Seat No. : _____

NI-103

December-2015

BCA, Sem-III

CC-204 : Fundamentals of Operating System

Time : 3 Hours] **[Max. Marks : 70**

1. (A) Answer the following : **6**

(1) What is an Operating System ? Differentiate between the roles of an OS as a Processor Manager and a Process Manager.

(2) Differentiate between preemptive and non-preemptive scheduling policies. Give examples of each.

OR

(1) Differentiate between a Job and a Process and also explain the role of a job scheduler and process scheduler.

(2) Differentiate between CPU bound jobs and I/O bound jobs.

(B) Answer the following : **8**

(1) What is a critical region ? How can the test and set lock mechanism be used to achieve mutual exclusion in a critical region ?

(2) What are process states ? What is the difference between the transitions :

(i) RUNNING $\rightarrow$ READY

(ii) RUNNING $\rightarrow$ WAIT

(iii) WAITING $\rightarrow$ READY

OR

(1) Using an example define and differentiate between turnaround time and CPU cycle time (Burst time).

(2) Given the following information :

Process	CPU Cycle (Burst Time)	Arrival Time
P1	13	0
P2	9	1
P3	4	3
P4	2	5

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

(i) FCFS

(ii) Round Robin (Time Quantum = 5 msec)

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 :

8, 42, 23, 37, 18, 29, 3

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

(2) What is starvation ? How can it be overcome ?

OR

(1) Explain the concept of double buffering. What is its advantage ?

(2) What are directed graphs ? Using an example show how they are useful.

(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) Explain how the technique of 'locking in databases' deals with deadlocks and also state what is the race condition.

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 the following : **6**

(1) Differentiate between a Page, Page Frame, Page Fault and Segment.

(2) What is the significance of modified and referenced bit in a page map table ?

OR

(1) What is external fragmentation ? How does it occur ?

(2) Why and when is page replacement policy required ? Give examples of such policies.

(B) Answer the following : **8**

(1) How does demand paging justify the existence of virtual memory ?

(2) What do you understand by paged memory allocation method ?

OR

(1) Explain how single user contiguous is different from fixed partition scheme.

(2) Explain the concept of relocatable dynamic partition scheme.

4. (A) Describe the following terms : **6**

(1) What are variable length records ? Explain its advantages and disadvantages.

(2) What is Trash collection ?

(3) What do you understand by Active and Passive Wire Tapping ?

OR

(1) What are fixed length records ? Explain its advantages and disadvantages.

(2) What is a logic bomb ?

(3) What do you understand by Social engineering ?

(B) Answer the following : **8**

(1) Explain non-contiguous storage allocation of files with its disadvantages and advantages.

(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) A waiting process is _____ when it continuously checking for the CPU to be available.

(3) The number of jobs getting executed in a given amount of time is called the _____.

(4) _____ is the condition for deadlock when a resource once allocated cannot be taken away from a process in between.

(5) A system is in a _____ when the allocation of resources to processes does not lead to deadlocks.

(6) _____ is performed by the Operating System to reclaim the fragmented sections of the memory space.

(7) The process of transfer of pages between the main memory and secondary memory is called _____.

(8) The part of the Operating System which handles the page fault is called _____.

(9) Excessive swapping of pages between the main memory and the secondary memory is called _____.

(10) The _____ table shows whether a page frame is busy of free.

(11) All pages are of the same size whereas _____ are of different sizes.

(12) The time required by the OS to switch from one job to another is called _____ time.

(13) A _____ provides security to a single file.

(14) The _____ part of an Operating System is responsible to create, delete and modify files.

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