Module-2

Q3 (a)   ┌IPC┐
           (Inter process communication)

↓ on basis of   on basis of
(Co-operations)   (Indipendent)

┌model:1┐   ┌model:2┐
(shared   (message
  memory)   passing)

Example:-
┌consumer-producer┐
(1) with bounded   1.   .3.
    buffer   ┌Naming┐   ┌2.Automatic┐ Synchronis-
                                                    -ation
(2) without bounded
    buffer

                                                (1)— blocking
                                                     send

         a) Direct   b) Indirect   (2)— non-
            Naming   Naming   blocking
                                                     send

                                                (3)— blocking
                                                     recieve

                                                (4)— Non
                                                     blocking
                                                     recieve

- Interprocess communication is the process of communication between any two given process
- These given process can itself be co-operational or independent
- On the basis of co-operation it can be studied by the two different models :-

- model 1 → Shared memory model
  - (All the process involved have shared one common memory).
  - These takes longer times as the use of API calls is involved.
  - We use this when we have to share large datas
  - EX - (Consumer-Producer involving the buffers)

- model 2 → message passing models.
  - (These are used to exchange memory between sender & receivers)
  - On link is used according to which the model can be further classified as:-
  1) Naming
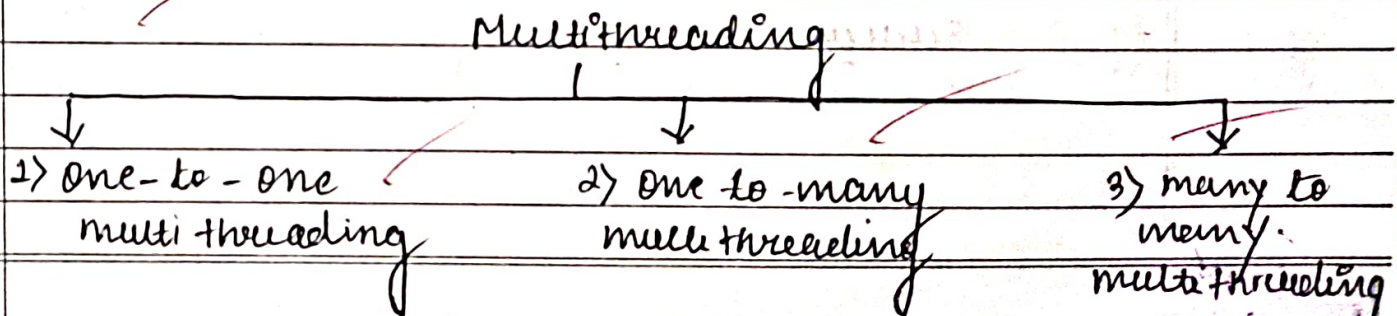 2) Automatic/ Synchronization   Explain in detail.
  3) Buffering

Example:- when producer produces 2 and consumer consume 2 then illustration as as buffer is empty But if the boundation of max terms are there then; producer can do only 2 production; it produces more then buffer is full
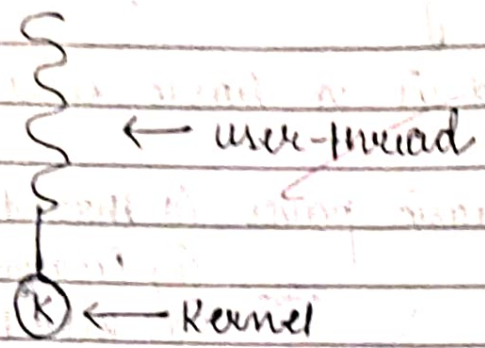
Q (3)(b) Multithreading models :-

- We know that thread is a basic unit of CPU utilisation
- A thread has four basic parts (i) thread ID
  - (ii) Program register
  - (iii) kernel
  - (iv) register set.
- Threading is supported by two interfaces :- (i) user-thread
  - (ii) kernel thread
- Thread can be single or multiple which can be shown as follows :-

data	
register	

thread

Single thread

data	data	data
register	register	register
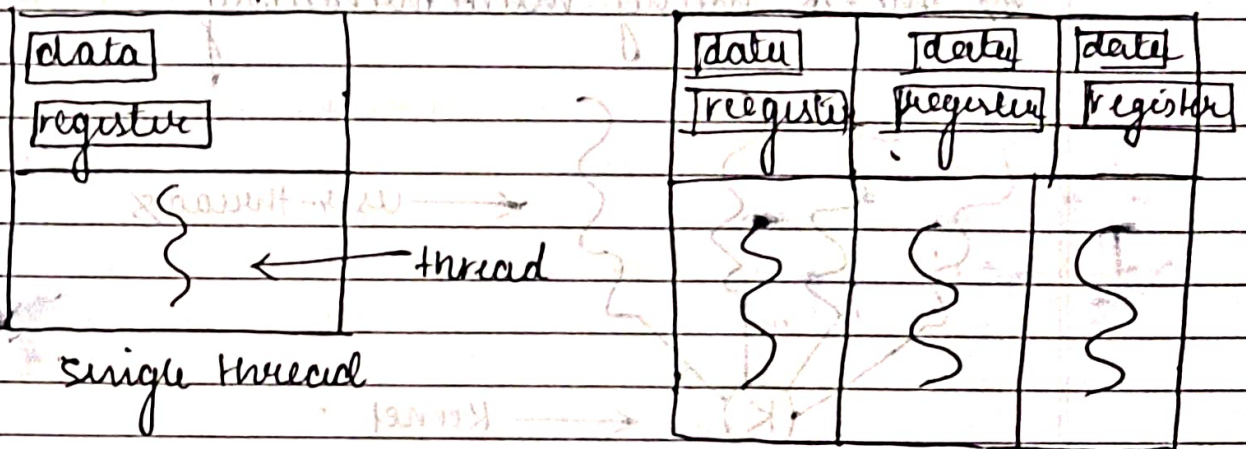
Based on these; there are three multithreading models available.

multiple-thread

Multithreading

1) One-to-one multi threading
2) One to-many multi threading
3) many to many. multi threading
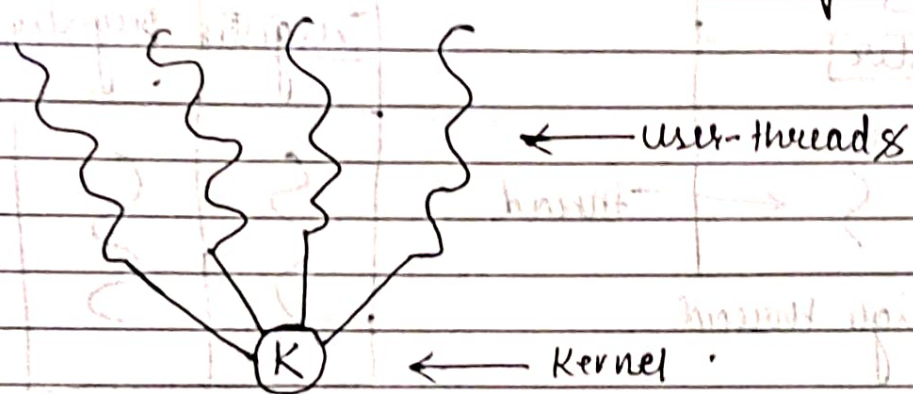
1) one-to-one multithreading

← user-thread

(K) ← — Kernel

In this multithreading one thread is connected with one kernel.

Example :- Intel 67/64
Linux

• 2) one-to-many-multithreading

← — user-threads

(K) ← — Kernel .

In this multithreading one kernel is having many user threads

example :-
VM instances
Solaris

3) Many - to many multithreading.

← user threads
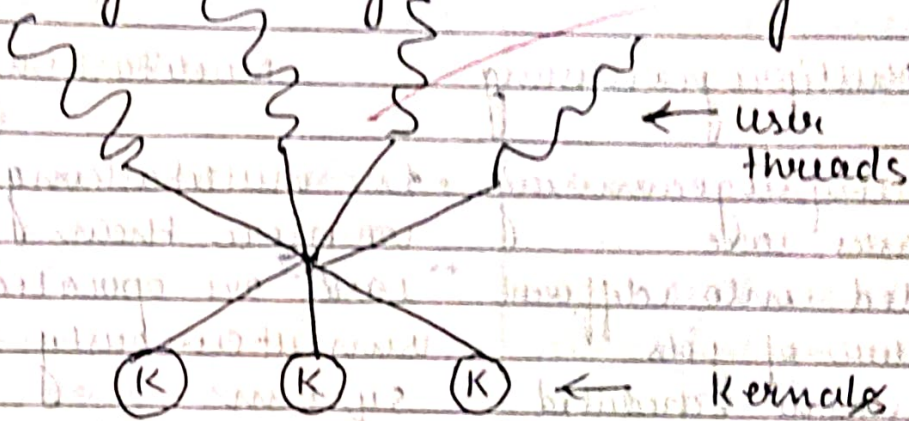
← Kernels

many kernal connected with multiple user threads.
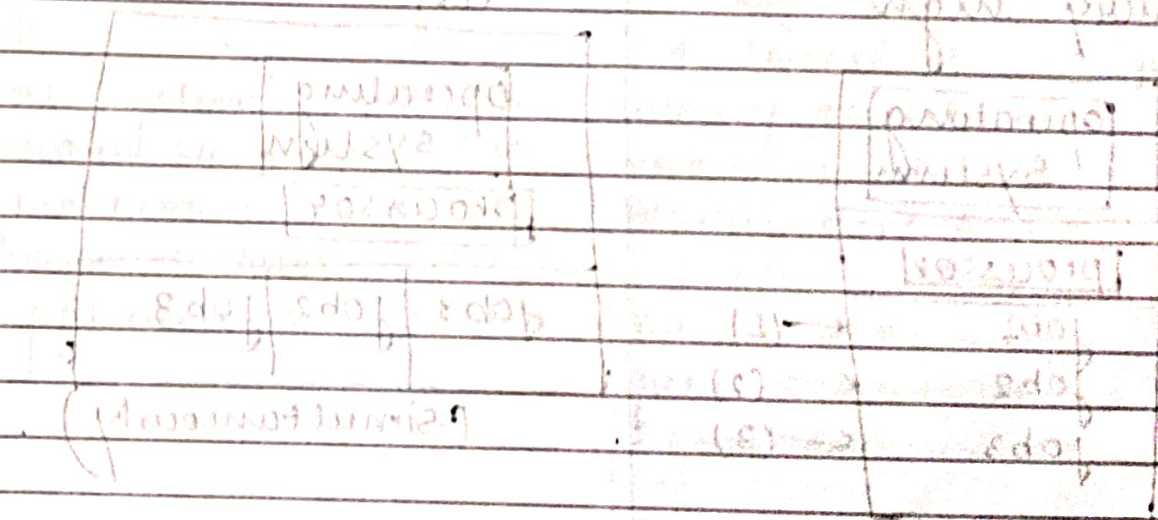
Module 1

(Q1) (b) iii. Multiprogramming — Multitasking

Multiprogramming	Multitasking
• In multiprogramming the tasks are divided into different number of jobs and their scheduled to the CPU.	• In multitasking, two or more than two tasks are operated simultaneously in the system.
• It takes longer time for execution	• It takes lesser time for the execution
• scheduling algorithm is used	• time sharing algorithm is used.
• Responsiveness is very high	• Responsiveness is very less.

Operating System
processor

job 1	← (1)
job 2	← (2)
job 3	← (3)

Operating system
processor

| job 1 | job 2 | job 3 |

(: simultaneously).

Q1(B) (i)

Criteria
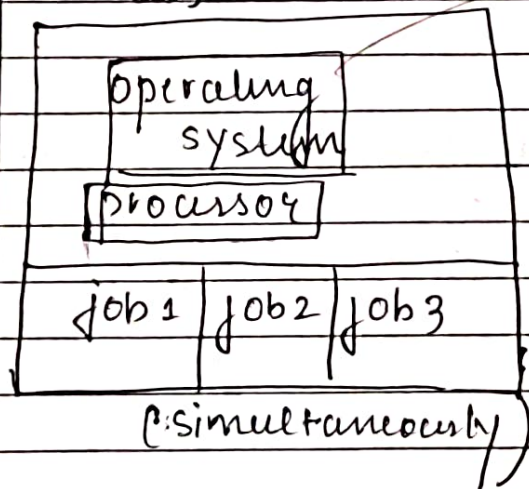
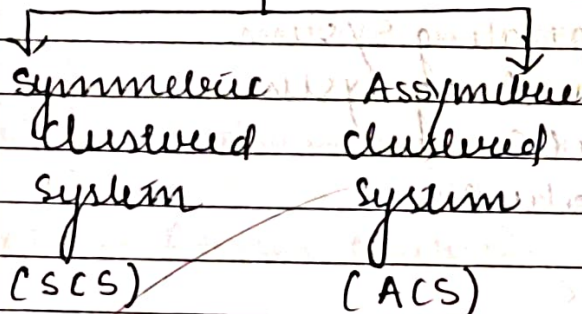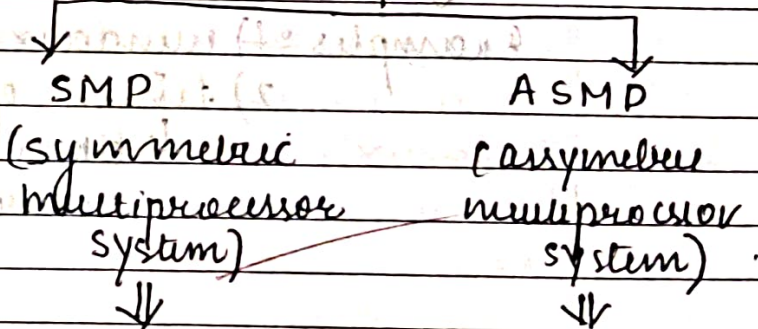| Clustered System	Multi-processor system
• Two or more than two system uses the same processor for sharing different softwares.	• Two or more than two processors are used in the system to share the hardware resources, memory.
• we have two branch in clustered system as well	• we have two categories of this multiprocessor system

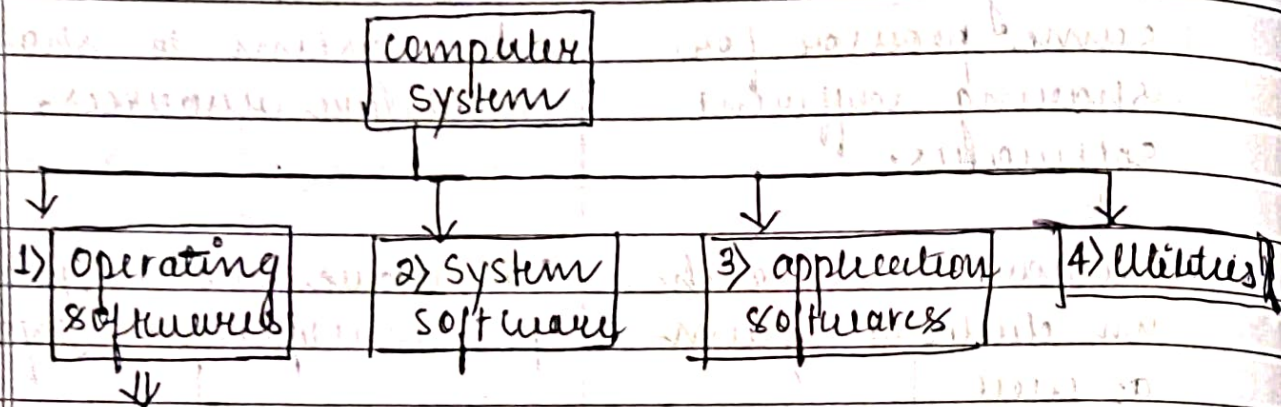| Symmetric Clustered System (SCS)	Assymetric clustered System (ACS)	SMP (symmetric multiprocessor System)	ASMP (asymmetric multiprocessor system)
⬇ all systems shared same processor & runs software applications	⬇ one acts as server & rests works as VM instances	⬇ It consist of many system of same levels & share same memory process. All have same peers & monitor each other.	⬇ one system monitors all other systems.

Q1 (a) Operating System

- An operating system is defined as set of programs which runs every time, a computer system is operated.

```
                    ┌──────────┐
                    │ computer │
                    │  System  │
                    └──────────┘
        ┌──────────────┼──────────────┬──────────────┐
        ↓              ↓              ↓              ↓
  ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐
  │1) Operating│   │2) System │   │3) application│   │4) Utilities│
  │ softwares │   │ software │   │ softwares │   │          │
  └──────────┘   └──────────┘   └──────────┘   └──────────┘
        ⇓
```

Examples : 1) windows operating system
           2) linux operating system
                ↓ Ubantu O.S
                  Kubernaties O.S

Services of Operating System

```
                    Services of Operating System
                    ↓                          ↓
        1) Based on user              2) Based on System
           interface                     interface
```

(1) ── User Interface

```
        ↓        ↓       ↓          1)              2)           3)
      GUI     Bench    CLI       Allocating      Accounting   Protection
                                 address
```

(2) ── Program execution

(3) ── (I/O) programs/device

(4) ── Information Managment   *Explain in detail*

(5) ── Process control

(7) ── Securities/communication

• So lets us clear with the different types of services that we get by the operating system on the bases of user interface.

• The user interface provide three modes to communicate the first one is GUI (graphic user interface) the bench and the CLI (command line interface) to communicate.

• the communication interface have two modes of communication;

1) message passing → exchange of message b/w sender & receiver via link

2) sharing memory → without calling APIs.

• The program execution involves two user interface & kernel interfaces.

Based on system; the operating system provide various services like;

1) whenever the hardwares are not working it mean hardware feature.

2) whenever the input & output devices are not working it mean problem with the level of power.

3) whenever program code have any errors than it should check arithmetics.

Quiz

1) (b)
2) (a)
3) (a)
4) (b)
5) (a)