Main Memory = RAM.

Q- Memory partioning

→

Memory partioning is a concept of memory management technique divides the memory into several small parts called as partition

The diffrent Partitions may contain same or diffrent processes.

In multiprogramming enviroments the memory is divided into various partitions and then diffrent parts of program are stored in the memory.

OS arranges arranges the diffrent processes in memory partition. It keeps track occupied ~~process~~ partition as well as free Partitions.

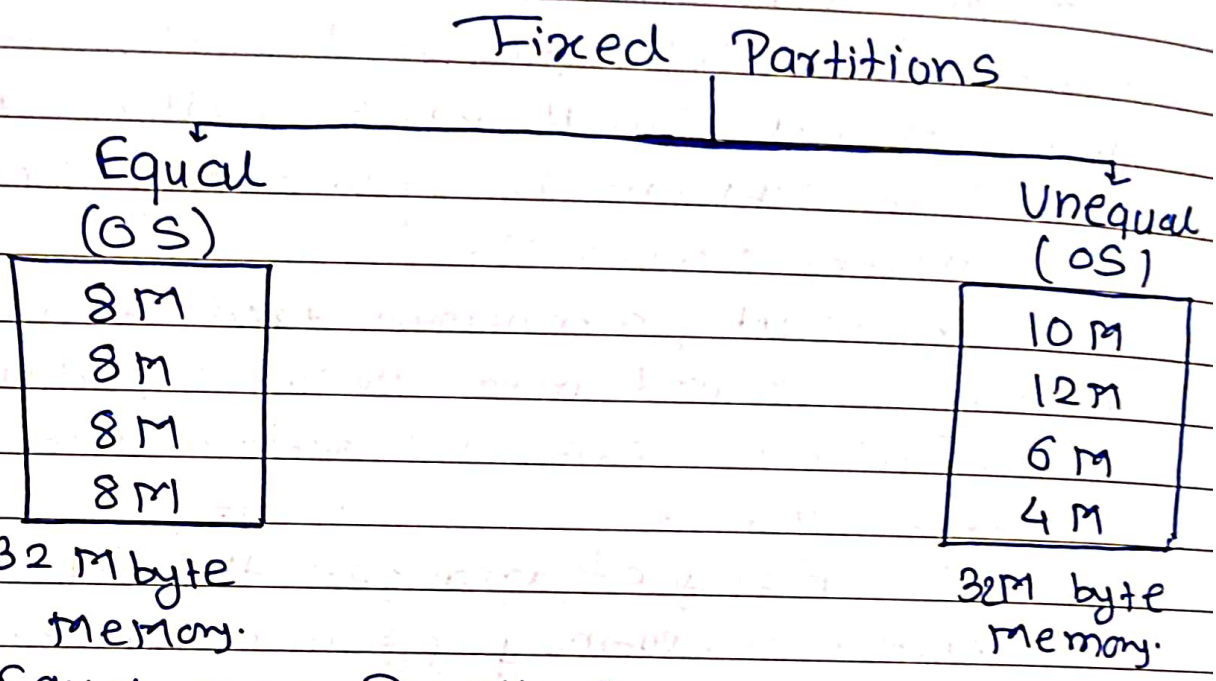
Diffrent Scheduling algorithm are used for input queue for deciding priority of the processess. Which are in queue.

- Diffrent technique used for memory partition.
  1. Fixed / Stadic memory partitioning
  2. Variable / Dynamic memory partitioning.

1. Fixed Memory Partioning:

Partitioning of main memory of into set of Non-overlapping memory regions called as Fixed partioning.

- Partitions are of Fixed Size.
- If the Process is assign to memo which is less than size then rem space can't be used.



① Equal size Partition:

- Here memory is divided into equal size partition. Any process whoese size is less than or equal Partition size can be load into avilable option
- If all Partition are in Full and No proc is in the ready state, the opearating syst can swap a process out of any of the partitions and load in another process, So that there is some work for the processor.

Problems:

① For a Program of too big size
② For a Module Needed is Not present.

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2. Unequal Size Partition:

Both Problem faced by equal size can be fixed by this approch.

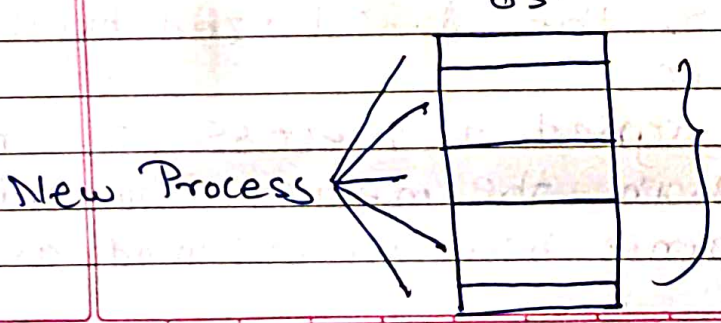
- Placement Algorithm for Memory management

(1) For Equal

- With equal size partition, the placem nt of Processes in Memory is trival. As long as there is No any avilable partitio
- Beacause all partition are of equa size it does not matter which partition is used. • If all partition are occupied with Processes that are not ready to run then one of these processes must be swapped out to make room for a new processes.

(2) For Unequal

- Here each Process is assign to th Smallest Partition within which it will fit. In this case a scheduling queue is needed for each Partition. to hold Swapped out Partition.



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- Advantages & Disadvantages of Fixed Par

ADV ① Easy to implement
② Less Computational Power

DISADV ① Internal Fragmentation
② External Fragmentation
③ Limit Process Size
④ Limitation of Degree of multiprogra

- Fragmentation

It is a unwanted problem where memory blocks cannot be allocated to the processes due to their small size & the block remain unused.

It can also be understood as when the Processes are loaded or removed from memory

A] Internal Fragmentation.
B] External Fragmentation.

① Internal Fragmentation.

: It occurs when memory is divided into fixed sized block

Whenever process is request for the memory appers, the fixed sized block is allocated Process.

"Memory assigned to process is somewhat larger than the memory requested then the diffrence between assigned and

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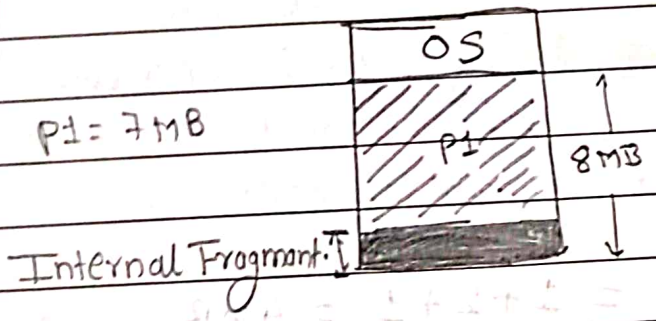
- Left unused space is known as Internal Fragmentation.
  - This leftover space inside the fixed sized blocked cannot be allocated to any process as it would be not be sufficient to satify the request of memory by the process.



(Explain with Example).

② External Fragmentation

- External Fragmentation occurs when there is sufficient amount of space in the memory to satisfy the memory request but process's memory cannot be satisfied as the avilable memory is in non-contegious manner.
- When process is created/loaded or removed from main memory the free space creates hole in the memory there are many holes in memory these holes are known as External Fragmentation

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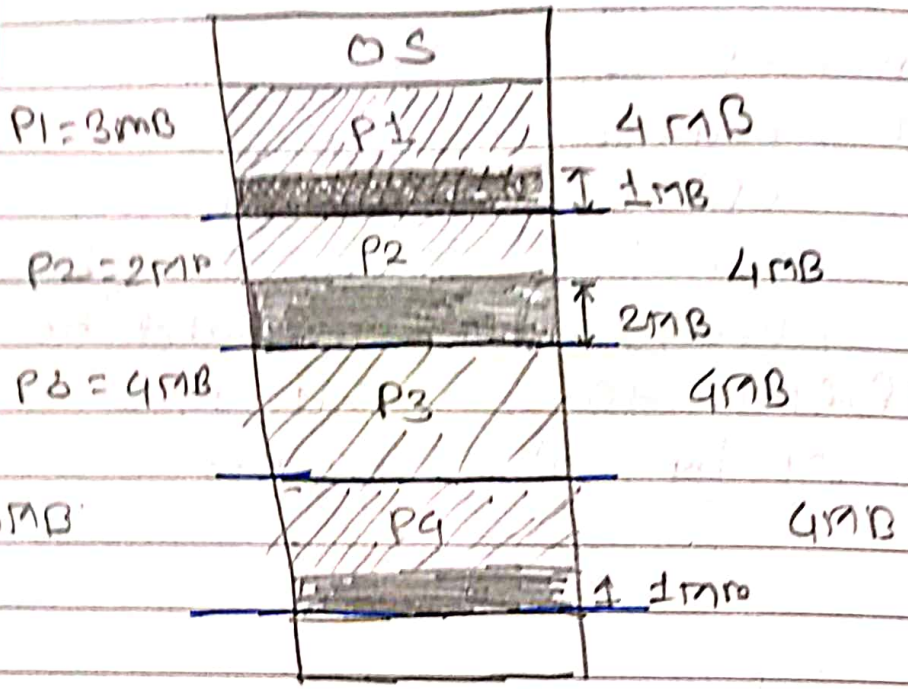

Total remaing Space = 1 + 2 + 1 = 4MB

P5 = 3MB → This can't fit as th
Memory is not contegous
This is known as External Fra

Parameter	Internal	External
Defn	Process is allocated to memory block of size greater due to which some space remains empty known as IF	Where we have so empty space left but we can't allo Process coz mem is contigous
occurance	when space is allocated some spare leftover	as space is used th release so can't use it
Soln	use dynamic allocation	use Defragmentation
where it exist	In paging internal fragmetation.	In segmentation External frgmer

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Write short Note on: Compaction

Use for: overcome External Fragmantation

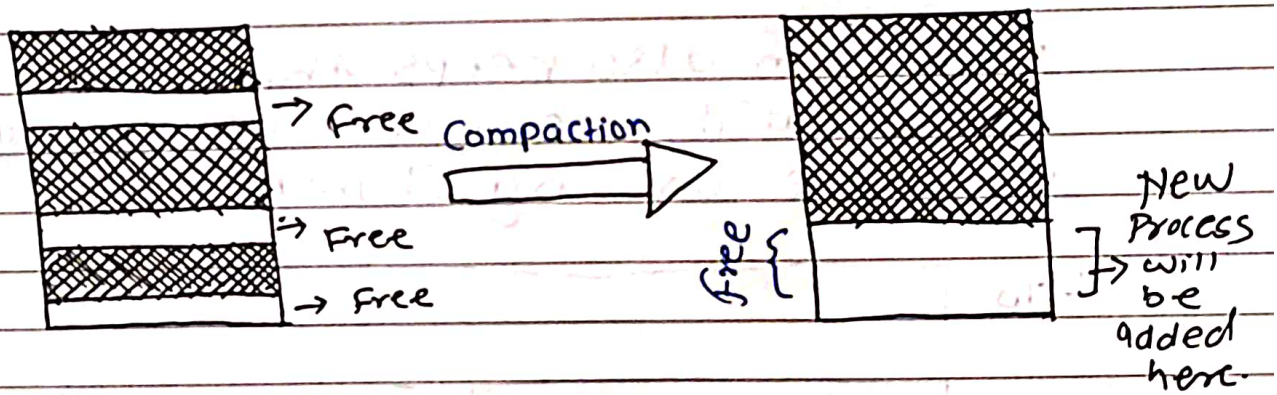
Defn:

The Process of Putting the used partitions at one end and creating one big free area at other end for the new process.

Goal: shuffle memory such that all free memory comes togather in one large block

Use: Help for solving Fragmantatin prb.

Diagram



Problems with this:

1. only possible when Program supports Dynamic Reallocation
2. Time consuming
3. Expensive
4. Less effective Solution...

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- **Buddy System:**

Static Partition Scheme suffers from the limitations of having the Fixed OP active Processess and the usage of space may also not be optimal

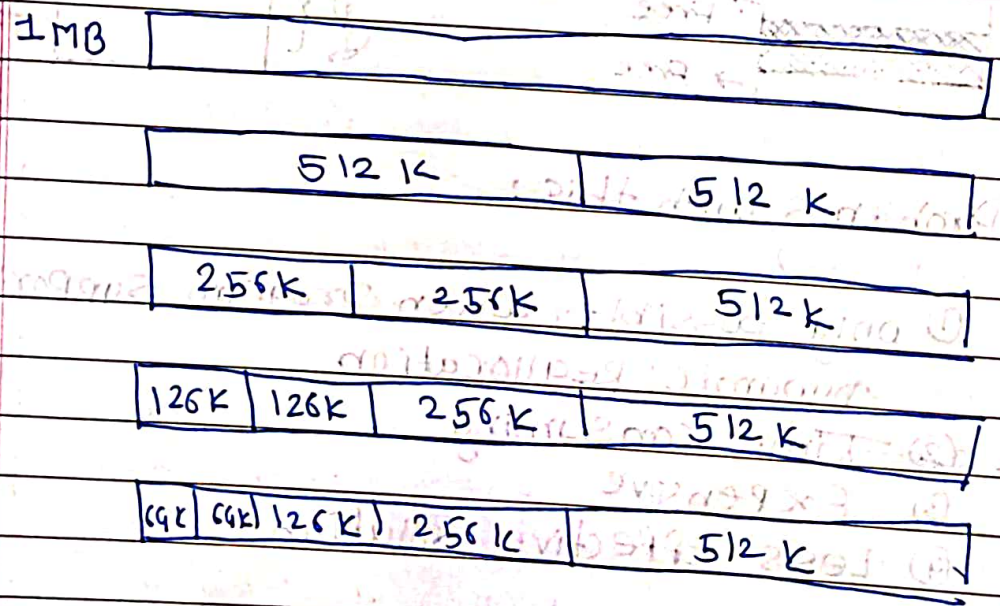
Works on "Power of 2" Algorithm

If: $2^{U-1} < S <= 2^U$: Allocate the whole block

Else:

Divide the block & Cheack everytime

∴ System also keeps the record of the unallocated block and can merge this to make one big Chunck.



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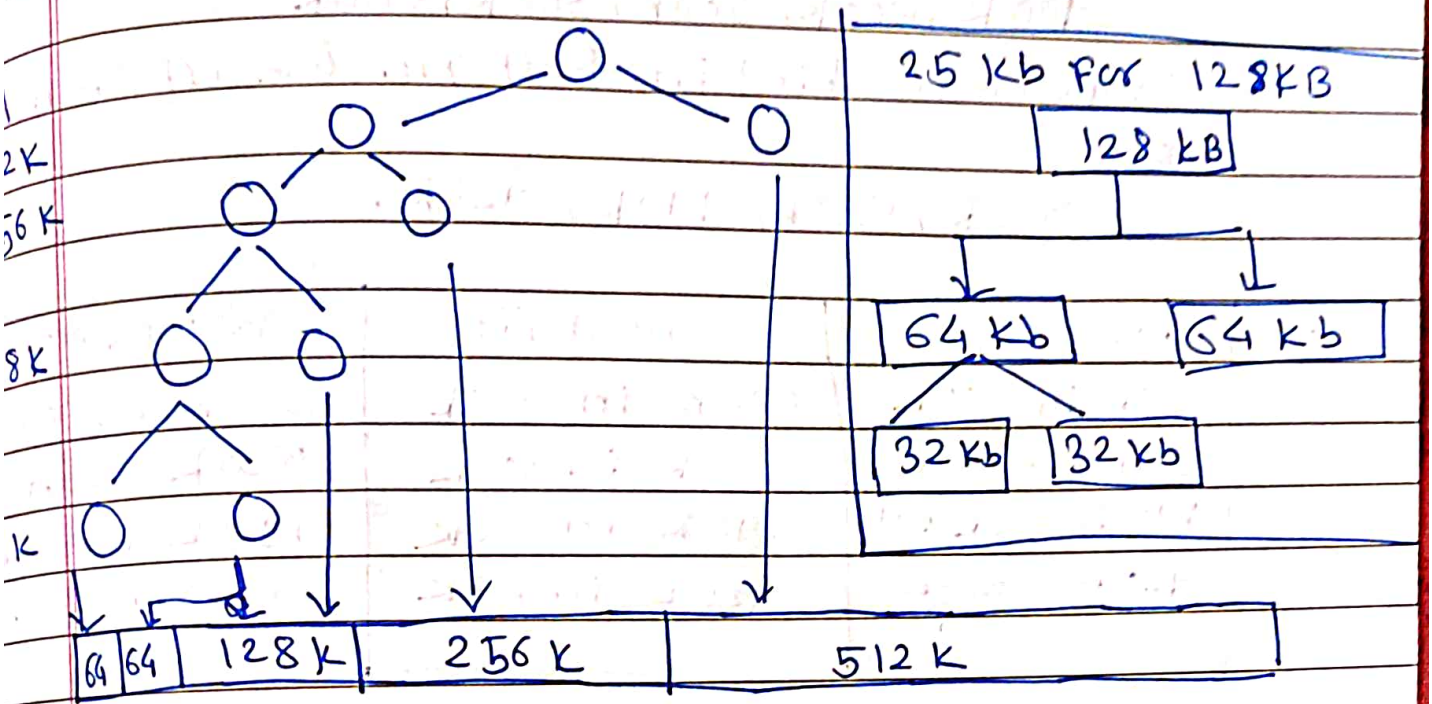
- Binary Tree Representation



ADV	DISADV
① Easy to implement	① Allocation Unit 2
② Allocate block of correct size	② Integral Fragm.
③ easy to merge holes	
④ Allocation Mem. Fast	

Memory Allocation Strategies.

→ Coz memory compaction is time consuming the os desigener decied a different technique for How to assign to memory.

Process.

- First Fit : Choose first avilable block
- Best Fit : Size closest to block
- Next Fit: Next location from best fit
- Wrost Fit: It allocates the largest Hole.

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Q- Given memory Partition Size
100K, 500K, 200K, 300K, 600K
Implement First Fit, Best Fit, & Wrost Fit Algo. for.
300K, 530K, 190K, 425K.

→

First Fit	Best Fit	Wrost Fit.
300K in 500K	300K in 300K	300K in 600K
530K in 600K	630K in 600K	530K wait
190 in 500K (2nd)	190K in 200K	190K in 500K
425K in ~~600K~~ wait	425K in 500K	425K wait