Generation in Graphical User Interface

Abhishek Agarwal[1] , Meenu Bhati[2]

[1]*B-Tech Student, Department of EIC, Global College of Technology, Jaipur, India*

***Abstract*-- Graphical User Interface (GUI for short) allows users to interact with the computer hardware in a user friendly way. It is a computer program that enables a person to communicate with a computer through the use of symbols, visual metaphors, and pointing devices. The GUI is now the standard computer interface, and its components have themselves become unmistakable cultural artifacts. In this paper I have discussed History of operating systems; working and generation of graphical user interface operating systems.**

Keywords: Artifacts, Precursor

I. INTRODUCTION

A GUI uses a combination of technologies and devices to provide a platform that the user can interact with, for the tasks of gathering and producing information. A series of elements conforming a visual language have evolved to represent information stored in computers. This makes it easier for people with few computer skills to work with and use computer software. The most common combination of such elements in GUIs is the WIMP ("window, icon, menu, and pointing device") paradigm, especially in personal computers.

II. HISTORY

A precursor to GUIs was invented by researchers at the Stanford Research Institute, led by Douglas Engelbart. They developed the use of text-based hyperlinks manipulated with a mouse for the On-Line System. The concept of hyperlinks was further refined and extended to graphics by researchers at Xerox PARC and specifically Alan Kay, who went beyond text-based hyperlinks and used a GUI as the primary interface for the Xerox Alto computer. Most modern general-purpose GUIs are derived from this system.

The PARC user interface consisted of graphical elements such as windows, menus, radio buttons, check boxes and icons. The PARC user interface employs a pointing device in addition to a keyboard. These aspects can be emphasized by using the alternative acronym WIMP, which stands for Windows, Icons, Menus and Pointing device.

Following PARC the first GUI-centric computer operating model was the Xerox 8010 Star Information System in 1981, followed by the Apple Lisa(which presented the concept of menu bar as well as window controls) in 1983, the Apple Macintosh 128K in 1984, and the Atari ST and Commodore Amiga in 1985. The GUIs familiar to most people today (as of the early 2000s) are Microsoft Windows, Mac OS X, and the X Window System interfaces for desktop and laptop computers, and Symbian, BlackBerry OS, Android, Windows Phone, Palm OS / Web OS, Firefox OS, and Apple's iOS for handheld ("Smartphone") devices.

Apple, IBM and Microsoft used many of Xerox's ideas to develop products, and IBM's Common User Access specifications formed the basis of the user interface found in Microsoft Windows, and the Unix Motif toolkit and window manager. These ideas evolved to create the interface found in current versions of Microsoft Windows, as well as in Mac OS X and various desktop environments for Unix-like operating systems, such as Linux.

III. WORKING

In computing, **graphical user interface** (**GUI**, sometimes pronounced "gooey" or "gwee") is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation. GUIs were introduced in reaction to the perceived steep learning curve of command-line interfaces (CLI), which require commands to be typed on the keyboard.

- **COMMAND LINE INTERFACE(CLI)**

Since the commands available in command line interfaces can be numerous, complicated operations can be completed using a short sequence of words and symbols. This allows for greater efficiency and productivity once many commands are learned, but reaching this level takes some time because the command words may not be easily discoverable or mnemonic. In addition, using the command line can become slow and error-prone when the user needs to enter very long commands, comprising many parameters and/or several different filenames at once. WIMPs ("window, icon, menu, pointing device"), on the other hand, present the user with numerous widgets that represent and can trigger some of the system's available commands. On the other hand, GUIs can be made quite hard by burying dialogs deep in the system, or moving dialogs from place to place. Also, dialog boxes are considerably harder for the user to script.WIMPs extensively uses modes as the meaning of all keys and clicks on specific positions on the screen are redefined all the time. Command

line interfaces use modes only in limited forms, such as the current directory and environment variables.

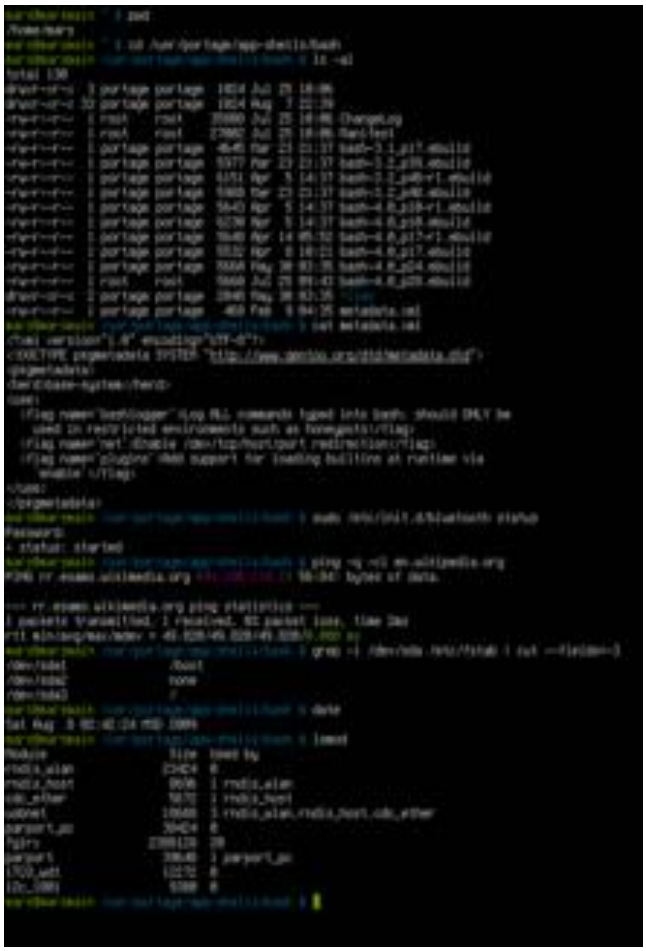

Figure 1. CLI operating system

Most modern operating systems provide both a GUI and some level of a CLI, although the GUIs usually receive more attention. The GUI is usually WIMP-based, although occasionally other metaphors surface, such as those used in Microsoft Bob, 3dwm or File System Visualizer (FSV).
Applications may also provide both interfaces, and when they do the GUI is usually a WIMP wrapper around the command-line version. This is especially common with applications designed for Unix-like operating systems. The latter used to be implemented first because it allowed the developers to focus exclusively on their product's functionality without bothering about interface details such as designing icons and placing buttons. Designing programs this way also allows users to run the program non-interactively, such as in a shell script.

- **THREE DIMENSIONAL USER INTERFACE**

For typical computer displays, *three-dimensional* are a misnomer—their displays are two-dimensional. Semantically, however, most graphical user interfaces use three dimensions - in addition to height and width, they offer a third dimension of layering or stacking screen elements over one another. This may be represented visually on screen through an illusionary transparent effect, which offers the advantage that information in background windows may still be read, if not interacted with. Or the environment may simply hide the background information, possibly making the distinction apparent by drawing a drop shadow effect over it. Some environments use the methods of 3D graphics to project virtual three dimensional user interface objects onto the screen. These are often shown in use in sci-fi films (see below for examples). As the processing power of computer graphics hardware increases, this becomes less of an obstacle to a smooth user experience. Three-dimensional graphics are currently mostly used in computer games, art and computer-aided design (CAD). A three-dimensional computing environment could also be useful in other scenarios, like molecular graphics and aircraft design.

Figure 2. 3D user interface

(B) GENERATION OF GRAPHICAL USER INTERFACE

1. Xerox Alto

The first GUI was developed by researchers at Xerox Palo Alto Research Center (PARC) in the ’70s. This research opened a whole new era of computer graphic innovations.
The first personal computer which used a modern graphical user interface was the Xerox Alto, developed in 1973. This was not a commercial product and was intended mainly for research at universities. It was not a commercial product, but several thousand units were built and were heavily used at PARC, other Xerox facilities, and at several universities for many years. The Alto greatly influenced the design of personal computers in the following decades, notably the Apple Macintosh and the first Sun workstations.

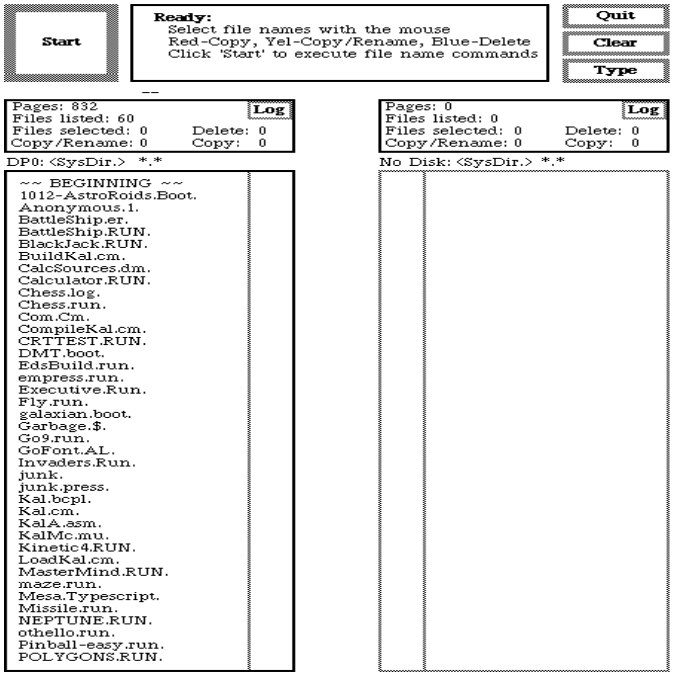

Figure 3. First user interface of Xerox alto

2. Xerox 8010 Star (released in 1981)

This was the first system that was referred to as a fully integrated desktop computer including applications and a GUI. It was known as *"The Xerox Star"*, later renamed *"ViewPoint"* and later again renamed to *"GlobalView"*.

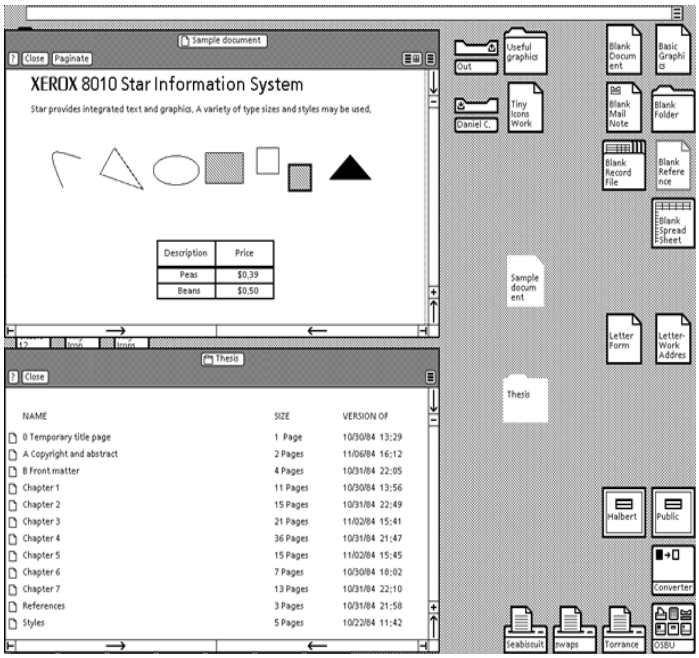

Figure 4. Xerox 8010 star user interface

3. Apple Lisa Office System 1 (released in 1983)

Also referred to as Lisa OS, which in this case is short for Office System. It was developed by Apple with the intention of being a document processing workstation. Unfortunately this workstation didn't last, it was *killed* by Apple's Macintosh operating system that was more affordable. There were upgrades to Lisa OS, *Lisa OS 2* in 1983 and *Lisa OS 7/7 3.1* in 1984, that upgraded the system itself, but not the graphical user interface.

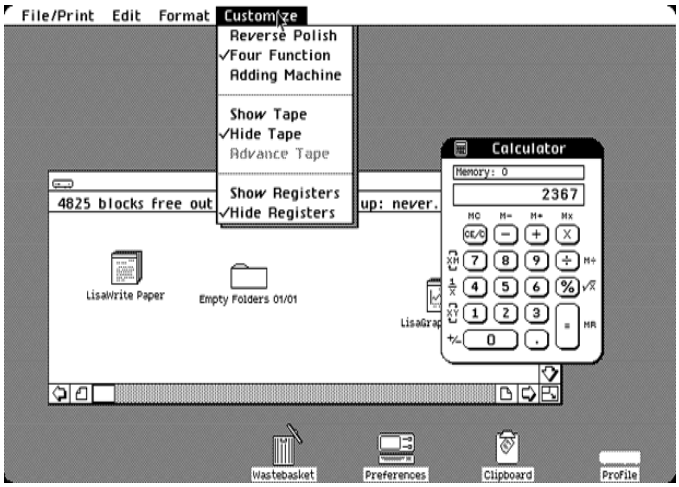

Figure 5. Apple Lisa Office System 1 user interface

4. Mac OS System 1.0 (released in 1984)

System 1.0 was the first operating system GUI developed for the Macintosh. It had several features of a modern operating system, being windows based with icons. The windows could be moved around with the mouse and files and folders could be copied by dragging and dropping onto the target location.

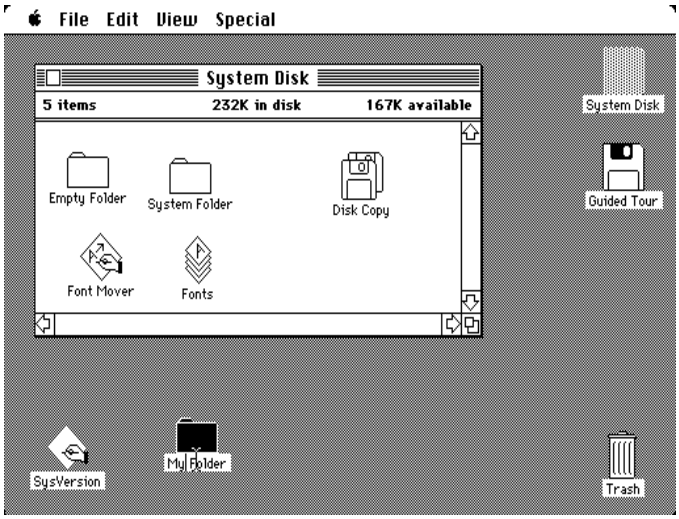

Figure 6: Mac OS System 1.0 user interface

5. Windows 1.0x (released in 1985)

In this year Microsoft finally caught up with the whole graphical user interface craze and released Windows 1.0, its first GUI based operating system (although no one would dare to refer to it as one). The system featured 32×32 pixel icons and color graphics. The most interesting feature (which later was omitted) was the icon of the animated analog clock.

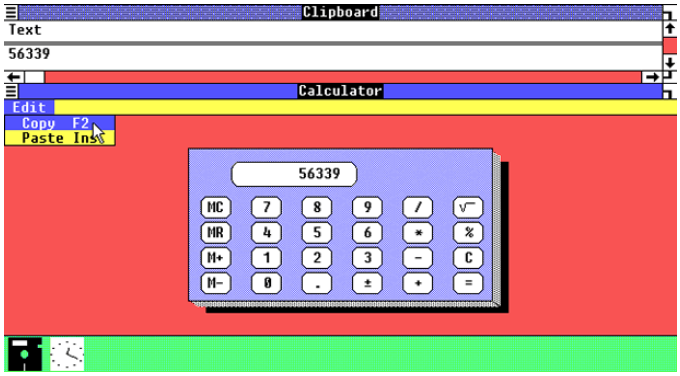

Figure 7. Windows 1.0x user interface

6. Windows 2.0x (released in 1987)

Windows 2.0 allowed application windows to overlap each other unlike its predecessor Windows 1.0, which could display only tiled windows. Windows 2.0 also introduced more sophisticated keyboard-shortcuts and the terminology of "Minimize" and "Maximize", as opposed to "Iconize" and "Zoom" in Windows 1.0. The basic window setup introduced here would last through Windows 3.1. Like Windows 1.x, Windows 2.x applications cannot be run on Windows 3.1 or up without modifications since they weren't designed for protected mode. Windows 2.0 was also the first Windows version to integrate the control panel.

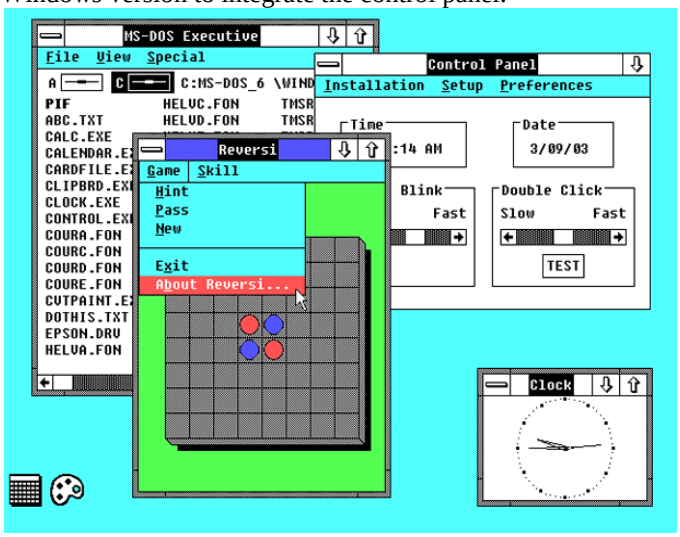

Figure 8. Windows 2.0x user interface

7. NeXTSTEP / OPENSTEP 1.0 (released in 1989)

Steve Jobs came up with the idea to create the perfect research computer for universities and research labs. This idea later evolved into a startup called NeXT Computer Inc. The first NeXT computer was released in 1988, however significant advances were made in 1989 with the release of the NeXTSTEP 1.0 GUI, which later evolved into OPENSTEP. The GUI's icons were bigger (48×48) and it introduced more colors. The GUI was initially monochrome, but version 1.0 started supporting color monitors too. This screenshot gives you have a peek into what would become the modern GUIs.

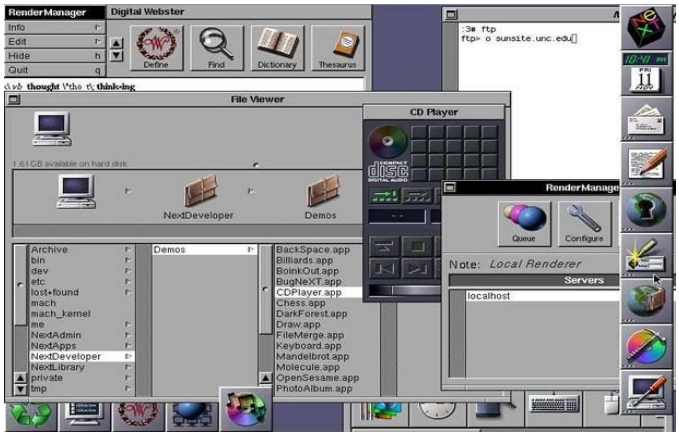

Figure 9. NeXTSTEP / OPENSTEP 1.0 user interface

8. Windows 3.0 (released in 1990)

By this version, Microsoft had realized the real potential in GUI's and started to significantly improve them. The operating system itself supported standard and 386 enhanced modes, which made use of higher memory capacity than 640 KB and hard disk space, resulting in the ability to use higher screen resolutions and better graphics, such as Super VGA 800×600 and 1024×768. Also, Microsoft hired **Susan Kare** to design the Windows 3.0 icons and to add a unified style to the GUI.

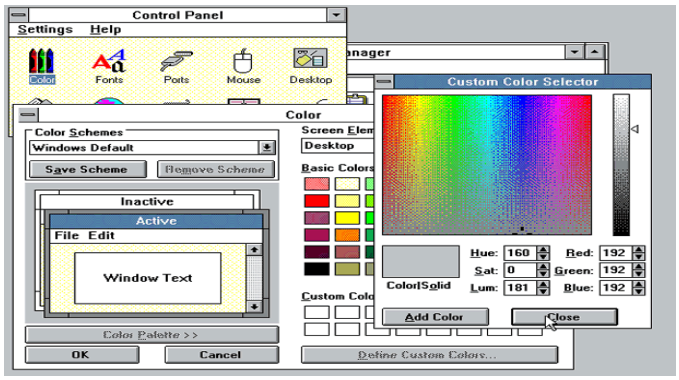

Figure 10. Windows 3.0 user interface

9. Windows 95 (released in 1995)

The user interface was completely re-designed since version 3.x. This was the first Windows version where a small close button was added to each window. The design team gave states (enabled, disabled, selected, checked, etc.) to icons and other graphics. The famous *Start* button appeared for the first time. This was a huge step forward for Microsoft regarding the operating system itself and the unified GUI.

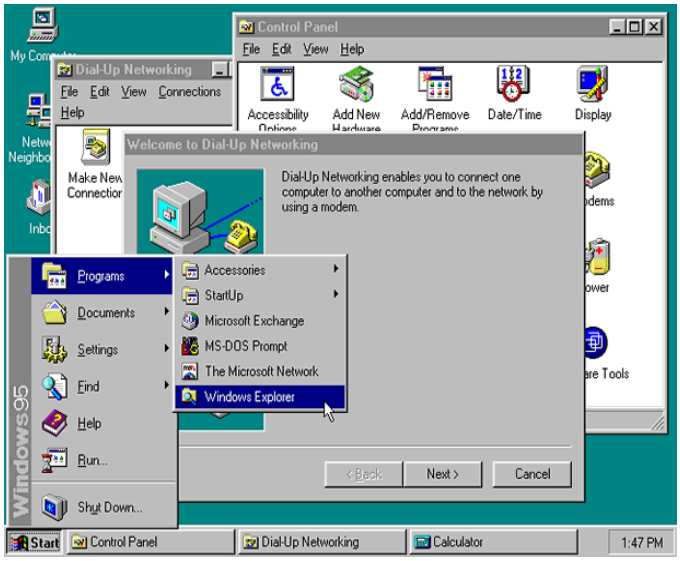

Figure 10. Windows 95 user interface

10. Mac OS System 8 (released in 1997)

Mac OS 8 is an operating system that was released by Apple Computer on July 26, 1997. It represented the largest overhaul of the Mac OS since the release of System 7, some six years previously. It puts more emphasis on color than previous operating systems. Released over a series of updates, Mac OS 8 was an effort to integrate many of the technologies developed for Apple's overly-ambitious operating system known as Copland.

Figure 11. Mac OS System 8 user interface

Mac OS 8 helped modernize the Mac OS while Apple developed its next generation operating system, OS X. 256 color icons were the default in this version of the GUI. Mac OS 8 was one of the early adopters of isometric style icons, also called pseudo-3D icons. The platinum grey theme used here became a trademark for future versions of the GUI.

11. Windows 98 (released in 1998)

Windows 98 (codenamed Memphis) is a graphical operating system by Microsoft. It is the second major release in the Windows 9x line of operating systems. It was released to manufacturing on May 15, 1998 and to retail on June 25, 1998. Windows 98 is the successor to Windows 95. Like its predecessor, it is a hybrid 16-bit/32-bit monolithic product with an MS-DOS based boot stage. Windows 98 was succeeded by Windows 98 Second Edition on May 5, 1999, then by Windows ME (Millennium Edition) on September 14, 2000. Microsoft ended support for Windows 98 on July 11, 2006.

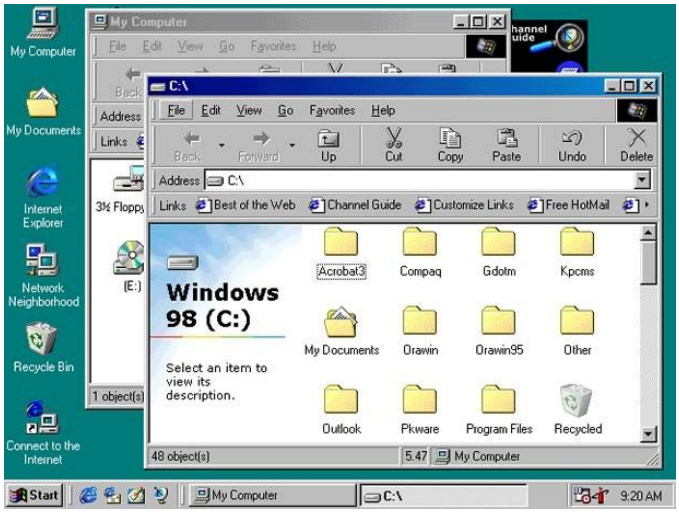

Figure 12. Windows 98 user interface

12. GNOME 1.0 (released in 1999)

GNOME is a desktop environment and graphical user interface (GUI) that runs on top of a computer operating system. It is composed entirely of free and open source software and is developed by both volunteers and paid contributors, the largest corporate contributor being Red Hat It is an international project that includes creating software development frameworks, selecting application software for the desktop, and working on the programs that manage application launching, file handling, and window and task management. GNOME is part of the GNU Project and can be used with various Unix-like operating systems, most notably **GNU/Linux**.

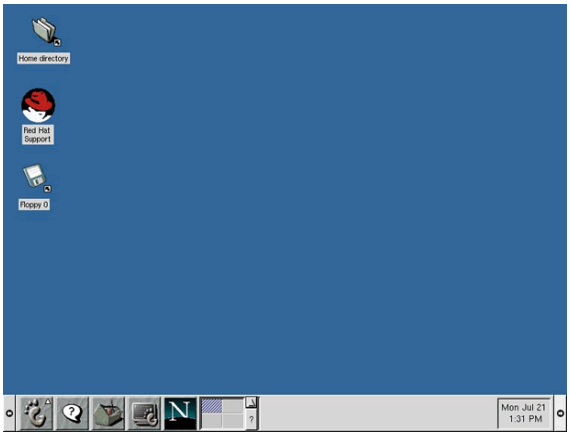

Figure 13. GNOME 1.0 user interface

13. Mac OS X (released in 2001)

In early 2000 Apple announced their new Aqua interface and in 2001 the company released it with their brand new operating system called Mac OS X. The default 32 x 32 and 48 x 48 icons were changed to big 128 x 128 anti-aliased and semi-transparent icons. Lots of criticism followed after the release of this GUI. Apparently users were not quite ready for such a big change, but soon enough they adopted the new style and today this GUI represents the basis of all Mac OS X operating systems.

Figure 14. Mac OS X user interface

14. Windows XP (released in 2001)

Windows XP, the successor to Windows 2000 and Windows ME, was the first consumer-oriented operating system produced by Microsoft to be built on the Windows NT kernel. The NT-based versions of Windows, which are programmed in C, C++, and assembly, are known for their improved stability and efficiency over the 9x versions of Microsoft Windows. Windows XP presented a significantly redesigned graphical user interface, a change Microsoft promoted as more user-friendly than previous versions of Windows. In an attempt to further ameliorate the "DLL hell" that plagued the past versions of Windows, improved side-by-side assembly technology in Windows XP allows side-by-side installation, registration and servicing of multiple versions of globally shared software components in full isolation. It is also the first version of Windows to use product activation in an effort to reduce software piracy.

Figure 15. Windows XP user interface

15. Windows Vista (released in 2007)

This was Microsoft's response to their competition. They also included quite a lot of 3D and animation. Since Windows 98, Microsoft has always tried to improve the desktop. With Windows Vista they released widgets and a somewhat improved replacement of the Active Desktop.

Figure 16. Windows Vista user interface

16. Mac OS X Leopard (released in 2007)

With their 6th generation, Mac OS X system Apple, once again improved the user interface. The basic GUI is still the Aqua with its candy scroll bars and platinum grey, blue colors. The new GUI features a more 3D look, with the 3D dock and lots more animation and interactivity.

Figure 17. Mac OS X Leopard user interface

16 Windows 7 (released in 2009)

Windows 7 is an operating system produced by Microsoft for use on personal computers, including home and business desktops, laptops, net books, tablet PCs, and media center PCs. It was released to manufacturing on July 22, 2009, and became generally available for retail worldwide on October 22, 2009, less than three years after the release of its predecessor, Windows Vista. Windows 7's server counterpart, Windows Server 2008 R2, was released at the same time. Windows 7 is succeeded by Windows 8. Unlike Windows Vista, which introduced many new features, Windows 7 was an incremental upgrade designed to work with Vista-compatible applications and hardware. Presentations given by Microsoft in 2008 focused on multi-touch support, an updated Windows shell with a new taskbar, a home networking system called Home Group, and performance improvements. Some standard applications that have been included with prior releases of Microsoft Windows, including Windows Calendar, Windows Mail, Windows Movie Maker, and Windows Photo Gallery, are not included in Windows 7; most are instead offered separately at no charge as part of the Windows Essentials suite.

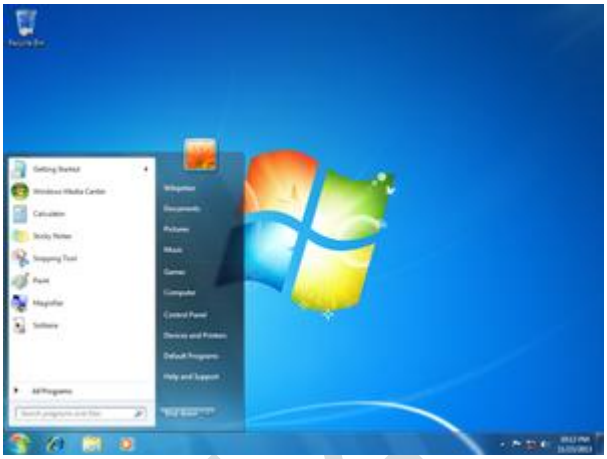

Figure 18. Windows 7 user interface

17. USER INTERFACE 2010 OWNWORDS

WINDOWS 8 & WINDOWS 8.1(released in 2012)

Windows 8 introduces significant changes to the operating system's user interface, many of which are aimed at improving its experience on tablet computers and other touch screen devices. The new user interface is based on Microsoft's Metro design language, and uses a Start screen similar to that of Windows Phone as the primary means of launching applications. The Start screen displays a customizable array of tiles linking to various apps and desktop programs, some of which can display constantly updated information and content through "live tiles". As a form of multi-tasking, apps can be snapped to the side of a screen. Alongside the traditional Control Panel, a new simplified and touch-optimized settings app known as "PC Settings" is used for basic configuration and user settings. It does not include many of the advanced options still accessible from the normal Control Panel.

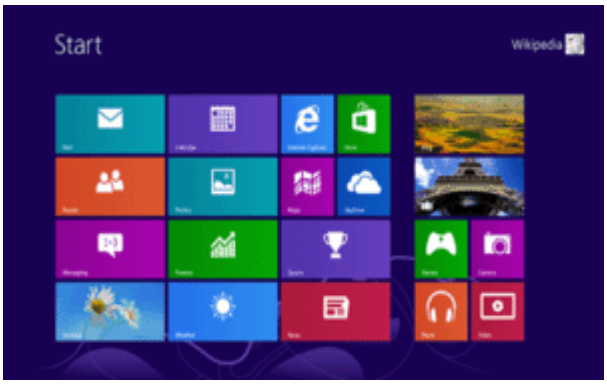

Figure 19. Windows 8 user interface

18. MAC OS MOUNTAIN LION

OS X Mountain Lion (version 10.8) is the ninth major release of OS X (formerly Mac OS X), Apple Inc.'s desktop and server operating system for Macintosh computers. OS X Mountain Lion was released on July 25, 2012 for purchase

and download through Apple's Mac App Store, as part of a switch to releasing OS X versions online and every year. Named to signify its status as a refinement of the previous OS X version, Lion, Apple's stated aims in developing Mountain Lion were to allow users to more easily manage and synchronize content between multiple Apple devices and to make the operating system more familiar.

Figure 20 . Mac OS Mountain Lion user interface

IV.CONCLUSION

In this review papers I have discussed what graphical user interfaces are. Here I have mentioned the history, working and the generation of graphical user interfaces. I hope that above information's stated correctly. Earlier we use CLI mode of user interface then as generation advanced introduction of graphics such as colour, font, geometric shapes and interactive user interface were gradually introduced and updated time to time.

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