Branch : CSE & IT Batch : Hinglish

WEEKLY TEST – 05

Subject : Operating System

Topic : Memory Management

Maximum Marks 20

Q.1 to 6 Carry ONE Mark Each

[NAT]

1. Consider a memory address with 38 bits and each word is of 32 bits. The capacity of memory in terms of words is_____GW.

[MCQ]

2. Which of the following is not a address binding technique?

(a) Compile time address binding.

(b) Static time address binding.

(c) Dynamic time address binding.

(d) None of these

[MCQ]

3. Consider a system with 512 GW memory and each word is of 64 bits. The length of the address in terms of bits is_____bits.

[MCQ]

4. Consider the following statements:

S_1: Program to be loaded in main memory before run time is called static loading.

S_2: Program modules are loaded during run time on demand is called dynamic loading.

Which of the following is correct?

(a) S_1 only

(b) S_2 only

(c) Both S_1 and S_2

(d) Neither S_1 nor S_2

[MCQ]

5. Where does the swap space reside?

(a) RAM (b) Disk

(c) ROM (d) None of these

[MCQ]

6. Which of the following is an advantage of dynamic linking?

(a) It reduces execution time overhead.

(b) Faster execution.

(c) The segment that are not used in RAM no need to link them.

(d) None of these.

Q.7 to 13 Carry TWO Mark Each

[MSQ]

7. Which of the following is/are Incorrect?

(a) Static linking is performed before runtime.

(b) Dynamic linking is performed during compile time.

(c) Dynamic linking suffers from space inefficiency problem.

(d) In static linking there is no installer error.

[NAT]

8. The capacity of a memory is defined by the number of words multiplied by the numbers of bits/word. For memory of 4K × 16 if P are separate address lines and Q are separate data lines. Then the value of P * Q is ____.

[NAT]

9. On a system with 2^{37} bytes of memory and fixed partitions with a partition size of 2^{26} bytes, what is the minimum number of bytes needed in an entry in the process table to record the partition to which a process has been allocated?

[NAT]

10. Consider a system having memory of size 2^{48} bytes uses fixed partitioning. It is divided into fixed size 2^{29} bytes. The OS maintains a process table with one entry per process. Each entry has two fields. First is a pointer pointing to partition in which the process is loaded and second field is process ID. The size of process ID is 4 bytes, then calculate the size of pointer to the nearest byte._____.

[MCQ]

11. Which of the following bit does not belong to page number?

(a) Time of loading (b) Frame number

(c) Protection bit (d) None of these

[MSQ]

12. Which of the following is/are solution of external fragmentation?

(a) Compaction

(b) Non-contiguous memory allocation

(c) Fixed size partition

(d) None

[MCQ]

13. Consider a memory system having 6 partitions of sizes 200 KB; 400 KB; 600 KB; 500 KB; 300 KB; 250 KB

There are 4 processes of size: 357 KB; 210 KB; 468 KB; 49 KB using best fit allocation policy, what partitions are not allocated/remains unallocated?

(a) 300 KB and 600 KB

(b) 400 KB and 600 KB

(c) 500 KB and 600 KB

(d) None of these

Answer Key

1. **(256)**
2. **(d)**
3. **(45)**
4. **(c)**
5. **(b)**
6. **(c)**
7. **(b, c)**
8. **(192)**
9. **(2)**
10. **(3)**
11. **(d)**
12. **(a, b)**
13. **(a)**

Hints and Solutions

1. (256)

Number of address bits = 38

Number of words = 2^{38}

= 256 GW

So, capacity of memory is 256 GW.

2. (d)

There are only three binding times

- Compile time
- Load time
- Runtime

3. (45)

Capacity of memory = 512 GW

= $2^9 * 2^{30}$ words

= $2^9 * 2^{30} * 64$ bits

= 2^{9+30+6} bits

= 2^{45} bits

Length of the address = $\log_2 2^{45}$

= 45 bits

Hence, (45) is correct.

4. (c)

Both the statements are correct.

S_1: Program to be loaded in main memory before run time is called static loading.

S_2: Program modules are loaded during run time on demand is called dynamic loading.

5. (b)

Swapping is carried out from memory to disk.

6. (c)

The segments that are not used in a run need not be linked into the process address space.

7. (b, c)

- Static linking is performed before runtime i.e during compile time or load time.
- Dynamic linking is performed during runtime.
- Static linking may lead to space inefficiency because some modules that are not needed during runtime. We are linking them.
- Static linking just copy and run. No installer requires. So, No installer error.

8. (192)

Word size = 16 bit

Total words = 4K

= 2^{12}

So, 12 address lines needed

P = 12

Data base size in same as word length which is 16

Q = 16

P * Q = 12 * 16

= 192

Hence, (192) is correct.

9. (2)

Number of partitions = $\frac{2^{37}}{2^{26}}$

= 2^{11}

Therefore, to address each partition we need 11 bits means 2 bytes.

Hence, (2) is correct.

10. (3)

Ptr	PID

Number of partitions = $\frac{2^{48}}{2^{29}}$

$= 2^{19}$

Size of pointer = 19 bits

≅ 3 bytes (size can never be less than 19 bits)

11. (d)

Frame	V/I	TOL	TOR	P_r	COR
↓	↓	↓	↓	↓	↓
Frame number	Valid Invalid bit	Time of loading	Time of reference	Protection	Count of reference

Hence, option (d) is correct.

12. (a, b)

Solutions of external fragmentation are-

(i) Completion

(ii) Non-contiguous memory allocation

13. (a)

200 KB	→ 49 KB
400 KB	→ 357 KB
600 KB	
500 KB	→ 468 KB
300 KB	
250 KB	→ 210 KB

So, 600 KB and 300 KB remains unallocated.