first application, which has been displayed on the full-sized window 112, is displayed on the sub-window 111 and when the execution screen of the second application, which has been displayed on the sub-window 111, is displayed on the full-sized window 112, the user of the terminal device 100 may easily recognize that the execution screen of the first application is displayed on the sub-

window 111 instead of on the full-sized window 112 and the execution screen of the second application is displayed on the full-sized window 112 instead of on the sub-window 111 based on the simultaneous output of the visual effect and the auditory effect.

[114] The input which is received in operation S401 and requests for a change of a display area of an execution screen of an application displayed on the sub-window 111 may control display of the application, which is displayed on the sub-window 111, such that the application is displayed on the full-sized window 112 instead of the sub-window 111. In the present embodiment, the application displayed on the sub-window 111 may not be controlled on the sub-window 111, but the execution screen of the sub-window 111 may be checked. However, the application displayed on the sub-window 111 may also be controlled according to settings.

[115] When used as a window for checking an execution state of an application, the sub-window 111 is useful since the application is displayed thereon. However, since the sub-window 111 is smaller than the full-sized window 112, the sub-window 111 may not be useful enough for controlling the application. Therefore, an input with regard to the sub-window 111 or a gesture detected in the sub-window 111 may be processed as an input or a gesture for controlling the sub-window 111 itself not for controlling the application.

[116] For example, when the application displayed on the sub-window 111 is a calculator application, an execution screen of the calculator application including an execution result of the calculator application may be displayed on the sub-window 111 according to control by the user. However, although an input for moving the sub-window 111 or adjusting a size of the sub-window 111 may be available, an input for performing a calculator function may not be available. Therefore, as the input that requests the change of the display area of the execution screen of the application is received in the sub-window 111, the user may control the application on the full-sized window 12 by displaying the execution screen of the application onto the full-sized window 112 instead of the sub-window 111.

[117] When the first application displayed on the sub-window 111 is displayed on the full-sized window 112, the second application displayed on the full-sized window 112 may be displayed on the sub-window 111. Since it may be considered that the application that the user wants to control is the first application displayed on the sub-window 111 at a point in time when the input that requests the change of the display area of the execution screen of the application is received in the sub-window 111 in operation S401, the second application may be displayed onto the sub-window 111 instead of on the full-sized window 112. Therefore, the second application, which was displayed on the full-sized window 112, does not disappear from the display screen 110 and

continue to be displayed on the sub-window 111.

[118] FIG. 5 illustrates a method of displaying applications by changing which applications are displayed on the sub-window 40 and the full-sized window 10, according to another embodiment of the present invention. In particular, display screens 510 and 520 are examples of display screens displaying applications according to the method of displaying the applications by changing which applications are displayed on the sub-window 40 and the full-sized window 10.

[119] Referring to the display screen 510 of FIG. 5, an execution screen of an application A is displayed on the sub-window 40. In this case, the input that requests the change of the display area of the execution screen of the application may be received or a gesture is detected in an area where the sub-window 40 is displayed. For example, a tapping gesture of the user may be detected in the area where the sub-window 40 is displayed. The display screen 510 may correspond to operation S401 of FIG. 4.

[120] On the display screen 520, the execution screen of the application A displayed on the sub-window 40 may be displayed on the full-sized window 10 in response to the input that requests the change of the display area of the execution screen of the application or the gesture detected in the area where the sub-window 40 is displayed. In addition, the execution screen of the application B displayed on the full-sized window 10 may be displayed on the sub-window 40 in response to the input that requests the change of the display area of the execution screen of the application or the gesture. The display screen 520 may correspond to operation S403 of FIG. 4.

[121] FIG. 6 is a flowchart of a method of displaying a sub-window in a hide mode, according to an exemplary embodiment.

[122] The method described in FIG. 6 is related to a method of displaying applications on the sub-window 111, and thus, the number of screens that may be displayed on the full-sized window 12 is not limited. For example, an execution screen of an application being executed in the terminal device 100 may be displayed on the full-sized window 12 other the execution screen of the application displayed on the sub-window 111. Alternatively, an application drawer screen including an icon used to display a home screen or execute an application of the terminal device 100 may be displayed on the full-sized window 12.

[123] In the present embodiment, displaying the sub-window 111 in the hide mode may mean that the terminal device 100 displays portions of the sub-window 111 or the sub-window 111 that is transparent is displayed on the display screen 110 in the hide mode. Alternatively, displaying the sub-window 111 in the hide mode may mean that the terminal device 100 displays an alternative image, which indicates the sub-window 111, in the hide mode. In this case, the alternative image may be much smaller than the sub-window 111.

[124] Since the sub-window 111 overlaps the full-sized window 112, there may be an area that is displayed on the full-sized window 112 but is covered by the sub-window 111. Therefore, instead of displaying the sub-window 111, the terminal device 100 may display only some portions of the sub-window 111, display the sub-window 111 such that the sub-window 111 is transparent, or display an alternative image which is smaller than the sub-window 111 so that areas covered by the sub-window 111 are visible on the full-sized window 112.

[125] Referring to FIG. 6, the execution screen of the application may be displayed on the sub-window 111 in operation S601.

[126] In operation S603, the terminal device 100 may determine whether there is an input or gesture with regard to the sub-window 111 for a predetermined amount of time or more.

[127] When there is no input or gesture with regard to the sub-window 111 for the predetermined amount of time or more, the terminal device 100 may determine whether the sub-window 111 is set to be in the automatic hide mode in operation S605. When there is no input or gesture with regard to the sub-window 111 for the predetermined amount of time or more, the terminal device 100 may display the sub-window 111 in the automatic hide mode in operation S609 according to whether the sub-window 111 is set to be in the automatic hide mode. For example, when there is no input or gesture with regard to the sub-window 111 for the predetermined amount of time or more, the terminal device 100 may display portions of the sub-window 111 or an alternative image indicating the sub-window 111, or the sub-window 111 that is transparent is displayed on the display screen 110 in the automatic hide mode.

[128] In the present embodiment, the automatic hide mode of the sub-window 111 may be set when a user input or a gesture for setting the automatic hide mode is detected. Alternatively, the automatic hide mode of the sub-window 111 may be released when a user input or a gesture for releasing the automatic hide mode is detected. For example, the automatic hide mode of the sub-window 111 may be set or released according to an input received in a configuration screen related to the sub-window 111. As another example, the automatic hide mode of the sub-window 111 may be set or released when the gesture is detected on the sub-window 111 of the display screen 110.

[129] When the automatic hide mode of the sub-window 111 is set and there is no input or gesture for a predetermined amount of time or more on the sub-window 111 of the display screen 110, the sub-window 111 may be displayed in the automatic hide mode. The gesture is not limited to or may be a certain gesture according to settings. For example, when a certain gesture is not detected on the sub-window 111 for a predetermined amount of time or more according to the settings, the sub-window 111 may be displayed in the automatic hide mode.

[130] Also, when the automatic hide mode is released, even though there is no input or gesture on the sub-window 111 of the display screen 110 for the predetermined amount of time or more, the sub-window 111 may not be displayed in the automatic hide mode.

[131] The terminal device 100 may display the sub-window 111 in the hide mode in operation S609 when the input or gesture detected in operation S603 or S607 is determined as an input or gesture that requests the sub-window 111 to be displayed in the hide mode.

[132] For example, the gesture that requests the sub-window 111 to be displayed in the hide mode may be a dragging and dropping gesture in which the sub-window 111 is vertically or horizontally dragged and dropped.

[133] When the sub-window 111 is in the hide mode, some portions of the sub-window 111 may be hidden and the other portions thereof may be displayed on the full-sized window 112, such as a bookmark.

[134] On the contrary, when the input or gesture detected in operation S603 or S607 is determined as an input or gesture that does not request the sub-window 111 to be displayed in the hide mode, the terminal device 100 may perform other functions according to the detected input or gesture. Then, in operation S603, the terminal device 100 may determine whether the sub-window 111 receives an input for a predetermined amount of time or more.

[135] In operation S611, the terminal device 100 may receive an input or gesture that requests a release of the hide mode of the sub-window 111. In operation S613, according to the detected input or gesture, the terminal device 100 may display the entirety of the sub-window 111 by releasing the sub-window 111 from the hide mode.

[136] FIGS. 7A through 7D illustrate a method of displaying a sub-window 111a in a hide mode, according to an exemplary embodiment.

[137] Referring to FIG. 7A, the terminal device 100 may display the sub-window 111a in the hide mode when a dragging and dropping gesture in which the sub-window 111a is vertically and horizontally dragged and dropped is detected.

[138] As shown in a display screen 710, the terminal device 100 may detect a dragging and dropping gesture in which the sub-window 111a is dragged in a right direction and dropped. The display screen 710 may show operation S607 of FIG. 6.

[139] As shown in a display screen 720, the terminal device 100 may display the sub-window 111a in the hide mode (111b) in response to the detected gesture. When the sub-window 111a is displayed in the hide mode, some portions of the sub-window 111a may be displayed as shown in the display screen 720. The display screen 720 may correspond to operation S609 of FIG. 6.

[140] Referring to a display screen 730, the terminal device 100 may release the hide mode

of the sub-window 111b which is displayed in the hide mode, upon detecting a dragging and dropping gesture in which the sub-window 111a is dragged and dropped to a left side. The display screen 730 may correspond to operation S611 of FIG. 6.

[141] Referring to a display screen 740, the terminal device 100 releases the hide mode in response to the detected gesture and may display an entire area of the sub-window 111a. The display screen 740 may correspond to operation S613 of FIG. 6.

[142] Referring to FIG. 7B, the terminal device 100 may display the sub-window 111a in the hide mode (111c) by detecting a dragging and dropping gesture on the sub-window 111a. As shown in display screens 750 through 780, locations of the sub-window 111a displayed in the hide mode may vary according to a dragging and dropping direction.

[143] Referring to the display screen 750, the terminal device 100 may detect a dragging and dropping gesture in which the sub-window 111a is dragged and dropped in an upward direction. The display screen 750 may correspond to operation S607 of FIG. 6.

[144] Referring to the display screen 760, the terminal device 100 may display the sub-window 111a, which is in the hide mode, on an upper area of the display screen (111c) in response to the detected gesture. The display screen 760 may correspond to operation S609 of FIG. 6.

[145] FIGS. 7C and 7D are examples of sub-windows 111d and 111e displayed in the hide mode by the terminal device 100.

[146] Referring to the display screen 770, when the sub-window 111a is displayed in the hide mode, an alternative image 111d that is smaller than the sub-window 111 is displayed instead of the sub-window 111.

[147] Referring to the display screen 780, when the sub-window 111 is displayed in the hide mode, the terminal device 100 may display a sub-window 111e that is transparent instead of the sub-window 111.

[148] FIG. 8 is a flowchart of a method of controlling the sub-window 111 according to areas where gestures are detected, according to an exemplary embodiment.

[149] Referring to FIG. 8, in operation S801, the terminal device 100 may detect a user gesture in the area where the sub-window 111 is displayed.

[150] In operation S803, the terminal device 100 may determine whether to move the sub-window 111 or change a size of the sub-window 111 according to the area of the sub-window 111 where the gesture is detected in operation S801.

[151] When the area of the sub-window 111 where the gesture is detected in operation S801 is not included in areas where the sub-window 111 may be moved or the size thereof may be changed, the terminal device 100 may perform operations for controlling the sub-window 111 other than moving the sub-window 111 or changing the size of the sub-window 111. For example, a color or brightness of the sub-window 111 is controlled, or volume of a sound output from an application displayed on the sub-

window 111 may be controlled. As another example, when the gesture is detected, the terminal device 100 may control the color or brightness of the sub-window 111, depending on the area of the sub-window 111 where the gesture is detected. Additionally, when the gesture is detected, the terminal device 100 may control volume of sound output from an application which is displayed on the sub-window 111, depending on the area of the sub-window 111 where the gesture is detected.

[152] Operations for controlling the sub-window 111 according to the gesture detected on the sub-window 111 are not limited to operations for moving the sub-window 111 or changing the size of the sub-window 111, and various operations for controlling the sub-window 111 according to the area of the sub-window 111 where the gesture is detected may be performed.

[153] In operation S805, when the terminal device 100 determines to change the size of the sub-window 111 according to the area of the sub-window 111 where the gesture is detected in operation S801, the terminal device 100 may change the size of the sub-window 111 according to the detected gesture in operation S807.

[154] In addition, in operation S805, when terminal device 100 determines to move the sub-window 111 according to the area of the sub-window 111 where the gesture is detected in operation S801, the terminal device 100 may move the sub-window 111 according to the detected gesture in operation S811.

[155] In present embodiment, when the sub-window 111 is moved according to the detected gesture, the terminal device 100 recognizes x and y values, which are a touch coordinate indicating where the gesture is detected, and may determine whether the touch coordinate of x and y values is included in a predetermined area where the sub-window 111 is moved to. For example, the predetermined area may be set as an upper area of the sub-window 111. When the touch coordinate where the gesture is detected is included an area where the sub-window 111 is moved to, the terminal device 100 may continue to track the touch coordinate where the gesture is detected. In addition, by re-setting touch coordinate of the sub-window 111 according to the tracked touch coordinate, the sub-window 111 may be moved according to the re-set touch coordinate. That is, the terminal device 100 moves the sub-window 111 according to the detected gesture and then may display a movement result on the display screen 110.

[156] FIGS. 9A and 9B illustrate a method of controlling the sub-window 111 according to areas 112 to 116 where gestures are detected, according to an exemplary embodiment.

[157] Referring to FIG. 9A, the sub-window 111 may be controlled according to the areas 112 to 116 where the gestures are detected.

[158] For example, when the gestures are detected in the areas 113, 114, 115 and 116, the size of the sub-window 111 may be adjusted according to the detected gestures. Moreover, when a gesture is detected in the area 112, the sub-window 111 may be

moved according to the detected gesture.

[159] Referring to FIG. 9B, the sub-window 111 may be moved according to gestures detected in an upper area 117 of the sub-window 111.

[160] Referring to a display screen 910, the sub-window 111 may be moved according to the gesture detected in the upper area 115 of the sub-window 111. The terminal device 100 may move the sub-window 111 to a left side of the display screen 910 according to a dragging gesture detected as a user gesture in the upper area 115 of the sub-window 111. The display screen 910 may correspond to operation S803 of FIG. 8.

[161] Referring to a display screen 920, the sub-window 111 is moved to the left side of the display screen 920 according to the detected gesture. The terminal device 100 may move the sub-window 111 to a bottom side according to a dragging gesture as long as the user gesture is still detected in the upper area 115 of the sub-window 111. The display screen 920 may correspond to operation S811 of FIG. 8.

[162] Referring to a display screen 930, the sub-window 111 is moved to a bottom of the display screen 920 according to the detected gesture. The display screen 930 may correspond to operation S811 of FIG. 8.

[163] FIGS. 10A and 10B illustrate a method of displaying an application list on sub-windows 111 and 117, according to an exemplary embodiment.

[164] Referring to FIG. 10A, the application list may be displayed on the sub-windows 111 and 117 in a stack mode.

[165] When the sub-windows 111 and 117 are displayed in the stack mode, execution screens of applications being executed in the terminal device 100 may be displayed on the sub-windows 111 and 117 which overlap in a predetermined order. For example, the sub-windows 111 and 117, on which the execution screens of the applications being executed in the terminal device 100 are displayed, may be displayed and overlap according to an execution order of the applications or a requested display order of the applications. The terminal device 100 may display at least one of the sub-windows 111 and 117 according to the number of applications being executed in the terminal device 100.

[166] When the sub-windows 111 and 117 are displayed in the stack mode and a new application, which is a second application, is executed, an execution screen of the second application is displayed on a full-sized window and the first application, which has been displayed on the full-sized window, may be displayed on the sub-windows 111 and 117. In other words, the execution screen of the first application may be displayed on a foremost sub-window from among the sub-windows 111 and 117.

[167] In the present embodiment, the execution screens of the applications may be displayed in an order of the foremost sub-window, a second sub-window, ..., from among the sub-windows 111 and 117.

[168] Referring to FIG. 10B, an application list including sub-windows 120, 121 and 122 may be displayed in a list mode.

[169] When the application list is displayed in the list mode, execution screens of applications being executed in the terminal device 100 may be displayed on the sub-windows 120, 121 and 122 according to a predetermined order. For example, the sub-windows 120, 121 and 122, on which the execution screens of the applications being executed in the terminal device 100 are displayed, may be displayed in an order in which the applications are executed or a requested display order of the applications.

[170] When the sub-windows 120, 121 and 122 are displayed in the list mode and a new application, which is the second application, is executed, an execution screen of the second application is displayed on a full-sized window, and an execution screen of the first application, which has been displayed on the full-sized window 112, may be displayed on a topmost sub-window from among the sub-windows 120, 121 and 122. In other words, the execution screen of the first application may be displayed on the topmost sub-window from among the sub-windows 120, 121 and 122.

[171] According to the present embodiment, the execution screens of the applications may be displayed in an order of the topmost sub-window, a second sub-window, ..., from among the sub-windows 120, 121 and 122.

[172] FIG. 11 is a flowchart of a method of displaying an application list on a sub-window 111, according to an exemplary embodiment.

[173] Referring to FIG. 11, the terminal device 100 may detect a gesture for requesting a display of the application list on the sub-window 111 or may receive an input in operation S1101.

[174] In operation S1103, the terminal device 100 may determine whether to display the sub-window 111 in the stack mode or the list mode according to the gesture detected or the input received in operation S1101. For example, the gesture that may be detected in operation S1101 may be a double tapping gesture for double tapping an area where the sub-window 111 is displayed.

[175] The terminal device 100 may determine whether to display the sub-window 111 in the stack mode or the list mode according to a preset list displaying mode. In the present embodiment, the list displaying mode indicates a method of displaying a list of the sub-window 111 and may include, for example, the stack mode and the list mode.

[176] The method of displaying the list of the sub-window 111 is not limited thereto, and the sub-window 111 may be variously displayed.

[177] When the terminal device 100 determines the list displaying mode of the sub-window 111 as the stack mode in operation S1103, the terminal device 100 may display the application list of the applications being executed on one or more sub-windows in the stack mode in operation S1105. The sub-windows may overlap and be displayed on the

full-sized window 112.

[178] In addition, when the terminal device 100 determines the list displaying mode of the sub-window 111 as the list mode in operation S1107, the terminal device 100 may display the application list of the applications being executed on one or more sub-windows in the list mode. The sub-windows may be displayed on the full-sized window 112.

[179] When one application is selected from a list of the displayed applications in operation S1109, the terminal device 100 may display the application selected in operation S1109 on the full-sized window 112. When there is an application displayed on the full-sized window 112 prior to operation S1111, an execution screen of the application may be displayed on the sub-window 111 instead of the full-sized window 112 in operation S1111.

[180] Operations S1109 and S1111 of FIG. 11 may correspond to operations S401 and S403 of FIG. 4, respectively. That is, when an application is selected from the list of the applications displayed on the sub-window 111, it may be considered that the selected application is displayed on the full-sized window 112. Therefore, the application selected in operation S1109 may be displayed on the full-sized window 112.

[181] FIG. 12 illustrates examples of displaying the application list on the sub-window 111 in the list mode, according to an exemplary embodiment.

[182] Referring to a display screen 1210, the terminal device 100 may detect a gesture or receive an input for requesting the display of the list of the sub-window 111 on the sub-window 111. For example, the terminal device 100 may detect a double tapping gesture for requesting the display of the list of the sub-window 111 on the sub-window 111. The display screen 1210 may correspond to operation S1101 of FIG. 11.

[183] Referring to a display screen 1220, the terminal device 100 may display applications A, C and D being executed in the terminal device 100 on the sub-windows 120, 121 and 122 in the list mode. The display screen 1220 may correspond to operation S1107 of FIG. 11.

[184] Referring to a display screen 1230, the terminal device 100 may display an execution screen of the application, which is selected from the applications displayed on the sub-windows 120, 121 and 122, on the full-sized window 112. For example, when a tapping gesture of the user is detected on the sub-window 122 where the application D is displayed, the terminal device 100 may display the application D on the full-sized window 112. In addition, the terminal device 100 may display the application D on the full-sized window 112 instead of on the sub-window 111. The display screen 1230 may correspond to operation S1111 of FIG. 11.

[185] Also, the display screen 1230 may correspond to operation S403 of FIG. 4. That is, when an application is selected from the list of the applications displayed on the sub-

windows 120, 121 and 122, the selected application may be displayed on the full-sized window 112.

[186] The displaying the application list in the stack mode will be described in detail with reference to FIGS. 14A and 14B.

[187] FIG. 13 is a flowchart of a method of converting a list item in a sub-window, according to an exemplary embodiment.

[188] Referring to FIG. 13, in operation S1301, the terminal device 100 may detect a gesture or receive an input for requesting the display of the list of the sub-window 111.

[189] In operation S1303, the terminal device 100 may display the list of applications being executed in response to the received input or the detected gesture.

[190] In operation S1303, the sub-window 111 may be displayed in the stack mode, the list mode, or another mode according to a predetermined list displaying mode. Alternatively, the list of the sub-window 111 may be displayed in a list displaying mode other than the stack mode according to the received input or the detected gesture. For example, the sub-window 111 may be displayed in different modes according to the detected gesture.

[191] In operation S1305, the terminal device 100 may receive a request for changing items of the list of the sub-window 111.

[192] In the present embodiment, the items of the list of the sub-window 111 may indicate respective sub-windows configuring the list of the sub-window 111.

[193] For example, the gesture for requesting a change of the items may be detected in an area where the sub-window 111 is displayed. The gesture for requesting the change of the items may be a dragging and dropping gesture for vertically and horizontally dragging and dropping the sub-window 111 in the area where the sub-window 111 is displayed.

[194] In operation S1307, the terminal device 100 may display a sub-window including an execution screen of a next application according to the gesture received in operation S1305. Therefore, the terminal device 100 may sequentially display sub-windows according to the gesture for requesting the change of the items.

[195] In the present embodiment, the execution order of the applications may be an order in which the applications are executed in the terminal device 100 or a requested display order of the applications screens of the applications.

[196] When the sub-windows are displayed in the stack mode, the terminal device 100 may sequentially change the foremost sub-window, which is displayed in the stack mode, to another sub-window according to the gesture received in operation S1305. When the list of the sub-windows is displayed in the stack mode, only an entire portion of the foremost sub-window may be displayed. In the case of other sub-windows, some portions thereof may be displayed. In another example, the display order of the sub-

windows may be changed so that the second sub-window, which overlaps the foremost sub-window, may be set as the foremost sub-window from among the sub-windows, and the foremost sub-window may be set as the backmost sub-window from among the sub-windows, according to the gesture received in operation S1305.

[197] When the list of the sub-windows is displayed in the stack mode, the terminal device 100 may display an animation showing an operation via which the foremost sub-window is sent to the backmost sub-window among the other sub-window, according to the detection of gestures. Therefore, it may be easily identified that the foremost sub-window is displayed on the backmost sub-window among the other sub-windows according to a result of changing the items of the sub-window 111.

[198] Also, when the list of the sub-windows is displayed, the terminal device 100 may sequentially display the sub-windows according to the gesture received in operation S1305. For example, the sub-windows may be sequentially displayed according to a scrolling gesture detected in a list area of the sub-windows. When the list of the sub-windows is displayed in the list mode, entire portions of the sub-windows may be displayed according to sizes of the sub-windows or a size of the display screen 110. Other sub-windows may not be displayed or some portions thereof may be displayed on the display screen 110.

[199] When an application is selected from the application list in operation S1309, the terminal device 100 may display an execution screen of the selected application on the full-sized window 112 in operation S1309. When there is an execution screen of an application displayed on the full-sized window 112 prior to operation S1311, the execution screen of the application displayed on the full-sized window 112 prior to operation S1311 may be displayed on the sub-window instead of the full-sized window 112 in operation S1311.

[200] Operations S1309 and S1311 of FIG. 13 may correspond to operations S401 and S403 of FIG. 4. That is, when one sub-window is selected from the list of the sub-window 111, an execution screen of an application, which was displayed on the selected sub-window, may be displayed on the full-sized window 112 instead of the selected sub-window. Therefore, the execution screen of the application selected in operation S1309 may be displayed on the full-sized window 112 instead of the sub-window 111.

[201] In the present embodiment, when the list of the sub-windows is displayed, the terminal device 100 may move at least one sub-window included in the list of the sub-window 111 as in the method of moving the sub-window 111 described with reference to FIGS. 8 and 9. For example, when a gesture with regard to some areas of the sub-window is detected while the list of the sub-windows is displayed, the terminal device 100 may move the sub-windows in the list according to the detected gesture. An area

where a gesture for requesting for moving the sub-windows may be detected in the stack mode may be an upper portion of the foremost sub-window displayed among the sub-windows. Also, an area where a gesture for requesting for moving the sub-windows may be detected in the list mode may be an upper portion of each sub-window.

[202] The movement of the sub-windows in the list will be described in detail with reference to FIGS. 16 and 17.

[203] FIGS. 14A through 15B are examples of a method of displaying the application list in the stack mode on the sub-window, according to an exemplary embodiment.

[204] FIGS. 14A and 14B are examples of display screens 1410 to 1470 on which sub-windows are displayed based on the method of displaying the list of the sub-windows in the stack mode.

[205] Referring to the display screen 1410, the execution screens of the applications A and B are displayed on the sub-window 111 and the full-sized window 112, respectively. The terminal device 100 may detect a gesture for requesting the display of the list of the sub-windows in the area where the sub-window 111 is displayed. For example, the gesture for requesting the display of the list of the sub-windows may be a double tapping gesture. The display screen 1410 may correspond to operation S1301 of FIG. 13.

[206] Referring to the display screen 1420, the terminal device 100 may display the list of the sub-windows, in which execution screens of the applications being executed are displayed, in response to the detected gesture. In detail, the sub-windows 120, 121 and 122 including the execution screens of the applications A, C and D may overlap and be displayed. The display screen 1420 may correspond to operation S1303 of FIG. 13.

[207] Referring to the display screen 1430, the terminal device 100 may detect a gesture for requesting a change of the foremost sub-window of the list of the sub-windows 120, 121 and 122. In this case, the gesture may be a dragging and dropping gesture in which an area where the sub-window 120 is displayed is dragged and dropped in a downward direction.

[208] In detail, requesting a change of the foremost sub-window of the list of the sub-windows 120, 121 and 122 may be the same as a request for changing the foremost sub-window to another sub-window in the list of the sub-windows. The display screen 1430 may correspond to operation S1305 of FIG. 13.

[209] Referring to the display screen 1440, the sub-window 121 including an execution screen of a next application according to the detected gesture may be displayed. In detail, when a next application, that is, an application to be executed after the application A is executed is the application C, the sub-window 121 including an execution screen of the application C may be displayed on the foremost sub-window

among the sub-windows 120, 121 and 122.

[210] In addition, the sub-window 120 including an execution screen of the application A that is displayed on the foremost window is disposed on a backmost sub-window among the list of the sub-windows 120, 121 and 122 and may be partially displayed. The display screen 1440 may correspond to operation S1307 of FIG. 13.

[211] Referring to the display screen 1450, the terminal device 100 may select one application from the displayed application list in order to display an execution screen of the selected application on the full-sized window 112. For example, the terminal device 100 may detect a gesture for selecting an application. The gesture may be a tapping gesture of tapping a portion of the sub-window 121 on which the execution screen of the application is displayed. The display screen 1450 may correspond to operation S1309 of FIG. 13.

[212] Referring to the display screen 1460, the terminal device 100 may display the execution screen of the application selected on the display screen 1450 on the full-sized window 112. The execution screen of the application B, which has been displayed on the full-sized window 112, may be displayed on the sub-window 111 instead of the full-sized window 112. The display screen 1460 may correspond to operation S1311 of FIG. 13.

[213] The display screens 1450 and 1460 may correspond to operations S401 and S403 of FIG. 4. That is, a gesture for selecting an application may be a gesture for displaying the execution screen of the application on the full-sized window 112 instead of the sub-window 111.

[214] Referring to the display screen 1470 of FIG. 14B, the terminal device 100 may display the execution screen of the application selected on the display screen 1450 on the full-sized window 112 instead of the sub-window 111. The execution screen of the application B, which has been displayed on the full-sized window 112, is displayed on the sub-window 123 and, unlike in the display screen 1460, the sub-window 123 is included in the list of the sub-windows 120, 122 and 123 which is displayed in the stack mode. Since the application B is the most recently executed application among applications displayed on the sub-windows 120, 122 and 123, the sub-window 123 on which the execution screen of the application B is displayed may be disposed at the forefront of the list. The display screen 1470 may correspond to operation S1311 of FIG. 13.

[215] FIG. 15A illustrates examples of displaying display screens 1510 to 1550 on which sub-windows are displayed based on the method of displaying the application list. The order of the sub-windows of the application list may be changed by a method different from the method of FIGS. 14A and 14B.

[216] Referring to the display screen 1510, execution screens of applications A and B are

displayed on a sub-window 111 and a full-sized window 112, respectively, and the terminal device 100 may detect a gesture for requesting a display of the list of the sub-windows. The display screen 1510 may correspond to operation S1301 of FIG. 13.

[217] Referring to the display screen 1520, the terminal device 100 may display the application list of the sub-windows, on which the execution screens applications being executed are displayed, in the stack mode in response to the detected gesture. In detail, sub-windows 120, 121 and 122 including execution screens of applications A, C and D may overlap and be displayed. The display screen 1520 may correspond to operation S1303 of FIG. 13.

[218] Referring to the display screen 1530, a gesture for changing an order of the sub-windows in the list may be detected in an area where at least one of the sub-windows 120, 121 and 122 is displayed. In other words, a gesture for moving the selected sub-window to the forefront of the application list may be detected. For example, a tapping gesture for tapping an area where the sub-window 121 is displayed to move the sub-window 121 to the forefront of the application list may be detected. The display screen 1530 may correspond to operation S1303 of FIG. 13.

[219] Referring to the display screen 1530, a gesture for displaying the execution screen of the application C onto the full-sized window 112 instead of the sub-window 121 may be detected in an area where the sub-window 121 is displayed. For example, a tapping gesture for tapping an area where the sub-window 121 is displayed in order to display the execution screen of the application C onto the full-sized window 112 instead of the sub-window 121 may be detected.

[220] Referring to the display screen 1540, as a result of selecting the sub-window 121, the sub-window 121 where the execution screen of the application C is displayed is disposed at the forefront of the application list and may be displayed. Then, a user gesture for displaying the sub-window 122, which is disposed at the forefront of the application list, on the full-sized window 112 may be detected. The gesture may be a tapping gesture for tapping the area where the sub-window 121 is displayed. The display screen 1540 may correspond to operation S1309 of FIG. 13.

[221] Referring to the display screen 1550, the terminal device 100 may display the execution screen of the application selected on the display screen 1530 or 1540 on the full-sized window 112. In the present embodiment, the sub-window 121 selected on the display screen 1530 may be directly display on the full-sized window 112 instead of being displayed at the forefront of the application list as shown in the display screen 1540. The execution screen of the application B displayed on the full-sized window 112 may be displayed on the sub-window 111. The display screen 1550 may correspond to operation S1311 of FIG. 13.

[222] The display screens 1530, 1540 and 1550 may correspond to operations S401

through S403 of FIG. 4, respectively. That is, a gesture for selecting an application may be a gesture for changing the display area of the application from the sub-window 111 to the full-sized window 112.

[223] FIG. 15B illustrates examples of display screens displaying a sub-window 11 in mode other than the stack mode or the list mode. A list displaying mode of the sub-window 111 will be referred to as a bookmark mode as shown in FIG. 15B.

[224] Referring to the display screen 1560, execution screens of applications A and B are respectively displayed on the sub-window 111 and the full-sized window 112, and the terminal device 100 may detect a gesture for requesting the display of the application list of the sub-window 111. The display screen 1560 may correspond to operation S1301 of FIG. 13.

[225] Referring to the display screen 1570, the terminal device 100 may display the application list on which applications, which are being executed, are displayed in the bookmark mode in response to the detected gesture. In detail, alternative images 131 and 132, which indicate that the applications C and D are being executed other than the application A, may be displayed on a side of the sub-window 111 like bookmarks. The display screen 1570 may correspond to operation S1303 of FIG. 13.

[226] Referring to the display screen 1580, the terminal device 100 may detect a gesture for displaying an execution screen of an application selected from among the application C and D on the sub-window 111 instead of displaying the execution screen of application A on areas where the alternative images 131 and 132 are displayed. For example, a tapping gesture for tapping the areas where the alternative images 131 and 132 are displayed.

[227] Otherwise, referring to the display screen 1580, the terminal device 100 may detect a gesture for displaying an execution screen of an application, which is selected from among the application C and D, on the full-sized sub-window 111 instead of displaying the execution screen of application Aon areas where the alternative images 131 and 132 are displayed. For example, a tapping gesture for tapping the areas where the alternative images 131 and 132 are displayed.

[228] Referring to the display screen 1590, as a result of selecting the alternative image 131, the alternative image 131 that indicates the execution screen application C may be displayed on the sub-window 111. When a user gesture for displaying the execution screen of the application C, which has been displayed on the sub-window 111, on the full-sized window 112 may be detected, the terminal device 100 displays the execution screen of the application C onto the full-sized window 112 instead of the sub-window 111, on display screen 1591. The gesture may be a tapping gesture for tapping an area of the sub-window 111 where the execution screen of the application C is displayed. The display screen 1590 may correspond to operation S1309 of FIG. 13.

[229] Referring to the display screen 1591, the terminal device 100 may display the execution screen of the application selected on the display screen 1580 or 1590 on the full-sized window 112. That is, in the present embodiment, an application C which corresponds to the alternative image 131 selected on the display screen 1580 may be directly displayed on the full-sized window 112 instead of displaying an entire portion of the sub-window 111, as shown in the display screen 1590. The execution screen of the application B may be displayed on the sub-window 111 instead of the full-sized window 112, on display screen 1591. The display screen 1591 may correspond to operation S1311 of FIG. 13.

[230] The display screens 1580 and 1591 may correspond to operations S401 and S403 of FIG. 4. That is, a gesture for selecting an application may be a gesture for displaying the execution of the application onto the full-sized window 112 instead of the sub-window 111.

[231] FIG. 16 is a flowchart of a method of moving a list group of sub-windows, according to an exemplary embodiment.

[232] The list group of the sub-windows may indicate the list of the sub-windows including one or more sub-windows. In the present embodiment, when the list of the sub-windows is moved, the sub-windows are moved together. The list of the sub-windows will be referred to as the list group of the sub-windows.

[233] Referring to FIG. 16, in operation S1601, the terminal device 100 may detect a gesture in areas where the sub-windows are displayed.

[234] In operation S1603, the terminal device 100 may determine whether the gesture detected in operation S1601 is for moving the list group of the sub-windows.

[235] The list group may be in the stack mode or the list mode, but are not limited thereto. The list group of the sub-windows may be displayed in various modes, and the list group of the sub-windows may be moved according to the detected gesture.

[236] In the present embodiment, when the list group of the sub-windows are moved according to the detected gesture, the terminal device 100 recognizes values of x and y, which are a touch coordinate indicating where the gesture is detected, and may determine whether the values are the same as x and y values of a center of a predetermined area in the sub-window 111 where the list group of the sub-windows is moved to.

[237] When the list group of the sub-windows is displayed in the stack mode, the areas for the movement of the list group of the sub-windows may be determined as an upper area of the sub-window disposed at the forefront.

[238] When the list group of the sub-windows is displayed in the list mode, the areas for the movement of the sub-windows may be determined as upper areas of one or more sub-windows displayed on a display screen.

[239] When the gesture detected in operation S1601 is not used in the areas for the movement of the sub-windows, the terminal device 100 may perform a preset task in operation S1605. The preset task may be performed according to gestures and may be a task other than the movement of the sub-windows. For example, when the gesture is detected in one of the areas for adjusting the size of a sub-window, and not in one of the areas for the movement of the sub-window, the terminal device 100 may adjust the size of the sub-window according to the detected gesture.

[240] In operation S1607, the terminal device 100 may move the list group according to the detected gestures.

[241] In the present embodiment, when the touch coordinate where the gesture is detected is an area for the movement of the sub-window 111, the terminal device 100 may continue to track the touch coordinate of the gesture. The terminal device 100 resets coordinates of the list group including sub-windows 120, 121 and 122 according to the recognized touch coordinate and may re-indicate locations of the list group including sub-windows 120, 121 and 122 according to the re-set coordinates. That is, the terminal device 100 moves the list group including sub-windows 120, 121 and 122 according to the detected gesture and may display movement results.

[242] FIG. 17 illustrates examples of moving the list group including sub-windows 120, 121 and 122 displayed in the list mode, according to an exemplary embodiment.

[243] Referring to a display screen 1710, the terminal device 100 detects a gesture in an area where the sub-window 120 is displayed and may determine whether the detected gesture is input in the areas 123. When it is determined that the detected gesture is input in the areas 123 for the movement of the list group including sub-windows 120, 121 and 122, the terminal device 100 may move the list group including sub-windows 120, 121 and 122 according to the detected gesture. For example, the areas for the movement of the list group including sub-windows 120, 121 and 122 displayed in the list mode may be set as areas 123, 124 and 125 of upper portions of the sub-windows displayed on the display screen 110. The display screen 1710 may correspond to operation S1603 of FIG. 16.

[244] Referring to a display screen 1720, the list group including sub-windows 120, 121 and 122 is moved to a left side according to the detected gesture. The display screen 1720 may correspond to operation S1607 of FIG. 16. In addition, the terminal device 100 may move the list group including sub-windows 120, 121 and 122 to a right side according to the detected gesture.

[245] Referring to a display screen 1730, the list group including sub-windows 120, 121 and 122 is moved to the right side according to the detected gesture. The display screen 1730 may correspond to operation S1607 of FIG. 16.

[246] FIG. 18 illustrates an example of moving the list group including sub-windows 120,

121 and 122 displayed in the stack mode, according to an exemplary embodiment.

[247] Referring to a display screen 1810, the terminal device 100 detects a gesture in an area where the sub-windows 120, 121 and 122 are displayed and may determine whether the detected gesture is input in an area 123 for the movement of the list group including sub-windows 120, 121 and 122. When it is determined that the detected gesture is input in the area 123 for the movement of the list group including sub-windows 120, 121 and 122, the terminal device 100 may move the list group including sub-windows 120, 121 and 122 according to the detected gesture. For example, an area for the movement of the list group including sub-windows 120, 121 and 122 displayed in the stack mode may be set as the area 123 of upper portions of the sub-window 120. The display screen 1810 may correspond to operation S1603 of FIG. 16.

[248] Referring to a display screen 1820, the list group including sub-windows 120, 121 and 122 is moved to a left side according to the detected gesture. The display screen 1820 may correspond to operation S1607 of FIG. 16.

[249] Also, referring to a display screen 1830, the terminal device 100 may move the list group including sub-windows 120, 121 and 122 to a lower right side. The display screen 1830 may correspond to operation S1603 of FIG. 16.

[250] Referring to a display screen 1840, the list group including sub-windows 120, 121 and 122 is moved to the lower right side. The display screen 1840 may correspond to operation S1607 of FIG. 16.

[251] FIG. 19 is a flowchart of a method of changing an orientation of the sub-window 111, according to an exemplary embodiment.

[252] Referring to FIG. 19, the terminal device 100 may detect a gesture for changing the orientation of the sub-window 111 in operation S1901. For example, a dragging and dropping gesture may be detected in the sub-window 111 in which the orientation is to be changed. Alternatively, a tilt of the terminal device 100 may be detected by a gravity sensor in the orientation to be changed. When the orientation of the sub-window 111 is changed according to the tilt thereof, an additional gesture, for example, a touching and holding gesture in which the sub-window 111 is touched and held, may be set to be distinguished from a change of an orientation of the full-sized window 112. For example, when the tilt is detected by the gravity sensor, the orientation of the sub-window 111 is changed according to the touching and holding gesture detected in the sub-window 111.

[253] In operation S1903, the terminal device 100 may change the orientation of the sub-window 111 in response to the detected gesture.

[254] In the present embodiment, since the orientation of the sub-window 111 may be changed in response to the detected gesture, the orientation of the sub-window 111 may be changed without changing the physical orientation of the terminal device 100.

[255] FIG. 20 illustrates a method of changing the orientation of the sub-window 111, according to an exemplary embodiment.

[256] Referring to a display screen 2010, the terminal device 100 may detect a gesture for changing an orientation of the sub-window 111. For example, a dragging and dropping gesture may be detected in the sub-window 111 in which the orientation of the sub-window 111 is to be changed. The display screen 2010 may correspond to operation S1901 of FIG. 19.

[257] Referring to a display screen 2020, the terminal device 100 may change the orientation of the sub-window 111 in response to the detected gesture. The orientation of the sub-window 111 is changed in a clockwise direction according to the detected gesture. The display screen 2020 may correspond to operation S1903 of FIG. 19.

[258] FIG. 21 is a flowchart of a method of displaying applications when terminating the applications, according to an exemplary embodiment.

[259] Referring to FIG. 21, in operation S2101, the terminal device 100 may receive an input for requesting termination of the applications. Alternatively, the terminal device 100 may detect a gesture for requesting the termination of the applications. For example, the terminal device 100 may receive an input by a termination button of the terminal device 100.

[260] In operation S2103, the terminal device 100 may determine whether an execution screen of a recently executed application is displayed on the full-sized window 112.

[261] In the present embodiment, since the application that is recently executed or for which a display request is received may be displayed on the full-sized window 112, when there is an application displayed on the full-sized window 112, the terminal device 100 may terminate the application that is displayed on the full-sized window 112 first. That is, the application that is recently executed or for which a display request is received may be terminated first by the terminal device 100 according to a termination request.

[262] In operation S2105, when an execution screen of an application being executed is displayed on the full-sized window 112, the terminal device 100 may terminate the application displayed on the full-sized window 112.

[263] In operation S2107, the terminal device 100 may determine whether there is an application displayed on the sub-window 111 after the application displayed on the full-sized window 112 is terminated.

[264] In operation S2107, when it is determined that there is no application displayed on the sub-window 111 after the application displayed on the full-sized window 112 is terminated, the terminal device 100 may determine that there is no application to be displayed on the full-sized window 112 after the application displayed on the full-sized window 112 is terminated. Therefore, the terminal device 100 may display an initial

screen of the terminal device 100, for example, a home screen or an application drawer screen on the full-sized window 112.

[265] When there is an application displayed on the sub-window 111, the terminal device may display an execution screen of the application displayed on the sub-window 111 on the full-sized window 112 instead of the sub-window 111.

[266] In addition, in the stack mode, when the list of sub-windows is displayed instead of the sub-window 111 in operation S2109, an execution screen of a foremost application of the list may be displayed on the full-sized window 112 after the application displayed on the full-sized window 112 is terminated. In addition, in the list mode, an execution screen of an uppermost application may be displayed on the full-sized window 112 after the application displayed on the full-sized window 112 is terminated.

[267] In operation S2115, after the application displayed on the full-sized window 112 is terminated, the terminal device 100 may determine whether there is an application being executed in the terminal device 100 other than the application displayed on the full-sized window 112 in operation S2109. The determination of the terminal device 100 is made to determine whether there is an application to be displayed on the sub-window 111 because the application, which was displayed on the sub-window 111, is being displayed on the full-sized window 112.

[268] When the list of sub-windows is displayed instead of the sub-window 111 in operation S2115, sub-windows, on which other applications except for the terminated application are displayed, may be displayed according to a preset list displaying mode, for example, the stack mode or the list mode.

[269] When it is determined that there is no application being executed in the terminal device 100 and which may be displayed on the sub-window 111, in operation S2115, the terminal device 100 may display the full-sized window 112 without the sub-window 111.

[270] When it is determined that there is an application being executed in the terminal device 100 and which may be displayed on the sub-window 111, in operation S2117, the terminal device 100 may display an execution screen of the application, which is determined in operation S2115 as being executed, on the sub-window 111.

[271] When it is determined that the execution screen of the application which is being executed is not displayed on the full-sized window 112 in operation S2103, the terminal device 100 may determine in operation S2111 whether the execution screen of the application, which is being executed in the terminal device 100, is displayed on the sub-window 111.

[272] Therefore, the terminal device 100 may terminate the application displayed on the sub-window 111 when there is no application displayed on the full-sized window 112 according to the termination request received in operation S2101.

[273] In operation S2111, when the execution screen of the application being executed is not displayed on the sub-window 111, the terminal device 100 may determine that there is no application to be terminated and may end a process according to the termination request.

[274] In operation S2113, when it is determined that the execution screen of the application being executed in the terminal device 100 is displayed on the sub-window 111, the terminal device 100 may terminate the application displayed on the sub-window 111.

[275] Moreover, in the stack mode, when the list of sub-windows is displayed instead of the sub-window 111 in operation S2113, the terminal device 100 may terminate the foremost application of the list. In addition, in the list mode, the terminal device 100 may terminate the topmost application of the list.

[276] In addition, in operation S2115, the terminal device 100 may determine whether there is an application being executed in the terminal device 100 other than the application terminated in operation S2113. The determination of the terminal device 100 is made to determine whether there is an application to be displayed on the sub-window 111 other than the application terminated in operation S2113.

[277] In operation S2115, when it is determined that there is no application that is being executed in the terminal device 100 other than the application which is terminated in operation S2113, it may be considered that there is no application to be displayed on the display screen 110 of the terminal device 100. Therefore, the terminal device 100 may display the initial screen of the terminal device 100, for example, the home screen or the application drawer screen on the full-sized window 112.

[278] When it is determined that there is an application that is being executed in the terminal device 100 in operation S2117, the terminal device 100 may display an execution screen of the application, which is determined in operation S2115 as being executed, on the sub-window 111.

[279] Moreover, when the list of sub-windows is displayed instead of the sub-window 111 in operation S2117, sub-windows on which applications other than the terminated application are displayed may be displayed according to the preset list displaying mode, for example, the stack mode or the list mode.

[280] In the present embodiment, when an input for requesting the termination of an application is received, the terminal device 100 may terminate the applications one by one according to the execution order of the applications or the display order of the applications by terminating the application displayed on the full-sized window 112 first.

[281] In addition, the terminal device 100 may terminate the applications one by one according to the execution order of the applications or the display order of the applications by terminating the application displayed on the sub-window 111 first when there is no application displayed on the full-sized window 112.

[282] Also, when there is no application displayed on the full-sized window 112, the terminal device 100 may terminate the applications one by one according to the execution order of the applications or the display order of the applications by terminating the application displayed on the uppermost or foremost sub-window first among the sub-windows displayed on the list of the sub-windows.

[283] FIGS. 22A and 22B are examples of a method of displaying execution screens of applications when terminating the applications, according to an exemplary embodiment.

[284] FIG. 22A illustrates examples of the method of displaying the applications when terminating the applications when a full-sized window 112 and a sub-window 120 display the execution screens of applications.

[285] Referring to a display screen 2210, the full-sized window 112 and the sub-window 120 display the execution screens of the applications. In this case, the terminal device 100 may receive an input for requesting the termination of the application. The display screen 2210 may correspond to operation S2101 of FIG. 21.

[286] Referring to a display screen 2220, an execution screen of an application C displayed on the full-sized window 112 is terminated, and then an execution screen of an application B displayed on the sub-window 120 may be displayed on the full-sized window 112. Also, an execution screen of an application A is being executed in the terminal device 100, and not the applications B and C, and the execution screen of the application A may be displayed on a sub-window 121 instead of the execution screen of the application B. The display screen 2220 may correspond to operations S2105, S2107, S2109, S2115 and S2117 of FIG. 21. In the display screen 2220, the terminal device 100 may receive the input for requesting the termination of the applications again.

[287] Referring to a display screen 2230, as terminal device 100 may receive the input for requesting the termination of the application again in the display screen 2220, the execution screen of the application B displayed on the full-sized window 112 may be terminated. In addition, the terminal device 100 may display the execution screen of the application A, which has been displayed on the sub-window 121, on the full-sized window 112 instead of the sub-window 121. The display screen 2230 shows that there is no sub-window 121 because the application A is the only application being executed in the terminal device 100. The display screen 2230 may correspond to operations S2115 and S2117 of FIG. 21.

[288] FIG. 22B illustrates examples of the method of displaying the execution screen of the application when terminating the application when the sub-window 111 only displays an application.

[289] Referring to a display screen 2240, an execution screen of the application is displayed on the sub-window 111. An initial screen of the terminal device for

executing a new application, for example, the home screen or the application drawer screen, may be displayed on the full-sized window 112. The display screen 2240 may correspond to operation S2101 of FIG. 21.

[290] Referring to a display screen 2250, the terminal device 100 may terminate the application B displayed on the sub-window 111 when the input for requesting the termination of the application is received. The display screen 2250 shows that only the initial screen of the terminal device 100 is displayed because there is no application being executed after the application B is terminated. The display screen 2250 may correspond to operation S2115 of FIG. 21.

[291] FIG. 23 is a flowchart of a method of displaying applications, according to an exemplary embodiment.

[292] Referring to FIG. 23, in operation S2301, the terminal device 100 may execute a new application. In this case, the sub-window 111 may not be displayed on the display screen 110 of the terminal device 100.

[293] In addition, in operation S2301, the terminal device 100 may receive an input for displaying the home screen.

[294] In operation S2303, the terminal device 100 may determine whether the screen displayed on the full-sized window 112 is an execution screen of an application or the home screen. That is, the terminal device 100 may determine whether the screen displayed on the full-sized window 112 may be displayed only on the full-sized window 112 or may also be displayed on the sub-window 111. The home screen may be set to be displayed only on the full-sized window 112 not on the sub-window 111.

[295] The initial screen of the terminal device 100, for example, the home screen or the application drawer screen, is a screen for executing applications, and thus, it may be considered that, when the terminal device 100 executes a new application, there is no need to display the home screen or the application drawer screen onto the sub-window 111 instead of the full-sized window 112 and continue to check the home screen or the application drawer screen.

[296] Therefore, the initial screen of the terminal device 100 such as the home screen or the application drawer screen may be set to be displayed only on the full-sized window 112 not on the sub-window 111. However, there may be an application that is set to be displayed only on the full-sized window 112 except for the initial screen of the terminal device such as the home screen or the application drawer screen.

[297] In operation S2307, the terminal device 100 may not display the sub-window 111 and may display an execution screen of a new application on the full-sized window 112. When an execution screen of another application is already displayed on the sub-window 111 in operation S2301, the execution screen of the application may continue to be displayed on the sub-window 111 even though a new application is executed.

[298] When it is determined that the execution screen of the application displayed on the full-sized window 112 may be displayed on the sub-window 111 in operation S2303, the terminal device 100 may display the execution screen of the application, which has been displayed on the full-sized window 112, on the sub-window 111 in operation S2305. In operation S2307, an execution screen of a new application may be displayed on the full-sized window 112.

[299] FIG. 24 illustrates examples of a method of displaying applications, according to an exemplary embodiment.

[300] Referring to a display screen 2410, the full-sized window 112 and sub-window 111 may display execution screens of applications, respectively.

[301] Referring to a display screen 2420, the home screen may be displayed on the full-sized window 112 as a new application. Also, an execution screen of an application B displayed on the full-sized window 112 may be displayed on the sub-window 111. The display screen 2420 may correspond to operation S2305 of FIG. 23.

[302] Referring to a display screen 2430, an application C may be displayed on the full-sized window 112 as a new application. Since the home screen displayed on the full-sized window 112 may not be displayed on the sub-window 111, the sub-window 111 may continue to display the application B. The display screen 2430 may correspond to operation S2307 of FIG. 23.

[303] Referring to a display screen 2440, the home screen may be displayed on the full-sized window 112 as a new application. Also, an execution screen of the application C displayed on the full-sized window 112 may be displayed on the sub-window 111. The display screen 2440 may correspond to operation S2305 of FIG. 23.

[304] An internal structure of a terminal device 2500 will be described with reference to FIGS. 25A and 25B.

[305] FIGS. 25A and 25B are block diagrams showing the internal structure of the terminal device 2500 displaying applications, according to an exemplary embodiment.

[306] The terminal device 2500 of FIGS. 25A and 25B may perform the method of displaying the applications as described with reference to FIGS. 1A to 22B.

[307] Referring to FIG. 25A, the terminal device 2500 may include a controller 2510 and a display 2520. However, all components of the terminal device 2500 are not essential. The terminal device 2500 may be executed by more or less components described herein.

[308] In general, the controller 2510 controls overall operations of the terminal device 2500. For example, the controller 2510 controls the sub-window 111 and the full-sized window 112 displaying execution screens of applications and may control the display screen 110. That is, the controller 2510 may generally control the display 2520.

[309] The display 2520 may display and output information processed by the display 2520.

For example, the display 2520 may display the sub-window 111 or the full-sized window 112 controlled by the controller 2510.

[310] In the present embodiment, the controller 2510 displays an execution screen of a first application on a first area when the first application is executed, and when a second application is executed while the first application is executed, the controller 2510 may control the display 2520 to display the execution screen of the first application onto a second area instead of the first area and to display an execution screen of the second application on the first area. The first and second areas may indicate the full-sized window 112 and the sub-window 111, respectively.

[311] Referring to FIG. 25B, the terminal device 2500 may include the controller 2510, the display 2520, a sensor 2530 and a user input unit 2540. However, all components of the terminal device 2500 are not essential. The terminal device 2500 may be executed by more or less components described herein.

[312] The controller 2510 and the display 2520 corresponds to the controller 2510 and the display 2520 of FIG. 25A, and thus, repeated descriptions will be omitted.

[313] The sensor 2530 detects current states of the terminal device 2500 such as a location thereof, whether to contact the user, a bearing, deceleration/acceleration and a tilt of the terminal device 2500 and generates sensing signals for controlling operations of the sensor 2530.

[314] The sensor 2530 may include a variety of sensors for detecting touches on a touch screen or proximity touches on the touch screen. A sensor for detecting the touches on the touch screen may be a tactile sensor. The tactile sensor may be a sensor for detecting a contact of a specific object to a degree of human sensitivity. The tactile sensor may detect a variety of information such as the roughness of a contact surface, the hardness of a contacting object, the temperature of a contacting point, or the like.

[315] In addition, the sensor for detecting the touches on the touch screen may be a proximity sensor.

[316] The proximity sensor is a sensor for detecting whether there is an object approaching the contact surface or whether there is an object around the contact surface by using power of an electromagnetic field or without mechanical contacts. Therefore, the proximity sensor has a fairly long lifespan and may be variously used compared to a contact-type sensor.

[317] Examples of the proximity sensor are a penetrating-type photoelectric sensor, a direct-reflex photoelectric sensor, a mirror-reflex photoelectric sensor, a high-frequency oscillation-type proximity sensor, a capacitive sensor, a magnetic proximity sensor, an infrared proximity sensor, or the like.

[318] Therefore, the sensor 2530 may detect gestures for controlling the full-sized window 112 or the sub-window 111. For example, the sensor 2530 may detect gestures of the

user such as a dragging gesture, a flicking gesture, a tapping gesture, a double tapping gesture, or the like. In this regard, the sensor 2530 may detect a direction, speed, length of the gestures, etc.

[319] The sensor 2530 may detect gestures for changing a display area of an execution screen of an application, which is displayed on the sub-window 111, from the sub-window 111 to the full-sized window 112 and for displaying an execution screen of an application, which is selected from among applications being executed in the terminal device 2500, on the sub-window 111.

[320] The sensor 2530 may detect a user gesture for hiding the sub-window 111 or whether there is an input with regard to the sub-window 111 for a predetermined amount of time or more. Therefore, according to detection results from the sensor 2530, the controller 2510 may control the display 2520 to display at least one of alternative images, which indicate some portions of the sub-window 111, a transparent portion of the sub-window 111 and the sub-window 111, instead of the sub-window 111 in a case where no user gesture is input for hiding the sub-window 111 or input with regard to the sub-window 111 for a predetermined amount of time or more.

[321] The sensor 2530 may detect a user gesture for displaying a list. Therefore, in response to the detected gesture for displaying the list, the controller 2510 may control the display 2520 to display an execution screen of at least one application, which is selected from among applications being executed in the terminal device 2500, on the sub-window 111 according to a sub-window displaying method.

[322] The user input unit 2540 generates input data for controlling operations of the terminal device 2500. The user input unit 2540 may include a keypad, a dome switch, a touch pad (constant pressure/electrostatic types), a jog wheel, a jog switch, an H/W button, etc. In particular, the touch pad may be referred to as a touch screen when the touch pad forms an interlayer structure with the display 150.

[323] In the present embodiment, the user input unit 2540 may include a termination button for terminating applications being executed in the terminal device 2500.

[324] When the display 2520 and the touch pad have the interlayer structure and form the touch screen, the display 2520 may also be used as not only an output device but also an input device. The display 2520 may include at least one of a liquid crystal display (LCD), a thin film transistor-liquid crystal display (TFT LCD), an organic light-emitting diode (OLED) display, a flexible display, and a three-dimensional (3D) display. There may be at least two displays according to a configuration type of the terminal device 2500. The touch screen may be formed to detect locations, extents, and the pressure of touch inputs. Moreover, the touch screen may be formed to detect real touches as well as proximity touches.

[325] Throughout the specification, the “real-touches” mean that a pointer actually touches

a screen, and the "proximity touches" mean that the pointer does not directly touches the screen and approaches the screen from a predetermined distance. In the present specification, the pointer is a tool for touching a specific area of a displayed screen or generating proximity touches, and examples of the pointer are a stylus pen, fingers, etc.

[326] A memory 2550 may store applications that may be executed in the terminal device 2500.

[327] The memory 2550 may include at least one storage medium selected from among a flash memory type memory, a hard disk type memory, a multimedia card micro type memory, a card-type memory (e.g., a secure digital (SD) memory, an ex-divided (XD) memory, etc.) random access memory (RAM), read-only memory (ROM), electrically erasable programmable read-only memory (EEPROM), PROM, a magnetic memory, a magnetic disk, and an optical disk. In addition, the terminal device 2500 may operate a web storage that performs a storage function of the memory 2550 on the Internet.

[328] According to one or more exemplary embodiments, display areas of applications displayed on a full-sized window and a sub-window may be easily changed.

[329] As described above, according to the one or more of the above exemplary embodiments, an application displayed on a full-sized window and applications displayed on sub-windows

[330] In addition, other exemplary embodiments can also be executed through computer readable code/instructions in/on a medium, e.g., a computer readable medium, to control at least one processing element to execute any above described embodiment. The medium can correspond to any medium/media permitting the storage and/or transmission of the computer readable code. The computer readable code can be recorded/transferred on a medium in a variety of ways, with examples of the medium including recording media, such as magnetic storage media (e.g., ROM, floppy disks, hard disks, etc.) and optical recording media (e.g., CD-ROMs, or DVDs), and transmission media such as Internet transmission media.

[331] It should be understood that the exemplary embodiments described herein should be considered in a descriptive sense only and not for purposes of limitation. Descriptions of features or aspects within each embodiment should typically be considered as available for other similar features or aspects in other embodiments.

[332] While one or more exemplary embodiments have been described with reference to the figures, 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 present embodiment as defined by the following claims.

Claims

[Claim 1] A method of a terminal device displaying an application, the method comprising:
displaying a first application on a full-sized window;
displaying a second application on a sub-window overlapping the full-sized window;
based on a first gesture being detected on the sub-window for displaying a plurality of sub-windows, displaying the plurality of sub-windows on the full-sized window in a stack in which sub-windows of the plurality of sub-windows overlap each other, the sub-windows displaying applications, respectively, that are being executed by the terminal device;
based on a second gesture being detected for changing a foremost sub-window in the stack of the plurality of sub-windows to a next sub-window, displaying the next sub-window as the foremost sub-window in the stack; and
based on a third gesture being detected for selecting one application from among the applications displayed in the plurality of sub-windows, displaying the one application on the full-sized window instead of the first application.

[Claim 2] The method of claim 1, further comprising, while displaying the one application on the full-sized window, displaying the first application as the foremost sub-window in the stack of the plurality of sub-windows.

[Claim 3] The method of claim 1,
wherein the full-sized window is displayed on substantially an entire area of a display of the terminal device,
wherein the second application is displayed on the sub-window, the sub-window being a window which is decreased in size from a size of the full-sized window while maintaining a certain proportion and which overlaps the full-sized window, and
wherein the sub-window is displayed on a portion of the entire area of the display of the terminal device.

[Claim 4] The method of claim 1, wherein the plurality of sub-windows overlap each other and are displayed according to an order in which each application is executed by the terminal device or an order in which each application is requested to be displayed.

[Claim 5] A terminal device for displaying an application, the terminal device comprising:

a display;
a memory storing one or more instructions; and
at least one processor configured to execute the one or more instructions to:
control the display to display a first application on a full-sized window,
control the display to display a second application on a sub-window overlapping the full-sized window,
based on a first gesture being detected on the sub-window for displaying a plurality of sub-windows, control the display to display the plurality of sub-windows on the full-sized window in a stack in which sub-windows of the plurality of sub-windows overlap each other, the sub-windows displaying applications, respectively, that are being executed by the terminal device,
based on a second gesture being detected for changing a foremost sub-window in the stack of the plurality of sub-windows to a next sub-window, control the display to display the next sub-window as the foremost sub-window in the stack, and
based on a third gesture being detected for selecting one application from among the applications displayed in the plurality of sub-windows, control the display to display the one application on the full-sized window instead of the first application.

[Claim 6] The terminal device of claim 5, wherein the at least one processor is further configured to execute the one or more instructions to, while displaying the one application on the full-sized window, control the display to display the first application as the foremost sub-window in the stack of the plurality of sub-windows.

[Claim 7] The terminal device of claim 5,
wherein the full-sized window is displayed on substantially an entire area of the display of the terminal device,
wherein the second application is displayed on the sub-window, the sub-window being a window which is decreased in size from a size of the full-sized window while maintaining a certain proportion and which overlaps the full-sized window, and
wherein the sub-window is displayed on a portion of the entire area of the display of the terminal device.

[Claim 8] The terminal device of claim 5, wherein the plurality of sub-windows overlap each other and are displayed according to an order in which each application is executed by the terminal device or an order in which each application is requested to be displayed.

[Claim 9] A non-transitory computer-readable recording medium having recorded thereon a program which, when executed by a computer, performs the method of claim 1.