



UNIT 4: WORKING WITH X WINDOWS (UBUNTU)

CS – 22: Operating Systems Concepts With Unix / Linux



- Window Manager
- Desktop Environment
- Start Menu and User Configuration
- startx Command
- Window Managers: GNOME and KDE
- Purpose of window manager
- The KDE Desktop and Panel
- Desktop Icons and Managing Windows
- The KDE Control Panel
- The GNOME Desktop and Panel
- Desktop Icons
- Managing Windows
- The GNOME Control Panel
- Configuring X
- /etc/X11/Xorg.conf file
- Tuning Xorg.conf
- Install / Uninstall Software

Assignment Questions

1. What is windows?
2. Explain window manager?
3. KDE Stands for _____.
4. What is GNOME?
5. What is desktop environment?
6. Explain KDE desktop in detail.
7. Explain GNOME control panel.
8. Write a step for install/uninstall software in Linux.
9. Explain X configuration.

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Layered Structure of X

Window Manager

A window manager is the piece of software responsible for managing the different windows that appear on your screen. The window manager controls the placement of windows, draws the borders and scrollbars, and is responsible for ensuring that your XWindows programs get along. A window manager is usually **started after the X server** finishes loading, which is the application responsible for drawing everything onto your screen. It is the window manager; however, that controls much of the look and feel of your X-Windows desktop. Usually window managers also allow you to launch applications. Window managers control the behaviour of windows and how they respond to the user. At minimum they at least provide focus control so that an application will know you're talking to it. A window manager is also concerned with how to place or move windows and sizes them. A tiling window manager will place windows in a grid and will only allow a user to create more frames and place windows in them, which will result in a highly controlled placement and size for the windows. Windows cannot typically overlap.

Purpose of Window Manager

Window managers control the behaviour of windows and how they respond to the user. At minimum they at least provide focus control so that an application will know you're talking to it. A window manager is also concerned with how to place or move windows and sizes them. A tiling window manager will place windows in a grid and will only allow a user to create more frames and place windows in them, which will result in a highly controlled placement and size for the windows. Windows cannot typically overlap. The disadvantage of this approach being a generally less user-friendly desktop hostile to using the mouse with windows taking up as much real estate as they can without intersecting other Windows, meaning space will be of short supply unless you don't mind some Windows getting much tinier. A stacking window manager is like what older Windows used to be: You're allowed to overlap windows all you like, size them as you wish, and place them where you want. A dynamic window manager allows the user to switch between a tiling mode and a stacking mode. Most modern desktops today, however, use a compositing window manager, which enables advanced window management techniques and enhanced visual effects; it usually takes on many of the disadvantages of stacking window managers (Reliance on the desktop's panel for most events.), solving some others (Thumbnail previews, "live" task switching where the windows themselves seem to transform themselves on-screen.), and introducing its own, including: A much heavier memory footprint, requiring somewhat more advanced hardware to work to its fullest. They can be slow if you use more eye candy than window management enhancements. And some compositing window managers on Linux will not work without OpenGL, which can mean trouble with some drivers that doesn't really have a considerable support for OpenGL. Most Linux desktop environments use compositing window managers, but are able to switch compositing on or off as needed, or load alternative window managers if their default choice is incompatible.

Desktop Environment





A desktop environment is the bundle of components that provide you common graphical user interface (GUI) elements such as icons, toolbars, wallpapers, and desktop widgets. Thanks to the desktop environment, you can use Linux graphically using your mouse and keyboard like you do in other operating systems like Windows and macOS.

There are several desktop environments and these desktop environments determines what your Linux system looks like and how you interact with it.

Most of the desktop environments have their own set of integrated applications and utilities so that users get a uniform feel while using the OS. So, you get a file explorer, desktop search, menu of applications, wallpaper and screensaver utilities, text editors and more.

Without a desktop environment, your Linux system will just have a terminal like utility and you'll have to interact it using commands only.

Some of the popular desktop environments are:

-  **GNOME** – Uses plenty of system resources but gives you a modern, polished system. GNOME is arguably the most popular desktop environment out there. Many of the popular Linux distros use GNOME as their default desktop. GNOME is designed to be easy to use and customizable. The user interface aims to provide a unique experience (kind of tailored for both mobile and desktops).
-  **Xfce** – Vintage look but light on resources. Xfce is one of the most lightweight desktop environments out there. Unlike LXQt, you will find a lot of major Linux distributions support XFCE editions. Xfce is light on resources but proves to provide a feature-rich user experience. If you need a performance-centric desktop environment without needing advanced customizations, Xfce is a great choice to go with.
-  **KDE** – Highly customizable desktop with moderate usage of system resources, KDE is one of the most popular desktop environments out there. You may also refer it as the “Plasma” desktop. Even though it's not my primary choice, it is highly customizable and extremely lightweight.
-  **Budgie** – Modern looks and moderate on system resources. Budgie desktop has been developed by the Solus project. In case you didn't know, Solus is an independently developed Linux distro where they utilize GNOME technologies such as GTK to develop the Budgie desktop environment. It's a mixed bag of modern UI and a traditional user interface. It's not exactly resource heavy but not a complete lightweight desktop environment either.

User Configuration: in ubuntu allows you to change/ manage the system settings of the computer.

startx Command

Once upon a time, when the memory of the computers was measured in kilobytes and the disks in megabytes, running the graphic interface all the time was considered harmful. Most Unix computers were used for scientific computations and simulation in multi-user environments, and the graphic interface running on them would reduce the memory and CPU power available to them. So when you needed a graphical interface you just started it with startx. startx basically runs an Xserver (the graphical "driver") and a command which run on it, which is typically a window manager. By default the commands that are run are in ~/.xinitrc file in your home directory, or some generic system file otherwise. Modern systems are thought from the bottom up to have a graphical system running all the time, so no one has probably checked the working of startx for ages -- that explains a lot of strange behavior you can have.

The KDE Desktop

The KDE Project, which is short for K Desktop Environment / Kool Desktop Environment, is an international organization that started as a desktop environment but soon evolved into a community whose main aim is the development of free, open-source software for different platforms. KDE is one of the largest open-source international communities out there that have become well known for creating stable and high-quality applications for both the desktop and mobile. The community of KDE is made up of all sorts of people with a diverse set of skills – programmers, writers, translators, artists, and so on.

KDE Panel

A Panel is a widget container which can be located on any side of the desktop. There can be multiple panels on the same side. The default layout is one panel that stretches across the entire bottom of the desktop with the following widgets application menu, desktop pager, task manager (list of open windows), system tray (including things like a device notifier) and clock. If you are using a laptop, netbook or other computer that uses a battery there will also be a power management widget in the system tray. At the end of the panel is a toolbox button which can be activated to access configuration options.

Desktop Icons

You can select whether the icons on the desktop, whichever folder you've chosen to show, appear horizontally (row) or vertically (column). By default, it is set to the column since most desktops align icons in vertical columns. You can also choose whether the icons should be aligned from left to right or right to left. Most of these settings, including the ones mentioned and those like icon sizes and sorting can also be simply changed in the Standard Menu with a right-click. What's interesting here in the Features section at the bottom. If you click on More Preview options... you can set which type of files will be shown as thumbnails.

Managing Windows

Each application running in KDE has its own window, and some applications may use more than one window. You can manipulate these windows in many ways to make your desktop work for you.

Switching Between Windows

If you want to use a window, it must be active. A window automatically becomes active when you open it, so that the application you opened is immediately ready to use.

Moving Windows

The first way to organize the windows on your desktop is to move them around. You can move windows so that they overlap other windows, or so that you can see the whole window.

Resizing Windows

You can make windows bigger or smaller, wider, or taller in one of two ways.

Hiding Windows

When you need to keep a program open, but you do not want it to take up space on your desktop, you can minimize it or shade it. To minimize a window, click the Minimize button, which is third from the right on the window titlebar. The window will not be displayed, but the program is still running, and an entry for it appears in the taskbar on the panel. To display the window again, click on its entry in the taskbar.

The KDE Control Panel

The KDE Control Center contains a number of configuration tools, called modules, that allow you to configure and view information about your system. You can configure the desktop, the window manager, input devices, and any other important part of your system here. The Control Center is split into two windows: the left window shows a hierarchical list of installed modules, and the right window displays them when they are selected.

Appearance & Themes

Holds settings for the desktop background, the screen saver, and the fonts appearing on the desktop. You can modify themes, window decorations, and styles of desktop elements, such as buttons, menus, and scroll bars. Cursor behavior and the splash screen that appears on KDE start-up can also be influenced here.

Desktop

Holds settings that allow you to increase or decrease the number of virtual desktops and to control panel options such as size, position, length, and appearance of the panel. You can also change the main menu here. In the taskbar section, configure taskbar options such as whether to show windows from all desktops on the taskbar. Two further sections allow you to control the behavior of windows.

Internet & Network

Lets you define Bluetooth options and preferences such as time-out values for certain connections. You can also share your desktop, enable or disable file sharing, and set options for local network browsing and proxy servers. The behavior of Konqueror as a Web browser can be modified here.

KDE Components

With the Component Chooser, change the default e-mail client, text editor, messenger, terminal, and Web browser. Whenever a KDE application needs to start an application of these types, it always calls the default component set here. Configure options for your desktop search with *Kerry Beagle®* here, for example, which directories to index. If needed, change the default file associations to identify a file type and start an appropriate application. Set options for Konqueror as a file manager. Define how KDE handles sessions on login or shutdown and modify your spell checking options here.

Peripherals

Holds options for devices such as digital cameras, displays, joysticks, keyboards, mice, OBEX devices, printers, remote controls, and removable media like CD-ROMs or USB sticks. For example, you can add your camera model and define the type of port by which it is connected to your computer or modify keyboard and mouse settings, such as repeat delay, single or double clicking options, and double-click intervals. You can assign default actions to certain types of removable media (for example, always start KsCD when detecting an audio CD) and configure printers.

Regional & Accessibility

Define country and language-specific options here, such as currency, number and date format, and keyboard layouts for different languages between which you can switch. You can also view and modify the predefined KDE shortcuts (for example, Alt+Ctrl+L to lock the screen). This category also offers accessibility options for handicapped users, such as sound and keyboard options and mouse gestures.

Security & Privacy

Go here to change your password, set options for KWallet (the KDE password management tool), configure encryption for KDE, or manage private data such as recently opened documents, recently visited Web sites, cookies, and the contents of the clipboard.

Sound & Multimedia

Holds options for configuring the system bell and system notifications and the encoding and device settings for audio CDs.

System Administration

Use this category to configure the appearance and behavior of the KDE login manager (KDM) or to change the default paths to some important directories for your data: Desktop, Autostart, and Documents. You can also install personal or systemwide fonts here.

The GNOME Desktop

GNOME (GNU Network Object Model Environment) is a graphical user interface (GUI) and set of computer desktop applications for users of the Linux operating system. It's intended to make a Linux operating system easy to use for non-programmers and generally corresponds to the Windows desktop interface and its most common set of applications. In fact, GNOME allows the user to select one of several desktop appearances. With GNOME, the user interface can, for example, be made to look like Windows or like Mac OS. In addition, GNOME includes a set of the same type of applications found in Office: a word processor, a spreadsheet program, a database manager, a presentation developer, a Web browser and an email program.

GNOME is derived from a long-running volunteer effort under the auspices of the Free Software Foundation, the organization founded by **Richard Stallman**. Stallman and fellow members of the Free Software Foundation believe that software source code should always be public and open to change so that it can continually be improved by others. GNOME is in part an effort to make Linux a viable alternative to Windows so that the desktop operating system market is not controlled by a single vendor.

GNOME also includes a widget library that programmers can use to develop applications that use the GNOME user interface. In addition to a desktop version, GNOME also comes as a user interface and set of applications for mobile devices.

The GNOME Panel

Gnome Panel is a component that is part of GnomeFlashback and provides panels and default applets for the desktop. A panel is a horizontal or vertical bar that can be added to each side of the screen. By default there is one panel on the top of the screen and one on the bottom, but this is configurable. The panels are used to add applets such as a menu bar to open applications, a clock and indicator applets which provide access to configure features of the system such as the network, sound or the current keyboard layout. On the bottom panel there is usually a list of open applications.

The GNOME Control Panel

The Gnome Control Center allows you to configure various parts of your system using a collection of tools called "caplets". These caplets may be associated with the core set of Gnome applications or other applications for which the developers have written caplets. Your Control Center may contain more options than are documented here depending on the applications installed on your system. Control Center is a part of Gnome desktop environment; it is included in control-center package.

You may start the Control Center one of three ways. To launch the Control Center without any particular active options, select the Control Center menu item from the Settings submenu in the Main Menu or type the command `gnomecc` at the command line prompt.

Configuring X

/etc/X11/Xorg.conf file

The X server is a single binary executable (/usr/bin/Xorg). Associated configuration files are stored in the /etc/X11/ directory (as is a symbolic link — X — which points to /usr/bin/Xorg). The configuration file for the X server is /etc/X11/xorg.conf. The directory /usr/lib/xorg/modules/ contains X server modules that can be loaded dynamically at runtime. By default, only some modules in /usr/lib/xorg/modules/ are automatically loaded by the X server. To load optional modules, they must be specified in the X server configuration file, /etc/X11/xorg.conf.

Tuning Xorg.conf: The Structure

The /etc/X11/xorg.conf file is comprised of many different sections which address specific aspects of the system hardware. Each section begins with a Section "<section-name>" line (where <section-name> is the title for the section) and ends with an EndSection line. Each section contains lines that include option names and one or more option values. These are sometimes enclosed in double quotes (").

Lines beginning with a hash mark (#) are not read by the X server and are used for human-readable comments.

Some options within the /etc/X11/xorg.conf file accept a boolean switch which turns the feature on or off. Acceptable boolean values are:

1, on, true, or yes — Turns the option on.

0, off, false, or no — Turns the option off.

The following are some of the more important sections in the order in which they appear in a typical /etc/X11/xorg.conf file. More detailed information about the X server configuration file can be found in the xorg.conf man page.

Choosing a Window Manager

The X Window System is simply the environment which allows graphics to be displayed on your system's hardware; the window manager is responsible for how X looks and how it interacts with you and your applications.

The Red Hat distribution of Linux contains several window managers, including fvwm, olvm, twm, AfterStep, and others. The default one that you will probably see when starting up X for the first time is fvwm95, a Win95-like environment.

Create, Delete, Rename, Copy files and folders

Note: Commands work same as discussed in unit 2

To create **file** we use **cat** command

To create **folder** we use **mkdir**

To delete **file** we use **rm** command

To delete **folder** we use **rmdir**

To rename **file/folder** we use **mv** command

To copy **file/folder** we use **cp/mv** command

Install / Uninstall Software

Step 1. In the Activities screen, search for "Ubuntu Software" and click on the orange USC icon. This will open the USC tool.

Step 2. To get a list of all installed applications, click on the "Installed" tab at the top navigation bar.

Step 3. Scroll down until you find the application you want to uninstall and click on the "Remove" button next to it.