

**DB-103**

December -2017

B.C.A., Sem.-III

**CC-204 : Fundamentals of Operating Systems**

Time : 3 Hours]

[Max. Marks : 70

1. (A) Answer any **three** :

6

- (1) Differentiate between the roles of an OS as a file manager and a process manager.
- (2) Differentiate between preemptive and non-preemptive scheduling policies. Give examples of each.
- (3) Explain the concept of Aging. Why is it required ?
- (4) What is the difference between time sharing and real time systems ?
- (5) What are Semaphores ? State the operations that can be performed on a semaphore.

(B) Answer the following :

8

- (1) Explain how Test and Set Lock Mechanism can be used to achieve synchronization. What are its drawbacks ?
- (2) What are process states and transitions ? Explain the following transitions :
  - (i) READY → RUNNING → READY
  - (ii) RUNNING → WAIT → READY

**OR**

- (1) Explain turnaround time, CPU cycle time (Burst time) and waiting time. Also state the relationship between them using an example.
- (2) Given the following information :

Process	CPU Cycle (Burst Time)	Arrival Time
P1	14	0
P2	7	1
P3	9	3
P4	2	5

Draw the time line and calculate the average turnaround time and average waiting time using :

- (i) First Come First Serve (FCFS)
- (ii) Shortest Remaining Time (SRT)

2. (A) Answer the following :

6

- (1) Consider that the disk where tracks are numbered from 0 to 49. It takes 1 ms to travel from one track to another. Assume that currently the read/write head is positioned at track 12.

Given the following track requests :

7, 45, 28, 39, 18, 25, 2

Calculate average seek time (average number of tracks travelled) using FCFS and SSTF.

- (2) Explain the difference between Deadlock and starvation.

**OR**

- (1) Explain the concept of double buffering. What is its advantage ?
- (2) What are directed graphs ? Using an example show why and where they are used.

(B) Answer the following :

8

- (1) What are virtual devices ? Explain how the concept of spooling makes a printer work as a virtual device.
- (2) What do you understand by Safe and Unsafe states ? Give example to explain your answer.

**OR**

- (1) Differentiate between data striping and disk mirroring along with their advantages and disadvantages.
- (2) Giving an example explain the situation of a deadlock. Explain how mutual exclusion and resource holding conditions give rise to deadlocks.

3. (A) Answer any **three** of the following :

6

- (1) What is internal fragmentation ? Explain how does it occur.
- (2) What is the significance of relocation register in memory management ?
- (3) What is thrashing and what is its cause ? How can thrashing be reduced ?
- (4) What is the significance of a modified bit and a referenced bit in demand paging system ?
- (5) Explain the concept of "Locality of Reference".

(B) Answer any **two** of the following :

8

- (1) Explain dynamic partition scheme of memory management. What is its drawback ?
- (2) Explain how single user contiguous is different from fixed partition scheme.
- (3) What is demand paging ? Explain how demand paging justifies the existence of virtual memory.
- (4) Explain the concept of segmented memory allocation.

4. (A) Describe the following terms :

6

- (1) Differentiate between fixed length and variable length records.
- (2) What do you understand by social engineering ?

**OR**

- (1) Differentiate between default passwords and backdoor passwords.
- (2) Explain the concept of indexed storage allocation.

(B) Answer the following :

8

- (1) Explain and differentiate contiguous and non-contiguous storage allocation of files.
- (2) What is data compression ? Explain three different methods of data compression.

**OR**

- (1) What is the requirement of an access control list ? How is it different from a capability list ?
- (2) Differentiate between embedded & interactive command with which user communicates with file manager. Give examples of each.

5. Fill in the blanks :

14

- (1) The job is in a \_\_\_\_\_ state when it enters the system.
- (2) The number of jobs getting executed in a given amount of time is called the \_\_\_\_\_.

- (3) \_\_\_\_\_ is performed by the operating system to reclaim the fragmented sections of the memory space.
- (4) The process of transfer of pages between the main memory and secondary memory is called \_\_\_\_\_.
- (5) The part of the operating system which handles the page fault is called \_\_\_\_\_.
- (6) The \_\_\_\_\_ table shows whether a page frame is busy or free.
- (7) All pages are of the same size whereas \_\_\_\_\_ are of different sizes.
- (8) The time required by the OS to switch from one job to another is called \_\_\_\_\_ time.
- (9) The full form of RAID is \_\_\_\_\_.
- (10) A \_\_\_\_\_ is an inactive unit whereas a \_\_\_\_\_ is an active unit of work.
- (11) If a page is of size 4K then the size of the page frame will be \_\_\_\_\_.
- (12) \_\_\_\_\_ Jobs have small I/O cycles and long CPU cycles.
- (13) Deadlock involves several \_\_\_\_\_ and \_\_\_\_\_.
- (14) \_\_\_\_\_ is the condition of deadlock when a resource can be accessed by only one process.