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* Assignment O.S System :-

- What is O.S System :-

° An operating System acts as an interface bet" the Software and computer hardware.

° It can manage the overall resources and operations of the computer.

- Write History of O.S :-

- Explain functions of O.S :-

-:- ① Memory Management.
② processor Management.
③ Device Management.
④ File management.

- ① Memory Management :-

- O.S manage primary or main mem
- it track of primary memory.
- The O.S decided the order in whic

processes are granted memory access, and for how long.

- It is performing an input/output operations.

② processor managment:

O.S manages the program which perform which perform this task is known as a traffic controller.

- Allocates the CPU that is a processor to a process. ① De-allocates processor when a process is no more required.

③ ① Device Managment:

- O.S manage device communication with respectives deivees.

- keep track of all devicess connected to the system.

- Allocates devices effectively and efficiently ① Deallocates.

- O.S.

④ File Managment:

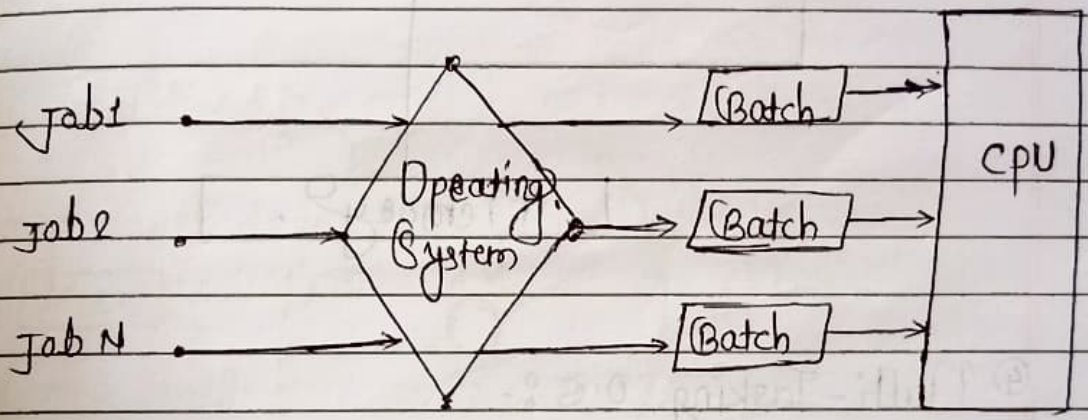
it keeps tracking of where information is stored, user access setting, the status of every file etc.

- O.S keep track information Regarding the creation, deletion, transfer, copy, and storage of files in an organized way.

CPU States in O.S.
I/O chanels.

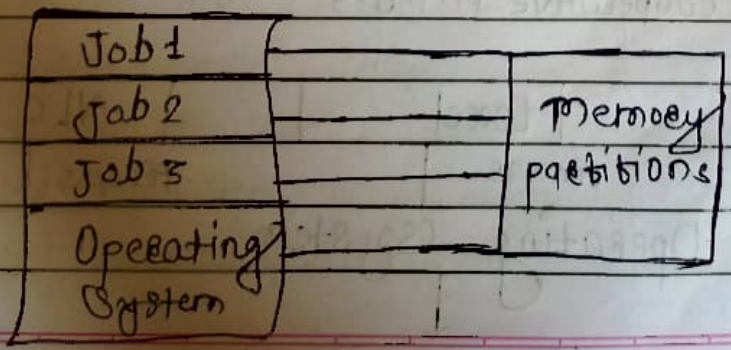
① Batch O.S :

This types of O.S does not interact with the computer directly. There is an operator which takes similar jobs having the same requirement and group them into batches. it is the responsibity of the operator to sort jobs with similar needs.



② Multi-Programming Operating System :

M.P.O.S can be simply illustrated as more than one program is present inthe main memory and any one of them can be kept in execution. This is basically used for better execution of resources.



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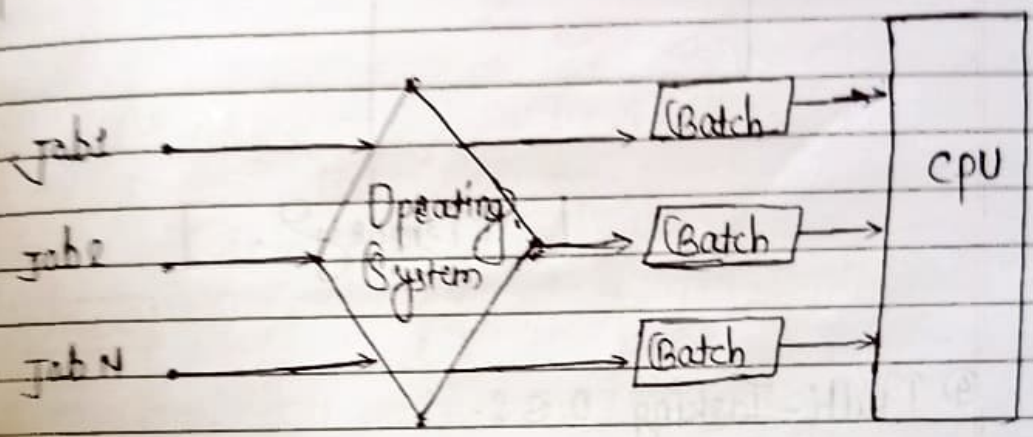

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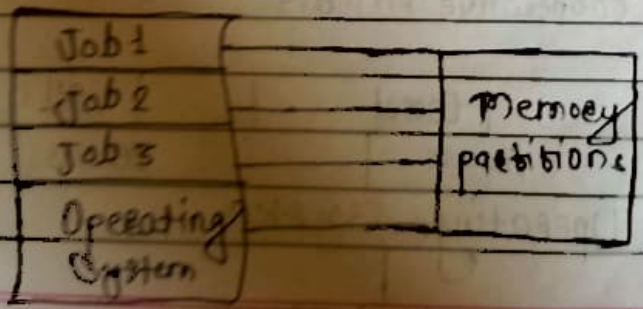

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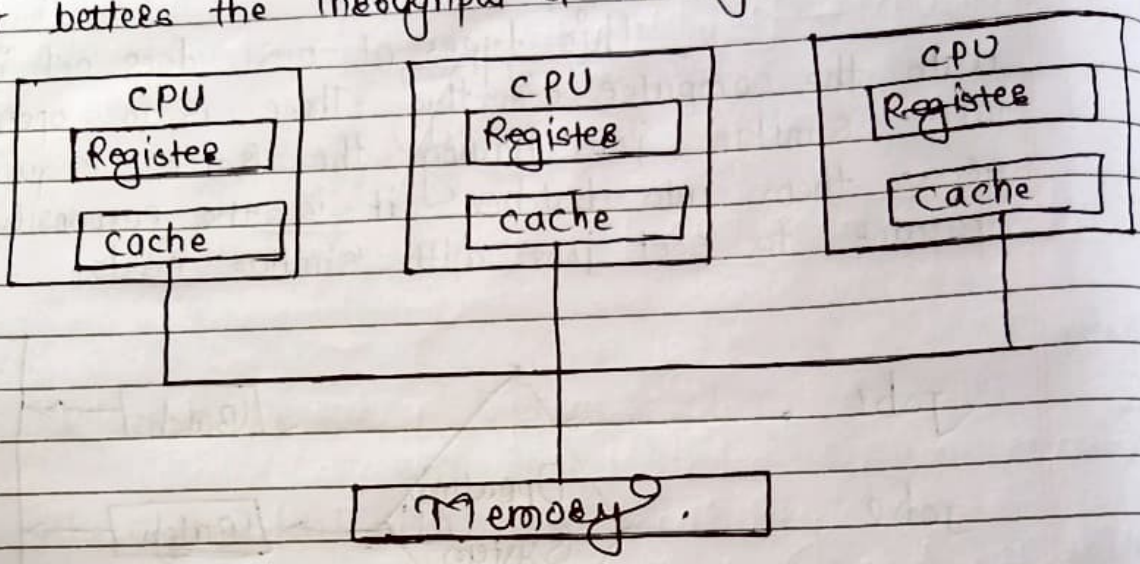
⑤ Multi-processing Operating System:-

M.P. O.S is a type of O.S in which more than one CPU is used for the execution of resources. it betters the theoughput of the System.

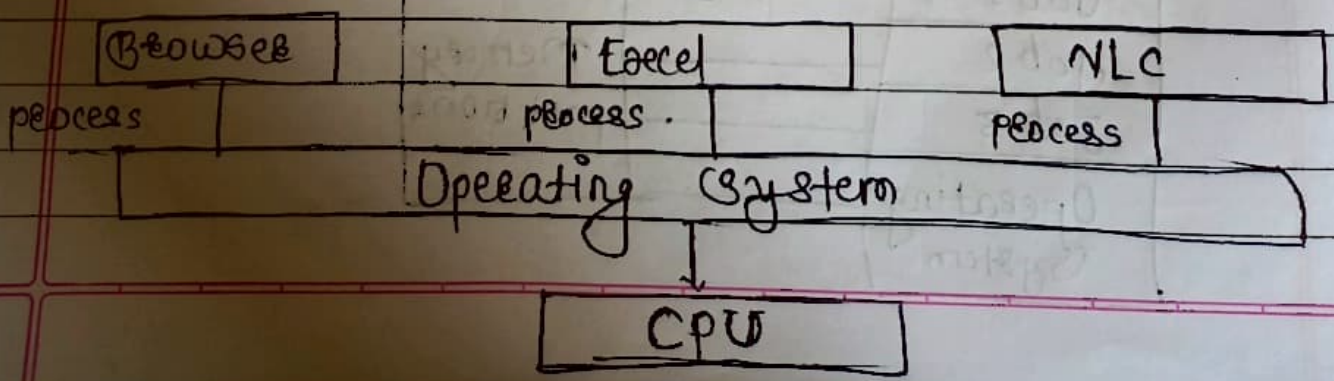


④ Multi-Tasking O.S:-

M.T.O.S is simply a multiprogramming O.S. with having facility of a Round-Robin Scheduling Algorithm. it can run multiple programs simultaneously.

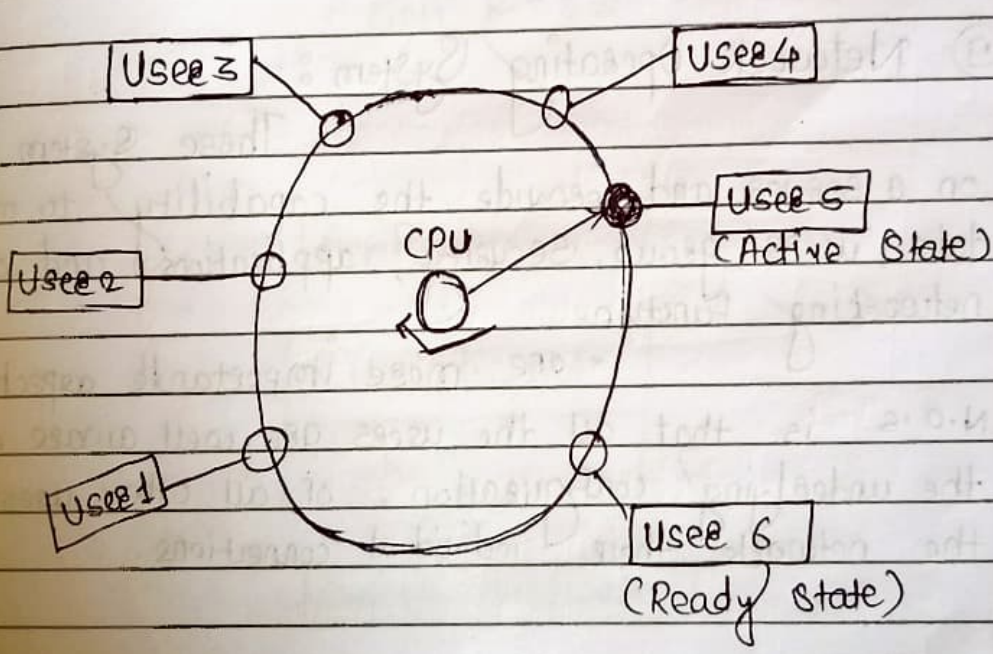
There are two Type of O.S:-

① preemptive M.T.O.S
② cooperative M.T.O.S



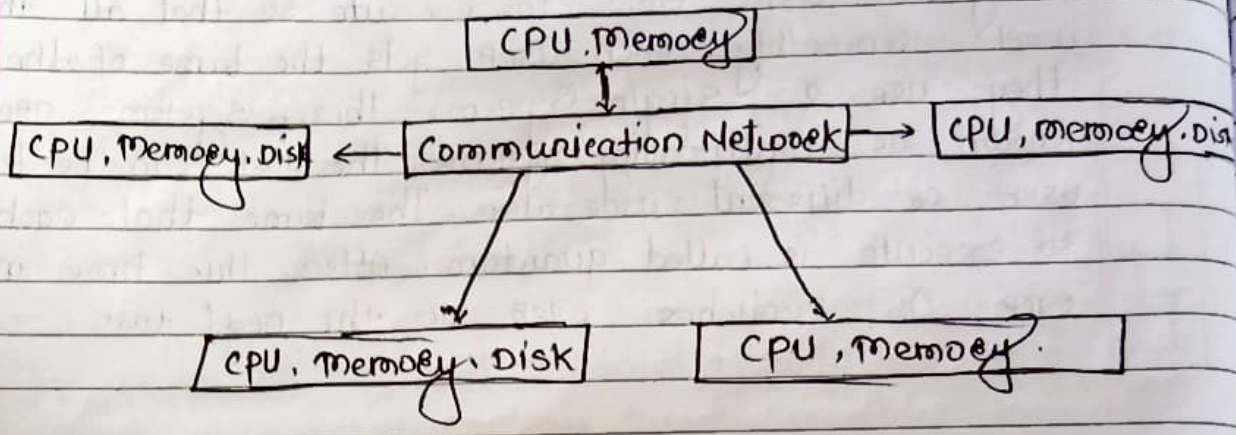
④ Time-Sharing Operating System :-

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 user 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.



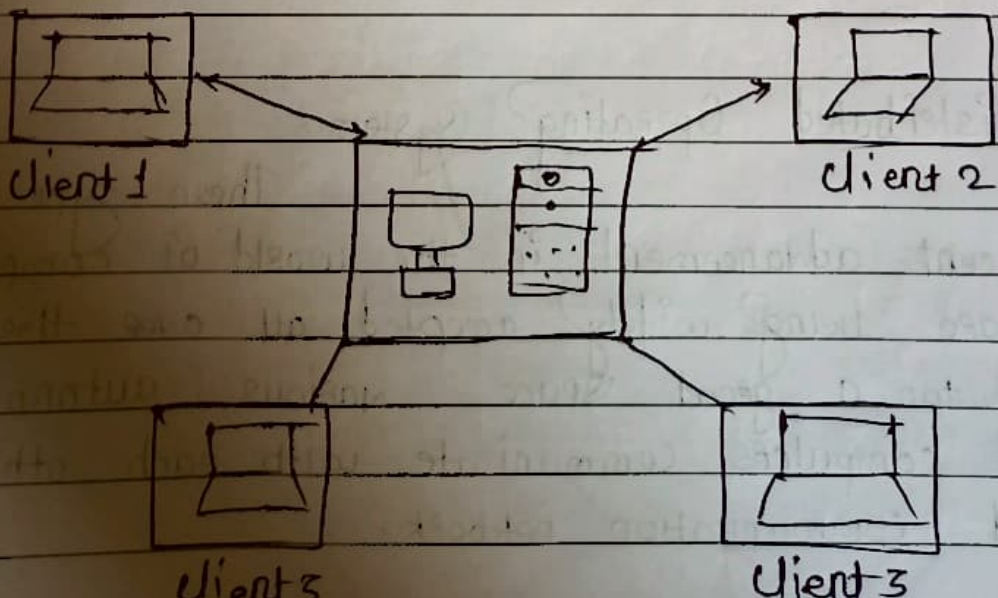
⑤ Distributed Operating System :-

These type of O.S. is a recent advancement in the world of computer technology and are being widely accepted all over the world and, that too a great space. Various autonomous interconnected computers communicate with each other using a shared communication network.



⑦ Network Operating System :-

- These System run on a server and provide the capability to manage data, users, group, security, applications and other networking functions.
- one more important aspect of N.O.S is that all the users are well aware of the underlying configuration, of all other users within the network, their individual connections.



⑧ Real-Time Operating System:

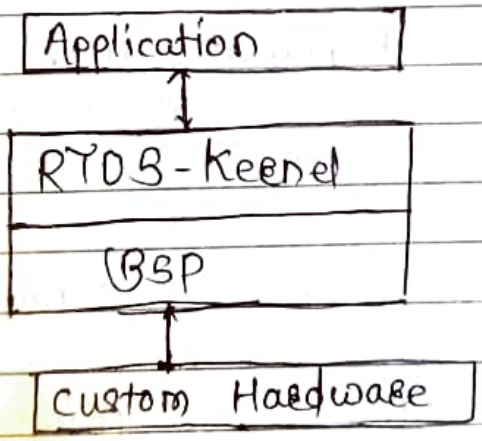
These types of OS serve real-time systems. The time interval required to process and respond to inputs is very small. This time interval is called response time.

- R.T.O.S are used when there are time requirements that are very strict like missile systems, air traffic control systems, robots, etc.

Types of R.T.O.S:

Hard R.O.S

Soft R.T.O.S.



Assignment No:- 3:-

① CPU State in O.S:-
② I/O chanels:-

1] ** ① CPU States:-

The basic unit of software that the O.S. deals with in scheduling the work done by the processor is either a process or a thread, depending on the operating system. it is processes, rather than applications, that the operating system controls and schedules for execution by the CPU.

Diagram.

- There are 3 general states of CPU:-
  ① Idle
  ② Running a user space program
  ③ Running the kernel. (mcq)
  ④ Exceptions:- what is

① Idle:-

which means it has nothing to do.

② Running a user space program:-

like a command shell, an email server, or a compiler.

③ Running the kernel:-

servicing interrupts or mangging resources.

2] *

2] Duplex channels:-

A duplex channel simply means that within each cable connection, there are two paths (lines) for the transmission of data. one path is for sending, and one is for receiving. similar to your telephone.

ⓐ Half-duplex:-

A half-duplex channel is capable of transmitting and receiving signals, but only in one direction at a time. similar to citizens' band (CB) radio transmission.

ⓑ Full-duplex:-

A full-duplex channel provides for simultaneous transmission in both directions, as in the use of the telephones.

Q:- Explain hardware concept relation to O.S:-

- O.S def.
- task
- I/O devices
- Block & character devices.

9:- Memory managment:-

② character devices :-

A character devices is one with which the driver communicates by sending and receiving single characters (bytes, octets).

For ex :-

- Serial ports, parallel ports,
- Sound cards etc.

* Memory Management :-

Q: what is m.m.

- explain continous memory allocation.
- explain fixepartion in continous m.allocation. (Diagram).

→ what is internal / external fragmentation.

Q: explain non-contiguous memory :-

Adv. disad.

Q. what is swapping.
Q. what is paging.
Q. short note Demand paging.
Q. short note · page replacement concept.

what is Frames } 1 marks.
what is pages }
internal - external fragmentation }
what is changed.

Assignment Manag.

Q: Memomey managment:

• M.m. can be define as:

collection of data in a specific format, it is used to store instructions and process data.

• The m.m modules of an O.S are concerned with the managment of primary memory.

• Primary memory is the one which the processors directly access for set of instruction & data.

• Memory is central to the operation of a modern computer system both the CPU & I/O system interact with memory.

Q: • Contiguous memory allocation:

• C.m.a is a memory managment technique in which memory is allocated to processes in contiguous blocks.

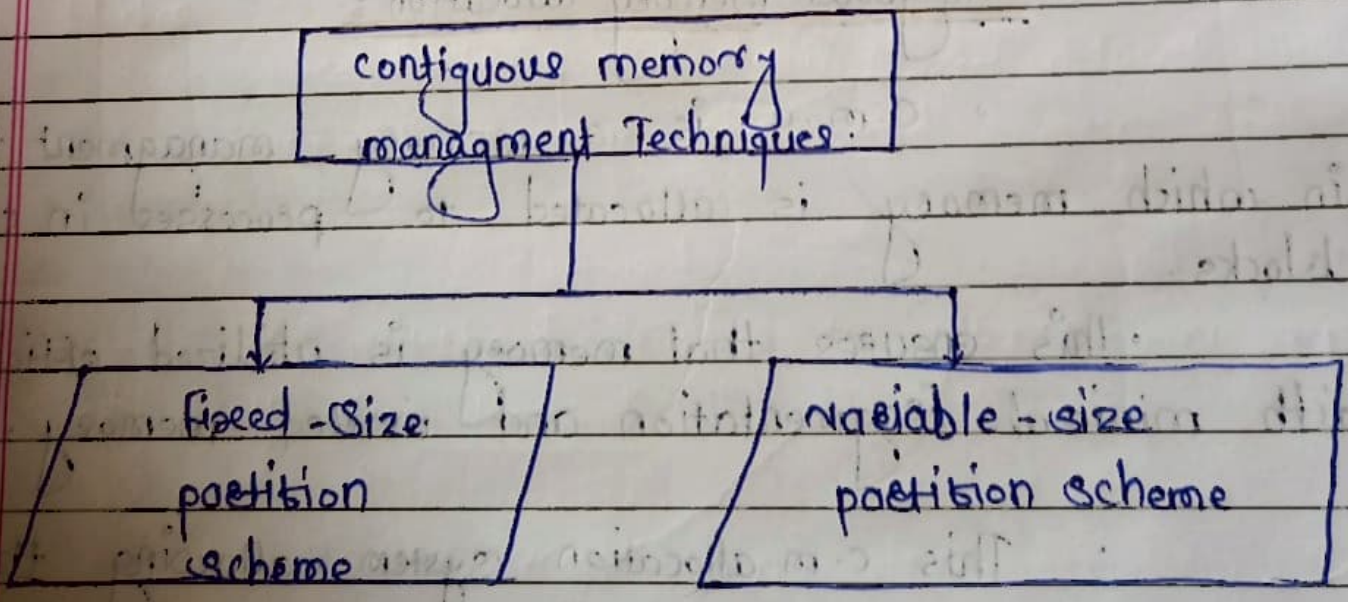
• This ensures that memory is utilized efficiently with minimal fragmentation and wasted memory.

• This c.m. allocation system allowing the manage memory in larges blocks, leading to faster access to memory and improve performance

• contiguous m. all. is an important technique used by O.S to efficiently manage memory resources and ensure memory is efficiently utilized.

Advantages:
- Efficient memory utilization. - no internal fragmentation.
- Simple and easy to manage.
- Fast access

Disadvantages:
- External fragmentation:
- Limited memory capacity.
- Difficulty in sharing memory.
- Lack of flexibility.



Q. What is Internal & External fragmentation?

* Internal fragmentation :-

its occues when memory blocks are allocated to the process more than their requested size.

↓

Due to this some unused space is left over and creating an internal fragmentation

* External fragmentation :-

We have a free memory block, but we can not assign it to a process bcz. blocks are not contiguous form.

ie we can not assign remaing free memory space to other bcz. space is not contiguous.

Q.] * Explain non-contiguous m.allocation :-

- non-c.m.allocation technique used in o.s to allocate memory to processes that do not require a contiguous block of memory.

- in this process is allocated a series of non-contiguous blocks of memory that can be located anywhere in memory.

- non-contiguous memory allocation, use pointers to link the non-contgiaous memory blocks allocated to a process. & this pointer used by o.s to keep track of the memory blocks allocated to them during the execution of process.

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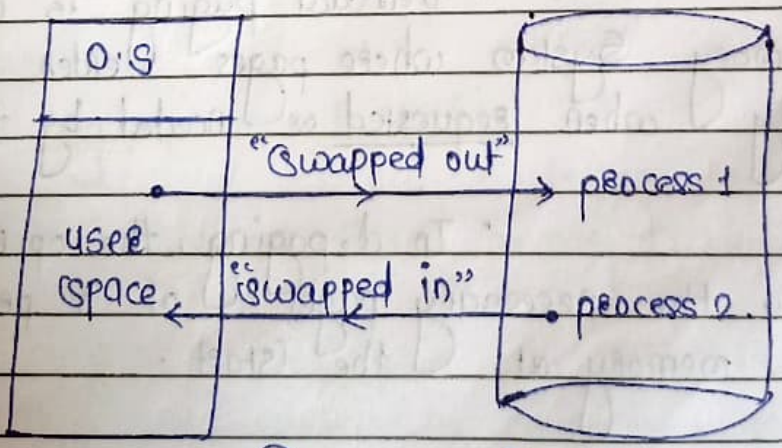
- Advantages:-
  - ① Reduces internal fragmention :- memory blockes can be allocated as needed, regardless of their physical location
  - Flexibility :- it allows processes to be allocated memory in a more flexible.

- ① Disadvantages:-
  - ① Lead External fragmentation :- it, where the available memory is broken into small, non-cont^{g} blockes.
    ie :- making it difficult to allocate large blo of memory to a process.
  - ② Overhead leading to slower memory allocati and deallocation times.
  - slower access.

Q. What is Swapping?

- Swapping is process of swap data temporarily secondary memory to main memory & main memory to secondary memory.
- it is is allows more processes to be run and can be fit into memory at one time.
- "Lifting program from the main memory to secondary memory placed it is called as "swapping out."
- "Lifting program from the secondary to main place main memory is known as "swapping in."
- This process used to improve the CPU utillization. This process / method is flexible & very imp. due to the increase number of files & dictionary entries.



Q.] What is paging?

This process of retrieving process in the form of pages from the secondary into main memory is known as paging.

- The basic purpose of paging is to separate each procedure into pages.

-:- main memory will also

- In O.S paging is a storage mechanism to retrieve processes from the secondary storage into the main memory in the form of pages.

Q.] Short note on demand paging:

- demand paging technique that is used in operating systems to improve memory usages and system performance.

- Demand paging is used in virtual memory system where pages enter main memory only when requested or needed by the CPU.

- In d. paging, the operating system loads only the necessary pages of a program into memory at the start.

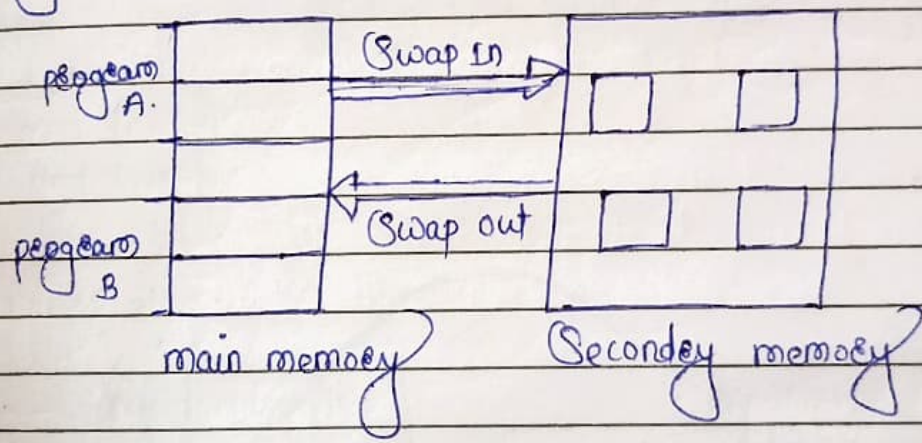
Advantages D.P:-

① Efficient use of physical memory.
② Support for larger programs.
③ Faster program start
④ Reduce memory usage.

Disadvantages:-

① page fault overload.
② Degraded performance
③ Fragmentation
④ complexity.

Diagram:-



Q. Short note page replacement concept :-

• page replacement is needed o.s that use virtual memory using Demand paging.

• p.r.c. in which a page from the main memory should be replaced by a page from Secondary memory. page replacement occures due to page faults. The replacement help the operating system to decide which page to replace.

- Some algo. for page Replacement:

  ① FIFO
  ② LRU (Least Recently used)
  ③ optimal, page Replacement.
  ④ MFU
  ⑤ LFU

IRS, IPRC model.

FCFS - algo
example.

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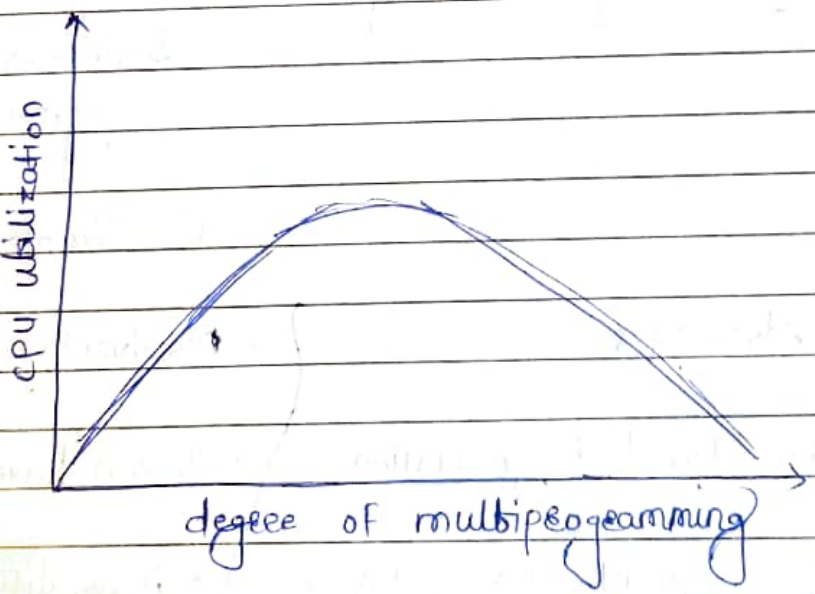
Q What is thrashing :-

- Thrashing is when the page fault and swapping happens very frequently at a higher rate, and then the operating system has to spend more time swapping these pages. This state in the operating system is know as thrashing.

- Because of thrashing, the "cpu" utilization is going to be reduced or negligible.

- The operating system monitors CPU utilization. If the cpu utilization is too low then we increase the degree of multiprogramming by introducing new process to the system. For this,



8) Short note on Segmentation:

In operating System, Segmentation is a memory managment technique in which is memory is divided into the variable size parts.

Each parts known as a Segments which can be allocated to a process.

- The details about each segment are stored in a table called a segment table.
- Segments table is stored in one or more of the segments.

* Types of Segmentation :-

① Virtual memory segmentation

② Simple Segmentation

* Advantages :-

- No internal fragmentation
- Avrg. segment size is larger than the actual page size
- less overhead.

* Disadvantages.

- It can have external frag.
- it is difficult to allocate contiguous memory to variable sized partition.
- costly memory mang. algorithms.