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Batch-F6

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Lab-1

**Question 1.1:**What is Unix?

The Unix operating system is a set of programs that act as a link between the computer and the user.

The computer programs that allocate the system resources and coordinate all the details of the computer's internals is called the **operating system** or the **kernel**.

Users communicate with the kernel through a program known as the **shell**. The shell is a command line interpreter; it translates commands entered by the user and converts them into a language that is understood by the kernel.

* Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
* There are various Unix variants available in the market. Solaris Unix, AIX, HP Unix and BSD are a few examples. Linux is also a flavor of Unix which is freely available.
* Several people can use a Unix computer at the same time; hence Unix is called a multiuser system.
* A user can also run multiple programs at the same time; hence Unix is a multitasking environment.

**Question 1.2:** What is Unix Enviroment Like?

An important Unix concept is the **environment**, which is defined by environment variables. Some are set by the system, others by you, yet others by the shell, or any program that loads another program.

A variable is a character string to which we assign a value. The value assigned could be a number, text, filename, device, or any other type of data.

For example, first we set a variable TEST and then we access its value using the **echo** command −

$TEST="Unix Programming"

$echo $TEST

It produces the following result.

Unix Programming

Note that the environment variables are set without using the **$** sign but while accessing them we use the $ sign as prefix. These variables retain their values until we come out of the shell.

When you log in to the system, the shell undergoes a phase called **initialization** to set up the environment. This is usually a two-step process that involves the shell reading the following files −

* /etc/profile
* profile

The process is as follows −

* The shell checks to see whether the file **/etc/profile** exists.
* If it exists, the shell reads it. Otherwise, this file is skipped. No error message is displayed.
* The shell checks to see whether the file **.profile** exists in your home directory. Your home directory is the directory that you start out in after you log in.
* If it exists, the shell reads it; otherwise, the shell skips it. No error message is displayed.

As soon as both of these files have been read, the shell displays a prompt −

$

This is the prompt where you can enter commands in order to have them executed.

## **Question 1.3:**Advantages and Disadvantages of UNIX

### Advantages

* Full multitasking with protected memory. Multiple users can run multiple programs each at the same time without interfering with each other or crashing the system.
* Very efficient virtual memory, so many programs can run with a modest amount of physical memory.
* Access controls and security. All users must be authenticated by a valid account and password to use the system at all. All files are owned by particular accounts. The owner can decide whether others have read or write access to his files.
* A rich set of small commands and utilities that do specific tasks well -- not cluttered up with lots of special options. Unix is a well-stocked toolbox, not a giant do-it-all Swiss Army Knife.
* Ability to string commands and utilities together in unlimited ways to accomplish more complicated tasks -- not limited to preconfigured combinations or menus, as in personal computer systems.
* A powerfully unified file system. Everything is a file: data, programs, and all physical devices. Entire file system appears as a single large tree of nested directories, regardless of how many different physical devices (disks) are included.
* A lean kernel that does the basics for you but doesn't get in the way when you try to do the unusual.

### Disadvantages

* The traditional command line shell interface is user hostile -- designed for the programmer, not the casual user.
* Commands often have cryptic names and give very little response to tell the user what they are doing. Much use of special keyboard characters - little typos have unexpected results.
* To use Unix well, you need to understand some of the main design features. Its power comes from knowing how to make commands and programs interact with each other, not just from treating each as a fixed black box.
* Richness of utilities (over 400 standard ones) often overwhelms novices. Documentation is short on examples and tutorials to help you figure out how to use the many tools provided to accomplish various kinds of tasks.

**Question 1.4** Different types of UNIX?

There are many different versions of UNIX. Until a few years ago, there were two main versions: the line of UNIX releases that started at AT&T (the latest is System V Release 4), and another line from the University of California at Berkeley (the latest version is BSD 4.4). Some other major commercial versions include SunOS, Solaris, SCO UNIX, AIX, HP/UX, and ULTRIX. The freely available versions include Linux and FreeBSD (FreeBSD is based on 4.4BSD-Lite).

Many versions of UNIX, including System V Release 4, merge earlier AT&T releases with BSD features. The recent POSIX standard for UNIX-like operating systems defines a single interface to UNIX. Although advanced features differ among systems, you should be able to use this introductory handbook on any type of system.

**Question 1.5:**Why we need Unix if we have windows?

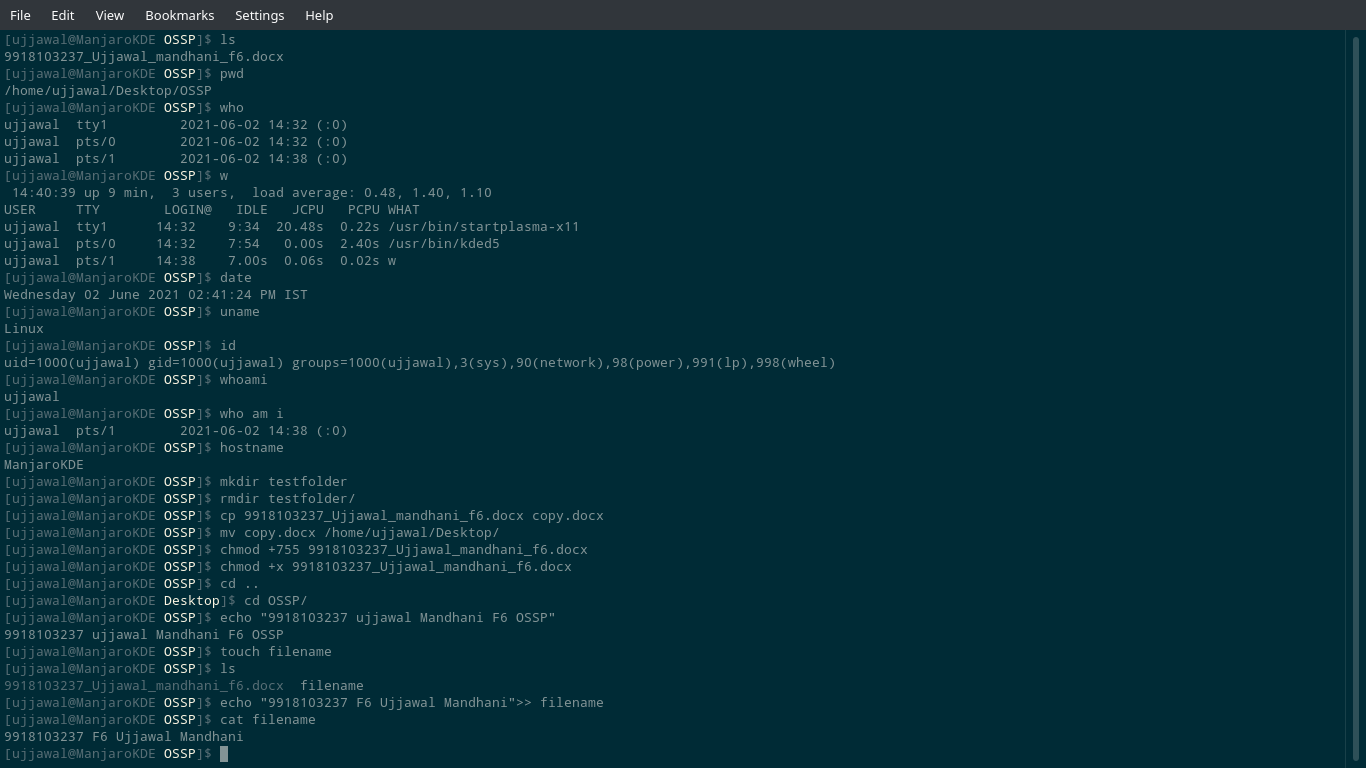
1. Unix is ultimately more secure than Windows cause you can control every process that is done by Unix and you are the supreme user in it unlike that in windows where it doesnt provide you all the powers to operate the OS.
2. Unix offers more control over your systems as you can schedule almost any process the only thing you need is basic and core knowledge regarding UNIX.
3. Unix was built by geeks who got fed up by the way the traditional OSs' worked and wanted to use a OS that has more transparency in its working and offers more power to the end user: Windows was built by salesmen who just wanted the end user to be capable of doing the normal everyday work.

**Question 1.6**: How to login access drives and folders?

Unix home directory is intended to be used on Unix systems, and for files produced and edited from Unix. The possibility to access it from a desktop PC is only provided to make it more convenient for researchers who work on Unix and need occasional access to their files from Windows or Mac. However, there are serious technical limitations in how this service is provided, and using Unix home directory as a storage for documents edited on your PC can lead to data corruption and loss of work. There are more reliable and more robust storage options for Windows users, including ndrive, xdrive and OneDrive.

Files stored in your Unix home directory might be visible to other users. This is standard practice on Unix machines used for academic research. Please do not use your Unix home directory for confidential files. Confidential admin files should be stored on ndrive or collab share. Confidential research data should be stored on collab share or on properly set up research storage volumes.

**Question 2:**Practice the commands



**Question 3:**Write a C program to print the entire enviroment variable.

**[ujjawal@ManjaroKDE]$** gcc filename.c    
**[ujjawal@ManjaroKDE]$** ./   
9918103237\_Ujjawal\_mandhani\_f6.docx  a.out                                   
**[ujjawal@ManjaroKDE]$** ./a.out    
  
SHELL=/bin/bash   
SESSION\_MANAGER=local/ManjaroKDE:@/tmp/.ICE-unix/1175,unix/ManjaroKDE:/tmp/.ICE-unix/1175   
WINDOWID=4194311   
COLORTERM=truecolor   
XDG\_SESSION\_PATH=/org/freedesktop/DisplayManager/Session1   
LANGUAGE=   
LC\_ADDRESS=en\_IN   
LC\_NAME=en\_IN   
SHELL\_SESSION\_ID=864a920b6bc2438ca726faf1db9b30c3   
DESKTOP\_SESSION=plasma   
LC\_MONETARY=en\_IN   
GTK\_RC\_FILES=/etc/gtk/gtkrc:/home/ujjawal/.gtkrc:/home/ujjawal/.config/gtkrc   
XCURSOR\_SIZE=24   
EDITOR=/usr/bin/nano   
GTK\_MODULES=canberra-gtk-module   
XDG\_SEAT=seat0   
PWD=/home/ujjawal/Desktop/OSSP   
XDG\_SESSION\_DESKTOP=KDE   
LOGNAME=ujjawal   
XDG\_SESSION\_TYPE=x11   
XAUTHORITY=/tmp/xauth-1000-\_0   
MOTD\_SHOWN=pam   
GTK2\_RC\_FILES=/etc/gtk-2.0/gtkrc:/home/ujjawal/.gtkrc-2.0:/home/ujjawal/.config/gtkrc-2.0   
HOME=/home/ujjawal   
LC\_PAPER=en\_IN   
LANG=en\_IN   
LS\_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=01;05;37;41:mi=01;05;37;41:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st  
=37;44:ex=01;32:\*.tar=01;31:\*.tgz=01;31:\*.arc=01;31:\*.arj=01;31:\*.taz=01;31:\*.lha=01;31:\*.lz4=01;31:\*.lzh=01;31:\*.lzma=01;31:\*.tlz=01;31:\*.txz=01;31:\*.tzo=01;31:\*.t7z=  
01;31:\*.zip=01;31:\*.z=01;31:\*.Z=01;31:\*.dz=01;31:\*.gz=01;31:\*.lrz=01;31:\*.lz=01;31:\*.lzo=01;31:\*.xz=01;31:\*.bz2=01;31:\*.bz=01;31:\*.tbz=01;31:\*.tbz2=01;31:\*.tz=01;31:\*.  
deb=01;31:\*.rpm=01;31:\*.jar=01;31:\*.war=01;31:\*.ear=01;31:\*.sar=01;31:\*.rar=01;31:\*.alz=01;31:\*.ace=01;31:\*.zoo=01;31:\*.cpio=01;31:\*.7z=01;31:\*.rz=01;31:\*.cab=01;31:\*.  
jpg=01;35:\*.jpeg=01;35:\*.gif=01;35:\*.bmp=01;35:\*.pbm=01;35:\*.pgm=01;35:\*.ppm=01;35:\*.tga=01;35:\*.xbm=01;35:\*.xpm=01;35:\*.tif=01;35:\*.tiff=01;35:\*.png=01;35:\*.svg=01;35  
:\*.svgz=01;35:\*.mng=01;35:\*.pcx=01;35:\*.mov=01;35:\*.mpg=01;35:\*.mpeg=01;35:\*.m2v=01;35:\*.mkv=01;35:\*.webm=01;35:\*.ogm=01;35:\*.mp4=01;35:\*.m4v=01;35:\*.mp4v=01;35:\*.vob=  
01;35:\*.qt=01;35:\*.nuv=01;35:\*.wmv=01;35:\*.asf=01;35:\*.rm=01;35:\*.rmvb=01;35:\*.flc=01;35:\*.avi=01;35:\*.fli=01;35:\*.flv=01;35:\*.gl=01;35:\*.dl=01;35:\*.xcf=01;35:\*.xwd=01  
;35:\*.yuv=01;35:\*.cgm=01;35:\*.emf=01;35:\*.axv=01;35:\*.anx=01;35:\*.ogv=01;35:\*.ogx=01;35:\*.pdf=00;32:\*.ps=00;32:\*.txt=00;32:\*.patch=00;32:\*.diff=00;32:\*.log=00;32:\*.tex  
=00;32:\*.doc=00;32:\*.aac=00;36:\*.au=00;36:\*.flac=00;36:\*.m4a=00;36:\*.mid=00;36:\*.midi=00;36:\*.mka=00;36:\*.mp3=00;36:\*.mpc=00;36:\*.ogg=00;36:\*.ra=00;36:\*.wav=00;36:\*.ax  
a=00;36:\*.oga=00;36:\*.spx=00;36:\*.xspf=00;36:   
XDG\_CURRENT\_DESKTOP=KDE   
KONSOLE\_DBUS\_SERVICE=:1.88   
KONSOLE\_DBUS\_SESSION=/Sessions/1   
PROFILEHOME=/home/ujjawal/Desktop/OSSP   
XDG\_SEAT\_PATH=/org/freedesktop/DisplayManager/Seat0   
KONSOLE\_VERSION=210400   
KDE\_SESSION\_UID=1000   
XDG\_SESSION\_CLASS=user   
TERM=xterm-256color   
LC\_IDENTIFICATION=en\_IN   
USER=ujjawal   
COLORFGBG=15;0   
KDE\_SESSION\_VERSION=5   
PAM\_KWALLET5\_LOGIN=/run/user/1000/kwallet5.socket   
DISPLAY=:0   
SHLVL=1   
LC\_TELEPHONE=en\_IN   
LC\_MEASUREMENT=en\_IN   
XDG\_VTNR=1   
XDG\_SESSION\_ID=2   
QT\_LINUX\_ACCESSIBILITY\_ALWAYS\_ON=1   
XDG\_RUNTIME\_DIR=/run/user/1000   
LC\_TIME=en\_IN   
QT\_AUTO\_SCREEN\_SCALE\_FACTOR=0   
XCURSOR\_THEME=macOSBigSur   
GTK3\_MODULES=xapp-gtk3-module   
XDG\_DATA\_DIRS=/home/ujjawal/.local/share/flatpak/exports/share:/var/lib/flatpak/exports/share:/usr/local/share:/usr/share:/var/lib/snapd/desktop   
KDE\_FULL\_SESSION=true   
BROWSER=/usr/bin/firefox   
PATH=/home/ujjawal/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/bin:/usr/bin/site\_perl:/usr/bin/vendor\_perl:/usr/bin/core\_perl:/var/lib/snapd/snap/bin   
DBUS\_SESSION\_BUS\_ADDRESS=unix:path=/run/user/1000/bus   
KDE\_APPLICATIONS\_AS\_SCOPE=1   
MAIL=/var/spool/mail/ujjawal   
LC\_NUMERIC=en\_IN   
KONSOLE\_DBUS\_WINDOW=/Windows/1

#include <stdio.h>

void main(int argc, char \*argv[], char \* envp[])

{

int i;

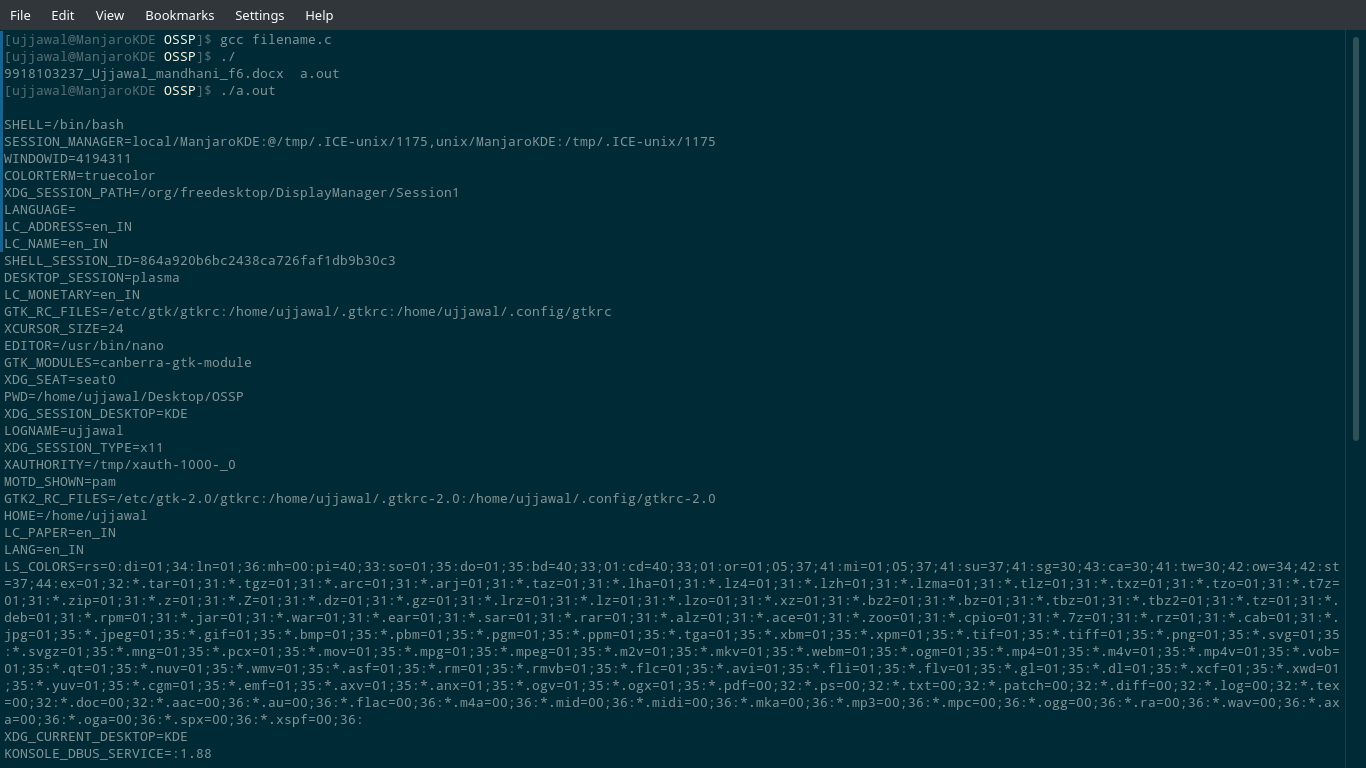
for (i = 0; envp[i] != NULL; i++)

{

printf("\n%s", envp[i]);

}

}



**Question 4**Write a C program to print the hostname of enviroment variable

#include <stdio.h>

#include <stdlib.h>

#include <unistd.h>

#include <limits.h>

int main(void)

{

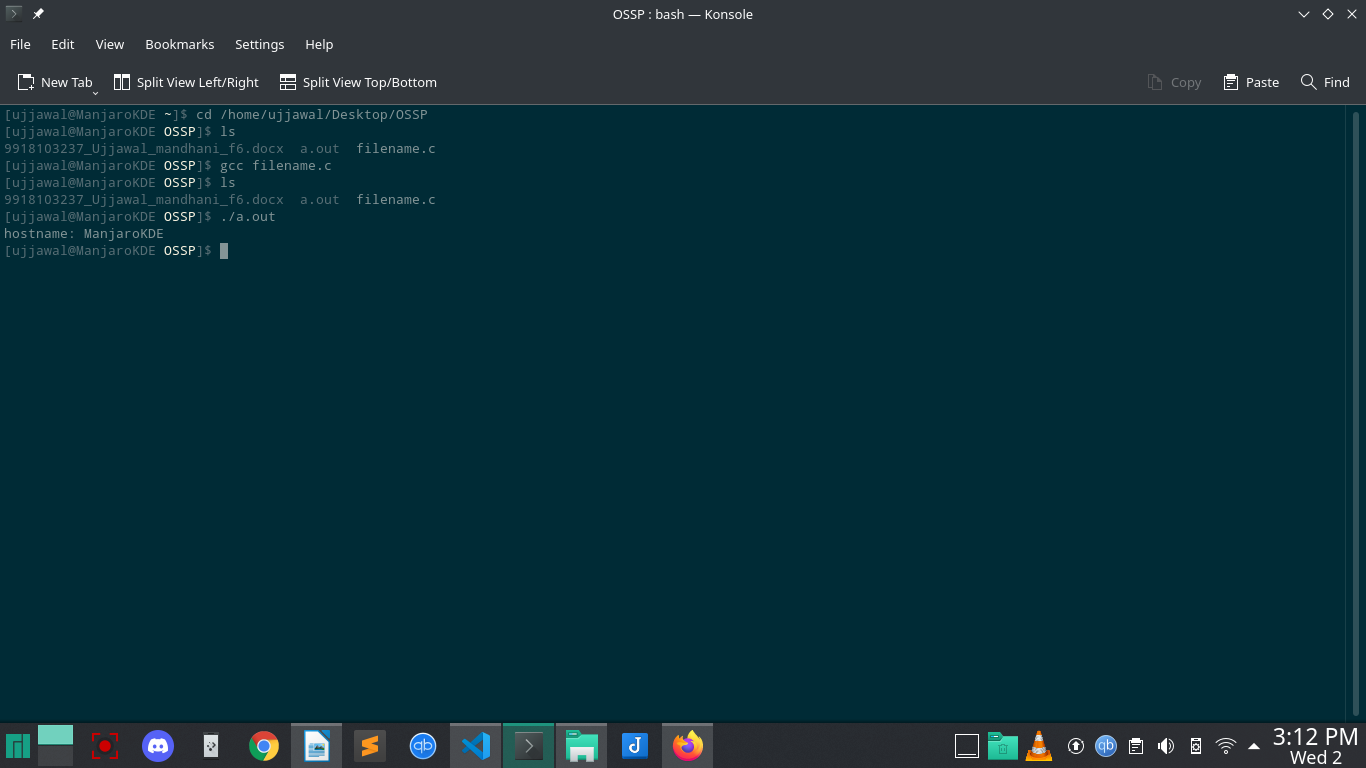
char hostname[HOST\_NAME\_MAX + 1];

gethostname(hostname, HOST\_NAME\_MAX + 1);

printf("hostname: %s\n", hostname);

return EXIT\_SUCCESS;

}

****