Branch : CSE & IT   Batch : English

Operating Systems
Memory Management   DPP 04

[MSQ]

1. Problem of external fragmentation can be resolved by _____.
   - (a) Compaction
   - (b) Overlay
   - (c) Paging
   - (d) Non-contiguous allocation

[NAT]

2. Consider a memory system having six partitions 400 K, 200 K, 300 K, 250 K, 100 K and 500 K. There are four process of size 289 K, 458 K, 200 K, 300 K. What is the total size of unallocated partitions using best fit allocation policy (in K)?

[MCQ]

3. Compaction is possible with_____ address binding.
   - (a) Static address binding
   - (b) Dynamic address binding
   - (c) Load time address binding
   - (d) Compile time address binding

[MCQ]

4. Given five memory partitions of 200 K, 600 K, 300 K, 400 K, 700 K, (in order), how would the first-fit, best-fit and worst-fit algorithms place process of 312 K, 517 K, 212 K, and 526 K, (in order)? Which algorithm makes the most efficient use of memory?
   **Note:** Space left after filling a partition is not used by any process.
   - (a) First fit
   - (b) Best fit
   - (c) Worst fit
   - (d) All perform almost same.

[NAT]

5. Consider a memory system with five partitions: 200 K, 250 K, 500 K, 600 K and 300 K (in order). There are some process request of size 200 K, 350 K, 30 K, 25 K, 100 K (in order). How much memory space will remain unused because of internal fragmentation if first-fit allocation policy is used?

[MCQ]

6. Consider the following graphical representation of program here horizontally connected blocks are independent modules and blocks connected vertically are dependent modules.
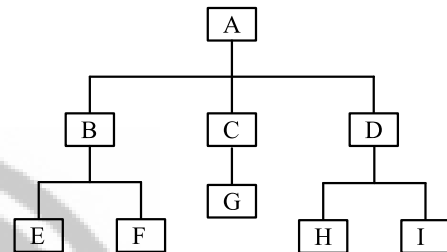
Memory requirement of each block is as follows:

A : 10KB   E: 5KB
B : 5KB   F: 10KB
C : 3KB   G: 3KB
D: 2KB   H: 4KB
                  I : 6KB

Which of the following memory space is sufficient enough to execute the given program using overlays?
   - (a) 48 KB
   - (b) 25KB
   - (c) 50KB
   - (d) 24KB

[MCQ]

7. A computer has 1000K of main memory. The jobs arrive and finish the following sequence.
   Job1 needs 100 K arrives
   Job2 needs 250 K arrives
   Job3 needs 400 K arrives
   Job1 finishes
   Job4 needs 40 K arrives
   Job5 needs 250 K arrives
   Job6 needs 60 K arrives
   Which of the following allocation policy perform efficiently?
   - (a) First fit
   - (b) Next fit
   - (c) Both will perform same
   - (d) None of these

Answer Key

1. (a, c, d)
2. (350K)
3. (b)
4. (b)
5. (1145K)
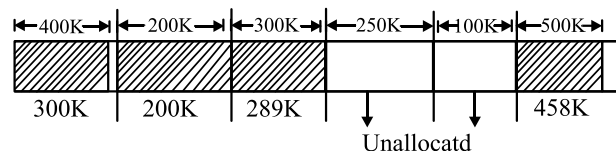6. (c)
7. (a)

Hints & Solutions

1. (a, c, d)

Compaction and non-contiguous allocation of memory are two solution for external fragmentation. Compaction is merging of non-contiguous free holes, by relocating all process to one end.

Paging is non-contiguous allocation technique used to solve problem of external fragmentation.

2. (350 K)

Using Best fit allocation policy.

So, 250 + 100 = 350K.

3. (b)

Compaction is possible with only Dynamic/run time address binding.

4. (b)

Using first fit:

312K is placed in 600K partition.

517K is placed in 700K partition.

212K is placed in 300K partition.

526K must wait.

Using Best fit:

312K is placed in 400K partition.

517K is placed in 600K partition.

212K is placed in 300K partition.

526K is placed in 700K partition.

Using Worst fit:

312K is placed in 700K partition.

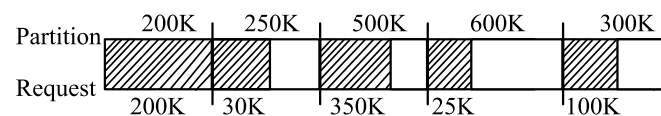517K is placed in 600K partition.

212K is placed in 400K partition.

526K must wait.

Therefore, best fit makes efficient use of memory option 'b' is correct.

5. (1145 K)

Using first fit:

Total internal fragmentation = [(200 – 200) + (250 – 30) + (500 – 350) + (600 –25) + (300 – 100)]

= [0 + 220 + 150 + 575 + 200]

= 1145

6. (c)

Total space required: 10 + 5 + 3 + 2 + 5 + 10 + 3 + 4 + 6

= 48 KB

Path I $\Rightarrow$ A $\rightarrow$ B $\rightarrow$ E $\Rightarrow$ 20 KB

Path II $\Rightarrow$ A $\rightarrow$ B $\rightarrow$ F $\Rightarrow$ 25 KB

Path III $\Rightarrow$ A $\rightarrow$ C $\rightarrow$ G $\Rightarrow$ 16 KB

Path IV $\Rightarrow$ A $\rightarrow$ D $\rightarrow$ H $\Rightarrow$ 16 KB

Path V $\Rightarrow$ A $\rightarrow$ D $\rightarrow$ I $\Rightarrow$ 18 KB

So, 25 KB will be sufficient enough to execute this program.

7. (a)
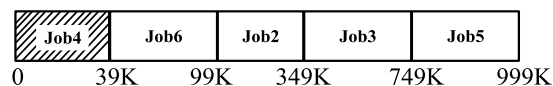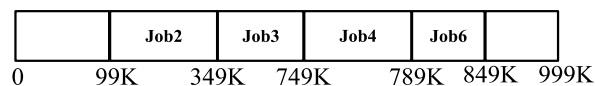
Sequence: Job1, Job2, Job3

Job 1 finishes

First fit:

Next fit:

Job 5 will wait.