

**Name: ASHMIT THAWAIT**

**Roll No.: 102203790**

**Sub Group: 2CO-17**

## **Operating Systems Assignment 1**

### **Q1. Introduction to the operating system with key functions.**

An operating system is a software that acts as an intermediary between the user and computer hardware. It provides an environment in which users can execute programs conveniently and efficiently.

The key functions of an operating system include:

1. **Process Management:** The operating system manages processes, which are instances of executing programs.
2. **I/O Device Management:** The operating system handles input and output devices, such as keyboards, mice, printers, and monitors. It manages the communication between these devices and the computer, allowing users to interact with the system.
3. **File Management:** It provides functions for creating, deleting, and organizing files, as well as controlling access to them.
4. **Network Management:** The operating system provides network connectivity and manages communication between computers on a network. It handles tasks such as establishing connections etc.
5. **Memory Management:** The operating system is responsible for managing the computer's memory. It allocates and deallocates memory space.
6. **Security Management:** The operating system enforces security measures to protect the system and user data. It controls access to resources.

### **Q2. Introduction to the Unix/Linux (Architecture).**

Unix and Linux are operating systems that are widely used in enterprise-level computing, scientific research, and web servers. The architecture of Unix/Linux is modular, meaning that it is made up of a collection of independent modules that can be loaded and unloaded dynamically. This makes it easy to add new features and functionality to the operating system.

The main concept that unites all the versions of Unix/Linux is the following four basics:

**Kernel:** The kernel is the heart of the operating system. It interacts with the hardware to manage system resources such as memory, CPU, and input/output devices.

**Shell:** The shell is the user interface to the operating system. It provides a command-line interface that allows users to interact with the system through a series of commands.

**User Commands and Applications:** User commands and applications are built using the system call interface and the kernel.

**Hardware:** The hardware layer consists of the physical components of the computer system, such as the CPU, memory, and input/output devices.

### Q3. Concept of Shell.

The shell is a program that takes commands from the keyboard and gives them to the operating system to perform. It is the layer of programming that understands and executes the commands entered by the user.

### Q4 Types of shell.

Types of Shells

1. Bourne shell (bsh): denoted by \$ symbol –most commonly available shell
2. C shell (csh): denoted by % symbol
3. Korn shell (ksh): denoted by \$ symbol

### Q5. Command structure.

The command structure of an operating system refers to the way in which the system is organized to receive and execute commands from users. Depending on the system, these commands may be entered through a command-line interface, which is a text-based way of interacting with the system. The command interpreter is responsible for receiving and executing the user-specified command.

### Q6. Introduction of basic linux commands (sudo, ls, pwd, mkdir, rmdir, rm, cd, cp, wc, mv, cmp, passwd, who, uname)

```
ashmit@ashmit-ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
ashmit@ashmit-ubuntu:~$ pwd
/home/ashmit
ashmit@ashmit-ubuntu:~$ uname
Linux
ashmit@ashmit-ubuntu:~$ who
ashmit    tty2          2023-08-11 21:50 (tty2)
ashmit@ashmit-ubuntu:~$ cd Desktop
ashmit@ashmit-ubuntu:~/Desktop$ ls
ashmit@ashmit-ubuntu:~/Desktop$ mkdir ashmit
ashmit@ashmit-ubuntu:~/Desktop$ ls
ashmit
ashmit@ashmit-ubuntu:~/Desktop$ cd ashmit
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat > 102203790.txt
Hello, I am ashmit from 2CO-17
^C
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
102203790.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat 102203790.txt
Hello, I am ashmit from 2CO-17
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cp 102203790.txt test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
102203790.txt  test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat test.txt
Hello, I am ashmit from 2CO-17
```

```
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cmp 102203790.txt test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ rm test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
102203790.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ rm 102203790.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cd
ashmit@ashmit-ubuntu:~$ cd Desktop
ashmit@ashmit-ubuntu:~/Desktop$ rmdir ashmit
ashmit@ashmit-ubuntu:~/Desktop$ ls
```

```
ashmit@ashmit-ubuntu:~/Desktop$ sudo
usage: sudo -h | -K | -k | -V
usage: sudo -v [-ABkns] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-ABkns] [-g group] [-h host] [-p prompt] [-U user] [-u user] [command]
usage: sudo [-ABEHknPS] [-r role] [-t type] [-C num] [-D directory] [-g group] [-h host] [-p prompt] [-R
    directory] [-T timeout] [-u user] [VAR=value] [-i|-s] [<command>]
usage: sudo -e [-ABkns] [-r role] [-t type] [-C num] [-D directory] [-g group] [-h host] [-p prompt] [-R
    directory] [-T timeout] [-u user] file ...
ashmit@ashmit-ubuntu:~/Desktop$ sudo su
[sudo] password for ashmit:
root@ashmit-ubuntu:/home/ashmit/Desktop# sudo apt-get install netstat
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package netstat
root@ashmit-ubuntu:/home/ashmit/Desktop# sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  firefox libwpe-1.0-1 libwpebackend-fdo-1.0-1
The following packages have been kept back:
  gjs libgjs0g
The following packages will be upgraded:
  accountsservice alsa-ucm-conf amd64-microcode apparmor appport appport-gtk apt apt-utils avahi-autoipd
  avahi-daemon avahi-utils base-files bind9-dnsutils bind9-host bind9-libs ca-certificates cpp-11 cups
```

## Q7 How to install, update, upgrade and remove any package in linux (apt-get).

Add a package: Open a terminal and update the list of available packages for your machine using the command: `sudo apt update`.

Install the desired package using the command: `sudo apt install package-name`.

Update a package: Open a terminal and update the list of available packages for your machine using the command: `sudo apt update`. Upgrade the installed packages to their latest version using the command: `sudo apt upgrade`.

Remove a package:

Open a terminal and remove the desired package using the command: `sudo apt remove package-name`.

It is important to note that when removing a package, any user configuration files associated with the package will not be removed. To remove these files as well, use the command: `sudo apt purge package-name`.

## Q8 >, >> option for directing the output of a command.

In Linux, the > and >> symbols are used for output redirection, allowing you to redirect the output of a command to a file instead of displaying it on the screen.

> (single greater-than symbol): The > symbol is used to redirect the output of a command to a file. It will be created if the file specified after > does not exist. If it already exists, its contents will be overwritten. Example: command > file.txt will execute command and redirect its output to file.txt, replacing any existing content in file.txt.

>> (double greater-than symbol): The >> symbol is used to append the output of a command to the end of a file. It will be created if the file specified after >> does not exist. The output will be appended to the existing content if it already exists.

Example: command >> file.txt will execute the command and append its output to the end of file.txt.

## Q9. Cat command.

It is used to open a file or simply read the file.

```
ashmit@ashmit-ubuntu:~/Desktop$ cd ashmit
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat > 102203790.txt
Hello, I am ashmit from 2CO-17
^C
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
102203790.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat 102203790.txt
Hello, I am ashmit from 2CO-17
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cp 102203790.txt test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ ls
102203790.txt  test.txt
ashmit@ashmit-ubuntu:~/Desktop/ashmit$ cat test.txt
Hello, I am ashmit from 2CO-17
```

## Q10. Compressing and archiving files (zip, tar).

```
ashmit@ashmit-ubuntu:~$ tar
tar: You must specify one of the '-Acdrtrux', '--delete' or '--test-label' options
Try 'tar --help' or 'tar --usage' for more information.
ashmit@ashmit-ubuntu:~$ zip
Copyright (c) 1990-2008 Info-ZIP - Type 'zip -L' for software license.
Zip 3.0 (July 5th 2008). Usage:
zip [-options] [-b path] [-t mmdyyy] [-n suffixes] [zipfile list] [-xi list]
  The default action is to add or replace zipfile entries from list, which
  can include the special name - to compress standard input.
  If zipfile and list are omitted, zip compresses stdin to stdout.
  -f  freshen: only changed files      -u  update: only changed or new files
  -d  delete entries in zipfile        -m  move into zipfile (delete OS files)
  -r  recurse into directories         -j  junk (don't record) directory names
  -0  store only                      -l  convert LF to CR LF (-ll CR LF to LF)
  -1  compress faster                 -9  compress better
  -q  quiet operation                 -v  verbose operation/print version info
  -c  add one-line comments           -z  add zipfile comment
  -@  read names from stdin            -o  make zipfile as old as latest entry
  -x  exclude the following names     -i  include only the following names
  -F  fix zipfile (-FF try harder)    -D  do not add directory entries
  -A  adjust self-extracting exe      -J  junk zipfile prefix (unzipsfx)
  -T  test zipfile integrity          -X  eXclude eXtra file attributes
  -y  store symbolic links as the link instead of the referenced file
  -e  encrypt                         -n  don't compress these suffixes
  -h2 show more help

ashmit@ashmit-ubuntu:~$
```