

Arrangement of Selected Subset of Objects in a Container

Cross-reference to related Inventions

The present invention is related to U.S. Serial No. 08/766,541
entitled "User Defined Template Arrangement of Objects in a Container",
filed on ⁹⁶¹²¹¹ bearing attorney docket number AT996-293.

Background of the Invention

1. Field of the Invention

The present invention relates to computer systems having display devices for displaying information to the computer system user. More particularly, the present invention relates to graphical information display devices that organize objects into containers and allow users to interact with the system by selecting objects within a container. Still more particularly, the present invention supports automatic arrangement of a subset of objects within a container.

2. Background and Related Art

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

Computer systems with graphical user interfaces (GUIs) permit the system user to select programs to execute or other actions by selecting ("clicking") on an icon representing an actionable object. The Apple Macintosh operating system introduced the use of graphical user interfaces and selectable objects. Operating systems such as the IBM OS/2 operating system, the Microsoft Windows operating system, and the OSF Common Desktop Environment for Unix operating systems provide graphical interface support using objects.

Actionable objects are represented as icons on the display screen. The user operates a pointing device such as a mouse, track ball, track point, or touchpad to move a cursor on the display screen. One or more selection buttons are provided to select an icon or to activate the program represented by the icon. The icons are typically grouped into containers (often called "folders") with other related icons. For example, all of the icons relating to a word processing product may be grouped into a single folder. A folder is an actionable object that can be opened to display its contents which may include other folders and icons. The full display screen is itself a container containing the folders and objects presented to the user.

The system user adds icons to his or her system when new programs are added or when new files or documents are created. This

may lead to a cluttered container or desktop with icons scattered without any discernable order. Most graphical user interface systems allow the user to drag icons into different positions, allowing them to rearrange the icons to suit their taste. These systems also provide an automatic arrange functions that rearrange all of the icons in a container. Automatic arrangement functions arrange the icons in an order specified by the user, for example, alphabetically by the name of the icon. The arrangement places the icons within the folder based on the systems arrangement specification. The OS/2 operating system, by default, arranges the icons in rows, left to right starting at the top left of the display. Windows 3.1 arranges the icons in rows starting at the bottom left, while Windows95 arranges the icons in columns starting at the top left of the screen.

Automatic arrangement has the disadvantage that all objects or icons in a container are rearranged. The system user may have manually arranged many of the icons or may be pleased with a portion of the arrangement. The user may wish to rearrange only some of the icons. Present systems do not provide an ability to rearrange less than all of the icons in a container.

Thus, a technical problem exists of providing a way for a system user to automatically rearrange a subset of the icons or objects in a container.

Summary of the Invention

The present invention is directed to a computer implemented system for arranging selected objects in a displayable container. The system comprises: means for selecting a plurality, but not all, of the objects in the container; means for initiating arrangement processing; means for constructing a list of selected objects and storing the list in a memory; means for indicating a starting point for rearranging the selected objects; and means for moving each object in the list to a new position starting with the first object at the starting point.

The present invention is directed to providing a process for rearranging a subset of the icons in a container. Icons to be rearranged are first selected. Then the user selects an action from a menu bar or pop-up menu requesting selective icon rearrangement. The user indicates a rearrangement direction (e.g. vertical or horizontal) and indicates a point on the screen to begin the layout of the rearranged icons. The system collects a list of the icons to be rearranged and then processes that list one at a time placing the icon in the next available display screen position.

It is therefore an object of the present invention to provide a means for automatically rearranging selected items in a graphic user interface container.

It is yet another object of the invention to provide a method for the user to specify selected items to automatically rearrange and to specify the location and orientation of the rearranged icons.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawing wherein like reference numbers represent like parts of the invention.

Brief Description of the Drawing

Figure 1 is a block diagram of a computer system according to the preferred embodiment of the present invention.

Figure 2 is an illustration of a display screen according to the present invention divided into cells.

Figure 3 is an illustration of a display screen and container divided into cells.

Figure 4 is an image showing the selection of objects for rearrangement.

Figure 5 is an illustration of the command menu selection.

Figure 6 is an illustration of the specific command item selection.

Figure 7 is an illustration of the selection of the starting point for object rearrangement.

Figure 8 is an illustration of the completed arrangement according to the present invention.

Figure 9 is a flowchart depicting the user selected object arrangement process according to the present invention.

Figure 10 is an illustration of the selective rearrangement conflicting with existing icon placement.

Figure 11 is an illustration of the result of conflicting arrangement.

Figure 12 is a flowchart depicting the system implemented process for arranging selected icons according to the preferred embodiment of the present invention.

Detailed Description

The present invention is implemented in a computer system such as that shown in Figure 1. The computer system **100** includes a processing complex **104** of one or more central processing units (CPUs) and random access memory and read-only memory **102**. The central processing units can be of any type including devices such as the Intel 486, Intel Pentium, IBM PowerPC or other processor. The system also includes an input/output controller **108** for managing the interface between the computer system and external devices. Network controller **110** allows interaction with a local area or wide area network.

External devices can include fixed disk drives **112** and removable storage devices **114**. The fixed and removable devices can be magnetic or optical devices. A keyboard **116** and pointing device **118** are provided for user entry of data. The pointing device **118** can be of any known type such as a mouse, trackball, trackpoint, touchpad or touch screen. The display **120** displays information generated by the system. The display includes facilities to display a cursor **122** that tracks the pointing device. The display screen displays icons or objects **124, 126, 128, 130**. These objects represent actionable objects that are selectable by the user. By actionable objects it is meant that selection of the object causes a defined action to be initiated. These actions can include the execution of a program, the opening of a folder or other container, or the modification of

the display environment.

The preferred embodiment of the present invention operates on an IBM Personal Computer workstation having an Intel Pentium CPU. The preferred embodiment works in conjunction with the IBM OS/2 operating system Presentation Manager function. The OS/2 Presentation Manager controls the display of information on the display screen. The Presentation Manager is used by application developers to construct and display information on the screen. The objects placed on the display screen are termed "Presentation Manager Controls" or simply "PM Controls." A subset of the controls are "PM Container Controls" that control the behavior of container objects such as the desktop or folders.

The present invention is implemented by modifying the behavior of an existing "PM Container Control." An alternative embodiment creates the selective arrange function as a new "PM Container Control." Other operating systems have analogous functions, for example, Microsoft Windows includes "List Controls" which provide similar function. The invention can be implemented in the operating system function that controls the display of icons or objects in containers. In each other operating system, an existing function is modified or a new function created to implement the present invention.

The arrange function can arrange icons or objects based on a grid or based on relative icon positions. A grid arrangement divides the screen into a grid of cells and arranges the icons by placing them in a cell. Icons may overlap if the cell is smaller than the icon size. Icons can be arranged in relation to other icons. Relative arrangement determines the location and extent of the previous icon, and displaces the next placed icon by a system or user defined amount from the existing icon. Relative arrangement prevents the overlapping of icons. The present invention is applicable to either a gridded or relative arrangement system. The preferred embodiment will be described with reference to a gridded system. It is to be understood, however, that when next icon position is determined the use of relative positioning can be substituted for gridded positioning without departing from the invention.

Display screen 121 can be divided into a grid of cells that can contain icons or objects. The entire display screen is divided as shown in Figure 2. Each cell 202 contains one desktop icon. A container other than the desktop can be similarly divided as shown in Figure 3. The container 302 is subdivided into cells such as 304.

The size of each cell and the number of cells in the container is dependent on the resolution of the display screen and the size of icons to be displayed. Display device resolution is expressed as a certain number

of pixels (picture elements) displayed horizontally and vertically. Common dimensions are 1024 pixels horizontally and 768 vertically (meaning that there are 768 rows of 1024 pixels each.) Another common dimension is 640x480. A container displayed on the desktop will have a dimension that can be expressed in pixels.

Icons can be of varying sizes. One approach to dividing the container space is to determine the maximum rectangular dimension, and then divide the container space into equal cells of that rectangular size. Alternatively, a standard cell size can be defined. For purposes of illustration, the present invention will consider an icon cell of 20 pixels by 20 pixels. Thus, a 1024x768 display screen can be divided into 38 rows of 51 cells.

The user process for performing the selective automatic rearrangement is as follows. First, the user selects the icons to be rearranged. Figure 4 illustrates the selection of objects 402 and 404. Selection of objects on the desktop is accomplished using known techniques such as placing the cursor over the object and depressing the "select" button (e.g. mouse button 1.)

Next the user activates a command menu. In the preferred embodiment this menu is the desktop (or container) pop-up menu activated

by depressing the “action” selector (e.g. mouse button 2.) The command menu 502 contains options including “Arrange” 504. The “Arrange” menu item cascades into menu 506 that offers options for automatic rearrangement. As an example, the “Selected Horizontal” 602 menu item is selected.

The “Selected Horizontal” command causes the cursor to change to a new shape 702 indicating selective rearrange mode. The cursor is responsive to movement of the pointing device and is positioned by the user at the point where selective rearrangement is to begin. The user depresses the “select” button (mouse button 1) when the modified cursor is in the desired position.

The selected objects are then repositioned, in this case horizontally, starting at the selected point on the display surface, see Figure 8. The cursor then returns to its prior shape.

The user process is illustrated in flowchart form in Figure 9. The user begins by selecting objects to rearrange 902. Then the user selects the menu action 904, and finally, the user indicates the arrangement starting point 906.

The preferred embodiment does not attempt to resolve conflicts

between requested rearrangement and existing icon positioning. For example, in Figure 10, objects **1002** and **1004** are selected for rearrangement and the starting point **1006** is selected to be on object **1008**. This results, as shown in Figure 11, in object **1002** overlaying object **1008**. An alternate embodiment includes an ability to check for icons that exist in a candidate cell causing the rearrangement to skip that cell.

The process of the present invention is illustrated in flowchart form in Figure 12. The object selection process is not part of this process since it occurs using existing techniques. The system first detects a menu selection of "selective arrange" **1202**. The system constructs **1216** a list of the selected objects by traversing the objects in the container. The selective rearrange can have an associated orientation, for example, horizontal or vertical. The selected orientation is detected **1204** causing the system to set the position increment to be either horizontal **1206** or vertical **1208**. The preferred embodiment includes orientation selection in the command, allowing the user to select either "Selective Horizontal" or "Selective Vertical," though other options for querying user preference are known in the art.

The system next modifies the cursor shape **1210** to indicate to the user that he or she is in selective rearrange mode. The system then waits for a cursor placement action **1212**. When the selection action (e.g. button

click) is detected, the system determines the cursor position 1214 and prepares to rearrange the icons or objects.

The list of selected objects is then processed 1218 to rearrange those objects starting at the point selected by the user. Each object is placed 1220 and the position for the next object incremented 1222. As noted above, the position of the next object can be determined based on a grid (*i.e.* move to the next horizontal or vertical cell) or based on the position relative to the previously placed icon (*i.e.* the bound of the previous icon plus a horizontal or vertical displacement.) When all of the selected objects have been processed the process terminates and the cursor returns to its previous shape 1224.

The preferred embodiment provides an easy to use automatic rearrangement of selected objects on the desktop or in a container.

It will be understood from the foregoing description that various modifications and changes may be made in the preferred embodiment of the present invention without departing from its true spirit. For example, the selective arrange can apply to desktop displays that use simple text rather than graphical icons. It is intended that this description is for purposes of illustration only and should not be construed in a limiting sense. The scope of this invention should be limited only by the language of the following claims.

Claim(s)

1. A computer implemented system for arranging objects in a displayable container, the system comprising:

means for selecting a plurality, but not all, of objects in said container;

means for initiating arrangement processing;

means for constructing a list of selected objects and storing said list in a memory;

means for indicating a starting point for rearranging said selected objects; and

means for moving each object in said list to a new position starting with the first object at said starting point.

2. The computer system of claim 1, wherein said means for moving comprises:



logic means for dividing said container into a grid having a plurality of cells;

display control means for placing each of said selected objects in a cell displaced from a previously placed object in a selected direction.

3. The system of claim 1, wherein said means for moving comprises:

display control means for placing each of said selected objects on said display at a displacement from a previously placed object in a selected direction.

4. A computer implemented method of arranging display objects in a container containing a plurality of display objects, the method comprising the steps of:

selecting one or more display objects, but less than all objects, from said plurality of display objects;

receiving a request to arrange selected objects;

building a list of selected objects;



receiving a starting position indication;

placing each object in a screen position offset from each previously placed selected object.

5. The method of claim 4, wherein said step of placing includes the steps of:



dividing said container into a grid of equivalent cells;

placing a first object within a cell containing the starting position;

placing each subsequent object in a cell offset from said first object cell in a selected direction.

6. The method of claim 5, wherein said selected direction is horizontal.

7. The method of claim 5 wherein said selected direction is vertical.

8. The method of claim 5 wherein said building, receiving and placing steps are contained in a container control function.

9. A computer program product having a computer readable medium having computer program logic recorded thereon for arranging a selected subset of objects in a container on a display, said computer program product comprising:



computer program product means having computer readable means for selecting a subset of objects in a displayed container;

computer program product means having computer readable means for placing each of said selected objects in said display container starting with a first object at a first position and each subsequent object at a position offset from said starting position.

10. The computer program product of claim 9, wherein said computer program product means having computer readable means for placing each of said selected objects comprises:

computer program product means having computer readable means for initiating selective rearrangement;

computer program product means having computer readable means for receiving an indicated starting point;

computer program product means having computer readable means
for receiving a rearrangement direction;



computer program product means having computer readable means
for creating a list in a computer memory of the selected objects.