

Test - 1

12/01/2024

3a) Interprocess communication involves information sharing between processes.  
It can be two ways:

- \* Independent: The execution of processes is not affected by other processes execution.
- \* Co-operative: The execution of process is affected by other processes execution.

Co-operative interprocess communication is crucial in an <sup>\*advantages</sup> interactive appliance.  
Here are few (applications of) interprocess communication:

- Information sharing: It involves exchange of services / resources between different processes.
- Modularity: It increases modularity by splitting into sub-processes thereby increasing speed.
- Convenience: It makes it convenient to execute different processes.

Co-operative IPC takes place in two ways

- \* Message passing
- \* Shared memory

DD MM YY YY

→ Message passing: This method is slow

- This method is used when the data is small.
- In this method each block is created.
- In this method system call has to be called whenever it has to be read/written.

→ Shared memory:

- A common pool of region is created in this method.
- System call is called only once.
- It is faster.
- It is used when data is large.

3b) Multi-threading models can be understood as a relationship between user thread & kernel thread.

There are mainly 3 multi-threading models.

→ Many to one: Here many user threads are connected to one kernel thread.

DD MM YY YY

--	--	--	--	--	--

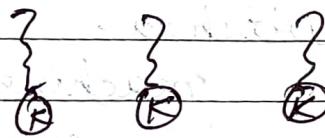


- Here various libraries can be used from single kernel thread.
- But whenever a block system call is initiated <sup>is one user thread</sup>, whole ~~thread~~ set-up is affected

Eg: Solaris

→ One to one model:

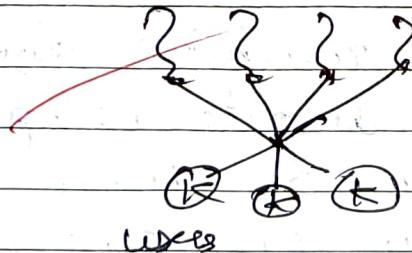
Here one user thread is linked to one kernel thread -



- Here parallelism is introduced and block system call is in one thread does not affect the other.

Eg: Windows

→ Many to many model:



Here several threads is connected to several kernel threads

→ There is high parallelism

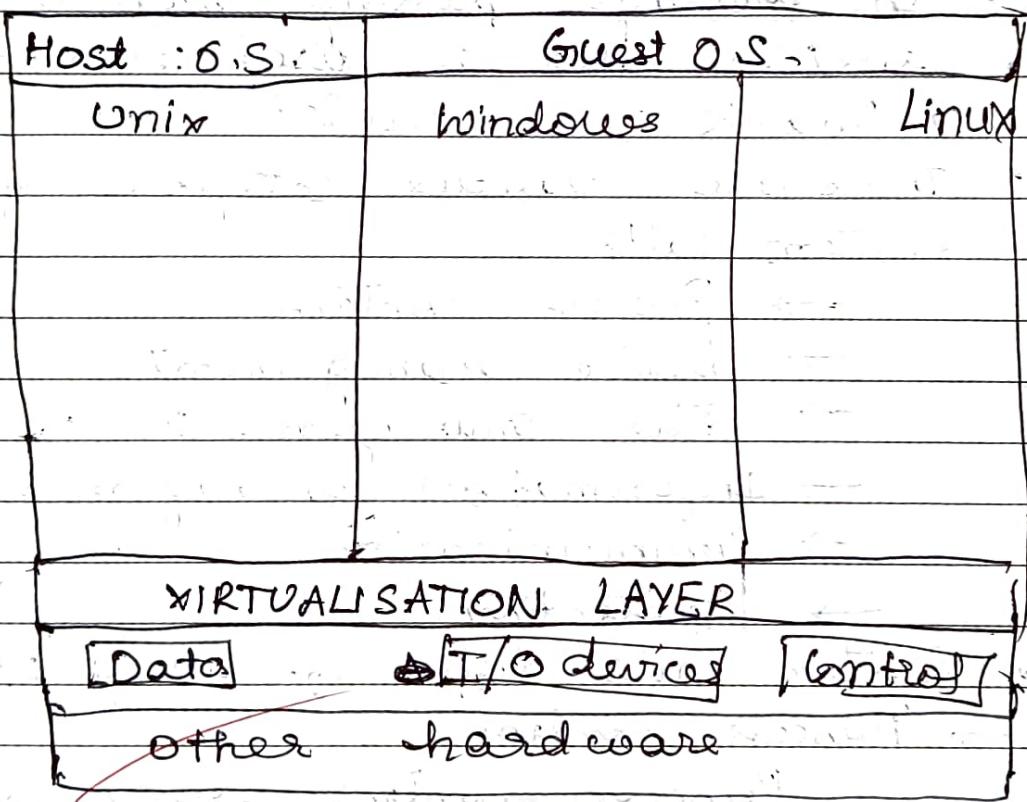
Eg: HP36

DD MM YY YY

- 2a) • Virtual machine is an abstract of various internal hardware, so that it creates an illusion that there is separate processor for each.
- Virtual machine involves a virtualisation layer.
  - Here is a virtual machine.
  - One host O.S. is used & many guest O.S. can be used.
  - So, therefore in a single system, that is with the same CPU, other internal hardware various environments can be switched.
  - This virtual machine helps the programmers to comprehend how their code works in different environments (i.e. different operating systems).
  - This increases the efficiency of the system & makes information sharing easier.
  - In one virtual machine different environment despite being present, each of them is protected from one other.

D	D	M	M	Y	Y	Y	Y

- We have two example of Virtual Machine
  - VMWare - one of the earliest known VM
  - JVM - JVM makes Java platform independent



DDMMYYYY

- 2b) • System calls are the means by which we can access the services of the operating system.
- It is necessary to for the interaction between the user and O.S.
  - In message passing, methods system calls is used every time a block is executed.
  - There are various categories of system calls
    - Process control
    - Device management
    - File management
    - Information management
    - Communication
    - Protection
  - System calls differ for every operating system
    - Process control

Process control system calls are used to create a process, wait for a process or terminate a process.

→ Device management

Device management system call is used to release/receive data, attach or detach data files, reposition of data files, devices, get/set devices.

D	D	M	M	Y	Y	Y	Y

### → File management

File management system calls are related to create a file, delete a file, read a file, write a file etc., get /set files.

### → Information management

Information management system calls are related to sleep, alarm, getpid, which manages the information provided.

### → Communication

Communication system files are related to a communication link between services of operating system.

### → Protection

Protection system calls are related to security, to determine access, modify access to certain services of operating system.

D D M M Y Y Y Y

Examples for system calls:

→ Process control: CreateProcess() }  
  | ExecuteProcess() } windows  
  | WaitProcess() }  
  | fork() }  
  | exec() } } Linux  
  | wait() }  
  | Exit() }

→ File management: create()

read()

write()

getfile()

setfile()

→ Device management: read()

write()

→ Information management: getpid()

sleep()

alarm()

→ Communication: shmgif()

→ Protection: umask()  
  chown()

D	D	M	M	Y	Y	Y	Y

## Quiz

1. c) new
2. (a) when process is scheduled to run after some execution
3. (b) communication b/w two processes.
4. (b) Program counter
5. b) 5. ~~ready~~ ~~block~~ ~~wait~~ terminate