**Name : Keyur Patel**

**Roll no : 16010421073**

**Exp no : 1**

**Batch : A3**

**Date : 1 Aug 2023**

**mkdir**

os\_it\_b317@ubuntu:~$ mkdir -m 444 sfsfsf

os\_it\_b317@ubuntu:~$ ls -l

total 88

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 123.txt

drwxr-xr-x 2 root root 4096 Jul 18 13:29 1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 456.txt

drwxrwxr-x 4 os\_it\_b317 os\_it\_b317 4096 Jul 18 13:38 A

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:28 a2

-rwxrw-r-x 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:08 A2.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 21 Jul 24 07:12 ab1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:06 abc.txt

drwxrwxr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 02:11 B

-r--r--rw- 1 os\_it\_b317 os\_it\_b317 19 Jul 25 02:12 B.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:20 Desktop

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 di.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 28 06:20 Documents

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 04:59 Downloads

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 it.txt

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 24 07:26 kj

drwxrwxrwx 3 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:26 kjsce

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:03 kjsce.txt

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:10 kuroshiro.txt

drwxrwxrwx 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:33 lmsns

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 11 Jul 28 05:31 meow.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Music

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 26 03:24 OS\_mihir

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 07:16 Pictures

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Public

-rw-r-x-w- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:34 sample\_a2

dr--r--r-- 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:36 sfsfsf

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Templates

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 12 Jul 28 05:28 test.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:05 ty.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Videos

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:03 xaa

os\_it\_b317@ubuntu:~$ mkdir kjsce

os\_it\_b317@ubuntu:~$ ls

123.txt A ab1.txt B.txt Documents kj kuroshiro.txt OS\_mihir sample\_a2 ty.txt

1.txt a2 abc.txt Desktop Downloads kjsce meow.txt Pictures Templates Videos

456.txt A2.txt B di.txt it.txt kjsce.txt Music Public test.txt xaa

os\_it\_b317@ubuntu:~$ mkdir -p kjsce/it

os\_it\_b317@ubuntu:~$ ls -l

total 80

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 123.txt

drwxr-xr-x 2 root root 4096 Jul 18 13:29 1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 456.txt

drwxrwxr-x 4 os\_it\_b317 os\_it\_b317 4096 Jul 18 13:38 A

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:28 a2

-rwxrw-r-x 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:08 A2.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 21 Jul 24 07:12 ab1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:06 abc.txt

drwxrwxr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 02:11 B

-r--r--rw- 1 os\_it\_b317 os\_it\_b317 19 Jul 25 02:12 B.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:20 Desktop

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 di.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 28 06:20 Documents

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 04:59 Downloads

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 it.txt

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 24 07:26 kj

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:26 kjsce

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:03 kjsce.txt

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:10 kuroshiro.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 11 Jul 28 05:31 meow.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Music

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 26 03:24 OS\_mihir

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 07:16 Pictures

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Public

-rw-r-x-w- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:34 sample\_a2

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Templates

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 12 Jul 28 05:28 test.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:05 ty.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Videos

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:03 xaa

os\_it\_b317@ubuntu:~$ mkdir -m 777 kjsce

mkdir: cannot create directory ‘kjsce’: File exists

os\_it\_b317@ubuntu:~$ chmod 777 kjsce

os\_it\_b317@ubuntu:~$ ls -l

total 80

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 123.txt

drwxr-xr-x 2 root root 4096 Jul 18 13:29 1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 456.txt

drwxrwxr-x 4 os\_it\_b317 os\_it\_b317 4096 Jul 18 13:38 A

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:28 a2

-rwxrw-r-x 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:08 A2.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 21 Jul 24 07:12 ab1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:06 abc.txt

drwxrwxr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 02:11 B

-r--r--rw- 1 os\_it\_b317 os\_it\_b317 19 Jul 25 02:12 B.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:20 Desktop

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 di.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 28 06:20 Documents

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 04:59 Downloads

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 it.txt

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 24 07:26 kj

drwxrwxrwx 3 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:26 kjsce

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:03 kjsce.txt

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:10 kuroshiro.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 11 Jul 28 05:31 meow.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Music

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 26 03:24 OS\_mihir

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 07:16 Pictures

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Public

-rw-r-x-w- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:34 sample\_a2

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Templates

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 12 Jul 28 05:28 test.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:05 ty.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Videos

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:03 xaa  
  
os\_it\_b317@ubuntu:~$ mkdir -m 777 kj

mkdir: cannot create directory ‘kj’: File exists

os\_it\_b317@ubuntu:~$ mkdir -m 777 lmsns  
  
  
**ls**

os\_it\_b317@ubuntu:~$ ls -d k\*

kj kjsce kjsce.txt kuroshiro.txt

os\_it\_b317@ubuntu:~$ rm kjsce.txt

os\_it\_b317@ubuntu:~$ ls -l

total 88

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 123.txt

drwxr-xr-x 2 root root 4096 Jul 18 13:29 1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 456.txt

drwxrwxr-x 4 os\_it\_b317 os\_it\_b317 4096 Jul 18 13:38 A

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:28 a2

-rwxrw-r-x 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:08 A2.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 21 Jul 24 07:12 ab1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:06 abc.txt

drwxrwxr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 02:11 B

-r--r--rw- 1 os\_it\_b317 os\_it\_b317 19 Jul 25 02:12 B.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:20 Desktop

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 di.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 28 06:20 Documents

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 04:59 Downloads

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 it.txt

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 24 07:26 kj

drwxrwxrwx 3 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:26 kjsce

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:10 kuroshiro.txt

drwxrwxrwx 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:33 lmsns

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 11 Jul 28 05:31 meow.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Music

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 26 03:24 OS\_mihir

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 07:16 Pictures

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Public

-rw-r-x-w- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:34 sample\_a2

dr--r--r-- 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:36 sfsfsf

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Templates

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 12 Jul 28 05:28 test.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:05 ty.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Videos

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:03 xaa  
  
os\_it\_b317@ubuntu:~$ ls -i

943556 123.txt 953807 a2 948548 B 929585 Documents 926535 kjsce 926094 meow.txt 929584 Public 926076 test.txt

934367 1.txt 943772 A2.txt 948720 B.txt 929582 Downloads 934215 kjsce.txt 929586 Music 953814 sample\_a2 943566 ty.txt

943569 456.txt 943571 ab1.txt 929581 Desktop 943517 it.txt 926417 kuroshiro.txt 944048 OS\_mihir 955591 sfsfsf 929588 Videos

934231 A 943567 abc.txt 943565 di.txt 943562 kj 955559 lmsns 929587 Pictures 929583 Templates 926077 xaa  
  
os\_it\_b317@ubuntu:~$ ls -a

. A B .cache Downloads kjsce meow.txt .profile .sudo\_as\_admin\_successful xaa

.. a2 .bash\_history .config .f.swp kuroshiro.txt .mozilla Public Templates

123.txt A2.txt .bash\_logout Desktop .gnupg lmsns Music sample\_a2 test.txt

1.txt ab1.txt .bashrc di.txt it.txt .local OS\_mihir sfsfsf .thunderbird

456.txt abc.txt B.txt Documents kj ly Pictures .ssh ty.txt  
  
  
**rm**

os\_it\_b317@ubuntu:~$ rm OS\_mihir

rm: cannot remove 'OS\_mihir': Is a directory

**mv**

os\_it\_b317@ubuntu:~$ mv sy ty

os\_it\_b317@ubuntu:~$ mv ty ly

**cp**

os\_it\_b317@ubuntu:~$ cp ly ty.txt

**find**

os\_it\_b317@ubuntu:~$ find k

find: ‘k’: No such file or directory

os\_it\_b317@ubuntu:~$ find kjsce

kjsce

kjsce/it  
  
**rmdir**

os\_it\_b317@ubuntu:~$ rmdir Videos

os\_it\_b317@ubuntu:~$ ls -l

total 92

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 123.txt

drwxr-xr-x 2 root root 4096 Jul 18 13:29 1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:08 456.txt

drwxrwxr-x 4 os\_it\_b317 os\_it\_b317 4096 Jul 18 13:38 A

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:28 a2

-rwxrw-r-x 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:08 A2.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 21 Jul 24 07:12 ab1.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:06 abc.txt

drwxrwxr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 02:11 B

-r--r--rw- 1 os\_it\_b317 os\_it\_b317 19 Jul 25 02:12 B.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:20 Desktop

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 di.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 28 06:20 Documents

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 04:59 Downloads

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 0 Jul 24 07:04 it.txt

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 24 07:26 kj

drwxrwxrwx 3 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:26 kjsce

-rwxrwxrwx 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:10 kuroshiro.txt

drwxrwxrwx 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:33 lmsns

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 18 Jul 31 06:01 ly

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 11 Jul 28 05:31 meow.txt

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Music

drwxrwxr-x 3 os\_it\_b317 os\_it\_b317 4096 Jul 26 03:24 OS\_mihir

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 Jul 25 07:16 Pictures

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Public

-rw-r-x-w- 1 os\_it\_b317 os\_it\_b317 0 Jul 25 07:34 sample\_a2

dr--r--r-- 2 os\_it\_b317 os\_it\_b317 4096 Jul 31 05:36 sfsfsf

drwxr-xr-x 2 os\_it\_b317 os\_it\_b317 4096 May 22 21:01 Templates

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 12 Jul 28 05:28 test.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 18 Jul 31 06:01 ty.txt

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 26 Jul 28 06:03 xaa

os\_it\_b317@ubuntu:~$   
  
  
os\_it\_b317@ubuntu:~$ ls

123.txt 456.txt a2 ab1.txt B Desktop Documents it.txt kjsce.txt meow.txt OS\_mihir Public Templates ty.txt xaa

1.txt A A2.txt abc.txt B.txt di.txt Downloads kj kuroshiro.txt Music Pictures sample\_a2 test.txt Videos  
  
**Touch**

os\_it\_b317@ubuntu:~$ cd Desktop/

os\_it\_b317@ubuntu:~/Desktop$ touch keyur.txt

os\_it\_b317@ubuntu:~/Desktop$ ls

095 keyur.txt

os\_it\_b317@ubuntu:~/Desktop$ ls -l

total 116

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 117603 Jul 24 07:46 095

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 0 Jul 31 05:08 keyur.txt  
  
**cat**

os\_it\_b317@ubuntu:~/Desktop$ ../

bash: ../: Is a directory

os\_it\_b317@ubuntu:~/Desktop$ cat > keyur.txt

hiiiii hellooo

^C

os\_it\_b317@ubuntu:~/Desktop$ cat >> keyur

oooooooooo^C

os\_it\_b317@ubuntu:~/Desktop$ cat keyur

os\_it\_b317@ubuntu:~/Desktop$ cat >> keyur

sfsfsfsfsfsfsfsfsf

^C

os\_it\_b317@ubuntu:~/Desktop$ cat keyur

sfsfsfsfsfsfsfsfsf

os\_it\_b317@ubuntu:~/Desktop$ cat keyur

sfsfsfsfsfsfsfsfsf

os\_it\_b317@ubuntu:~/Desktop$ cat >> keyur

hiiiiiiiiiiiiiiiii

^C

os\_it\_b317@ubuntu:~/Desktop$ cat keyur

sfsfsfsfsfsfsfsfsf

hiiiiiiiiiiiiiiiii  
  
**pwd**

os\_it\_b317@ubuntu:~/Desktop$ pwd

/home/os\_it\_b317/Desktop  
  
**chmod**

os\_it\_b317@ubuntu:~/Desktop$ chmod -777 keyur.txt

os\_it\_b317@ubuntu:~/Desktop$ ls -l

total 124

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 117603 Jul 24 07:46 095

-rw-rw-r-- 1 os\_it\_b317 os\_it\_b317 38 Jul 31 05:23 keyur

---------- 1 os\_it\_b317 os\_it\_b317 15 Jul 31 05:16 keyur.txt

**Activity1**

1. **Batch Operating System**

This type of operating system does not interact with the computer directly. There is an operator which takes similar jobs having the same requirement and groups them into batches. It is the responsibility of the operator to sort jobs with similar needs.

**Advantages of Batch Operating System**

* It is very difficult to guess or know the time required for any job to complete. Processors of the batch systems know how long the job would be when it is in the queue.
* Multiple users can share the batch systems.
* The idle time for the batch system is very less.
* It is easy to manage large work repeatedly in batch systems.

**Disadvantages of Batch Operating System**

* Batch systems are hard to debug.
* The computer operators should be well known with batch systems.
* It is sometimes costly.
* The other jobs will have to wait for an unknown time if any job fails.

1. **Multi-Programming Operating System**

[Multiprogramming Operating Systems](https://www.geeksforgeeks.org/difference-between-multitasking-multithreading-and-multiprocessing/) can be simply illustrated as more than one program is present in the main memory and any one of them can be kept in execution. This is basically used for better execution of resources.

**Advantages of Multi-Programming Operating System**

* Multi Programming increases the Throughput of the System.
* It helps in reducing the response time.

**Disadvantages of Multi-Programming Operating System**

* There is not any facility for user interaction of system resources with the system.

1. **3. Multi-Processing Operating System**

[Multi-Processing Operating System](https://www.geeksforgeeks.org/difference-between-multiprocessing-and-multiprogramming/) is a type of Operating System in which more than one CPU is used for the execution of resources. It betters the throughput of the System

**Advantages of Multi-Processing Operating System**

* It increases the throughput of the system.
* As it has several processors, so, if one processor fails, we can proceed with another processor.

**Disadvantages of Multi-Processing Operating System**

* Due to the multiple CPU, it can be more complex and somehow difficult to understand.

1. **Multi-Tasking Operating System**

Multitasking Operating System is simply a multiprogramming Operating System with having facility of a Round-Robin Scheduling Algorithm. It can run multiple programs simultaneously.

There are two types of Multi-Tasking Systems which are listed below.

* [Preemptive Multi-Tasking](https://www.geeksforgeeks.org/difference-between-preemptive-and-cooperative-multitasking/)
* [Cooperative Multi-Tasking](https://www.geeksforgeeks.org/difference-between-preemptive-and-cooperative-multitasking/)

**Advantages of Multi-Tasking Operating System**

* Multiple Programs can be executed simultaneously in Multi-Tasking Operating System.
* It comes with proper memory management.

**Disadvantages of Multi-Tasking Operating System**

* The system gets heated in case of heavy programs multiple times.

1. **Time-Sharing Operating Systems**

Each task is given some time to execute so that all the tasks work smoothly. Each user gets the time of the CPU as they use a single system. These systems are also known as Multitasking Systems. The task can be from a single user or different users also. The time that each task gets to execute is called quantum. After this time interval is over OS switches over to the next task.

**Advantages of Time-Sharing OS**

* Each task gets an equal opportunity.
* Fewer chances of duplication of software.
* CPU idle time can be reduced.
* Resource Sharing: Time-sharing systems allow multiple users to share hardware resources such as the CPU, memory, and peripherals, reducing the cost of hardware and increasing efficiency.
* Improved Productivity: Time-sharing allows users to work concurrently, thereby reducing the waiting time for their turn to use the computer. This increased productivity translates to more work getting done in less time.
* Improved User Experience: Time-sharing provides an interactive environment that allows users to communicate with the computer in real time, providing a better user experience than batch processing.

**Disadvantages of Time-Sharing OS**

* Reliability problem.
* One must have to take care of the security and integrity of user programs and data.
* Data communication problem.
* High Overhead: Time-sharing systems have a higher overhead than other operating systems due to the need for scheduling, context switching, and other overheads that come with supporting multiple users.
* Complexity: Time-sharing systems are complex and require advanced software to manage multiple users simultaneously. This complexity increases the chance of bugs and errors.
* Security Risks: With multiple users sharing resources, the risk of security breaches increases. Time-sharing systems require careful management of user access, authentication, and authorization to ensure the security of data and software.

1. **Distributed Operating System**

These types of operating system is a recent advancement in the world of computer technology and are being widely accepted all over the world and, that too, at a great pace. Various autonomous interconnected computers communicate with each other using a shared communication network. Independent systems possess their own memory unit and CPU. These are referred to as [loosely coupled systems or distributed systems](https://www.geeksforgeeks.org/difference-between-loosely-coupled-and-tightly-coupled-multiprocessor-system/).

**Advantages of Distributed Operating System**

* Failure of one will not affect the other network communication, as all systems are independent of each other.
* Electronic mail increases the data exchange speed.
* Since resources are being shared, computation is highly fast and durable.
* Load on host computer reduces.

**Disadvantages of Distributed Operating System**

* Failure of the main network will stop the entire communication.
* To establish distributed systems the language is used not well-defined yet.
* These types of systems are not readily available as they are very expensive. Not only that the underlying software is highly complex and not understood well yet.

1. **Network Operating System**

These systems run on a server and provide the capability to manage data, users, groups, security, applications, and other networking functions. These types of operating systems allow shared access to files, printers, security, applications, and other networking functions over a small private network. One more important aspect of Network Operating Systems is that all the users are well aware of the underlying configuration, of all other users within the network, their individual connections, etc. and that’s why these computers are popularly known as [tightly coupled systems](https://www.geeksforgeeks.org/difference-between-loosely-coupled-and-tightly-coupled-multiprocessor-system/).

**Advantages of Network Operating System**

* Highly stable centralized servers.
* Security concerns are handled through servers.
* New technologies and hardware up-gradation are easily integrated into the system.
* Server access is possible remotely from different locations and types of systems.

**Disadvantages of Network Operating System**

* Servers are costly.
* User has to depend on a central location for most operations.
* Maintenance and updates are required regularly.

1. **Real-Time Operating System**

These types of OSs serve real-time systems. The time interval required to process and respond to inputs is very small. This time interval is called **response time**.   
**Real-time systems** are used when there are time requirements that are very strict like missile systems, air traffic control systems, robots, etc.

**Advantages of RTOS**

* **Maximum Consumption:** Maximum utilization of devices and systems, thus more output from all the resources.
* **Task Shifting:** The time assigned for shifting tasks in these systems is very less. For example, in older systems, it takes about 10 microseconds in shifting from one task to another, and in the latest systems, it takes 3 microseconds.
* **Focus on Application:** Focus on running applications and less importance on applications that are in the queue.
* Real-time **operating system in** the **embedded system:** Since the size of programs is small, RTOS can also be used in embedded systems like in transport and others.
* **Error Free:** These types of systems are error-free.
* **Memory Allocation:** Memory allocation is best managed in these types of systems.

**Disadvantages of RTOS**

* **Limited Tasks:** Very few tasks run at the same time and their concentration is very less on a few applications to avoid errors.
* **Use heavy system resources:** Sometimes the system resources are not so good and they are expensive as well.
* **Complex Algorithms:** The algorithms are very complex and difficult for the designer to write on.
* **Device driver and interrupt signals:** It needs specific device drivers and interrupts signal to respond earliest to interrupts.
* **Thread Priority:** It is not good to set thread priority as these systems are very less prone to switching tasks.

**Activity 2:**

Take any 5 domains like gaming, finance, banking etc and suggest which OS will be best suitable for

these domains.

1. **Gaming**:

* **Windows OS**: Windows is the most suitable operating system for gaming due to its extensive compatibility with a vast library of games, DirectX support, and optimized drivers for gaming hardware. Most game developers target Windows as their primary platform, ensuring a wide range of gaming options.

1. **Finance and Banking**:
   * **Linux**: For backend server infrastructure, Linux is often the preferred choice in the finance and banking industry due to its stability, security, and cost-effectiveness. Many financial institutions run their servers on Linux for handling transactions, databases, and security.
   * **Windows Server**: Windows Server is also commonly used in this domain, especially for applications and services that require integration with Microsoft technologies.

1. **Healthcare**:
   * **Windows OS**: Windows is often used for healthcare organizations due to its compatibility with various medical software and equipment. Many medical devices and tools are designed to work seamlessly with Windows-based systems.
   * **iOS**: In the healthcare sector, iOS devices (iPhones and iPads) are used by medical professionals for various tasks like accessing patient records, managing appointments, and medical education applications due to their security and app availability.

1. **Education**:
   * **Chrome OS**: Chrome OS is well-suited for the education domain, especially in schools and educational institutions. Its simplicity, ease of management, and integration with Google's suite of educational tools make it an ideal choice for students and teachers.
   * **Windows OS**: Windows is also widely used in educational settings, especially for higher education and specialized applications not supported on Chrome OS.

1. **Scientific Research and Engineering**:
   * **Linux**: Linux is the go-to choice for scientific research and engineering due to its flexibility, powerful command-line tools, and the availability of specialized software packages for various research disciplines.
   * **macOS**: Some researchers and engineers prefer macOS for its Unix-based environment and compatibility with development tools.