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CSE202 Enrol. No. .....

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END SEMESTER EXAMINATION : APRIL – MAY, 2018

QPERATING SYSTEM

Time : 3 Hrs. *Maximum Marks : 70*

Note: ***Attempt questions from all sections as directed. Use of Simple Calculator is allowed.***

SECTION – A (30 Marks)

Attempt any **five** *questions out of* **six.**
Each question carries **06** *marks.*

1. List out the main purposes of the operating system along with the four steps that are highly needed to run a program on a completely dedicated machine.

2. Under what circumstances would a user be better off using a time sharing system, rather than a PC or single user workstation?

P.T.O.

3. Consider the following snapshot of a system :

Processes	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's Algorithm :

(a) What is content of matrix need?

(b) Is the system in a safe state?

(c) If a request from process PI arrives for (0, 4, 2, 0), can the request be granted immediately?

4. Under what circumstances do page fault occurs? Describe the actions taken by the operating system when a page fault occurs.

5. Illustrate various kinds of performance overhead associated with servicing an interrupt in the system?

6. Could you simulate a multilevel directory structure with a single-level directory structure in which arbitrarily long names can be used? If your answer is yes, explain how you can do so, and contrast this scheme with the multilevel directory scheme. If your answer is no, explain what prevents your simulation's success. How would your answer change if file names were limited to seven characters?

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three.**
Each question carries **10** *marks.*

7. (a) Consider a system that supports the strategies of contiguous, linked and indeed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file? (5)

(b) Consider a logical address space of 64 pages of 1,024 words each, mapped onto a physical memory of 32 frames.

(i) How many bits are there in the logical address?

(ii) How many bits are there in the physical address? (5)

P.T.O.

8. (a) The problem of speed mismatch between the CPU and I/O devices seems to be a big threat to the system overall performance. So, to avoid this mismatch problem, what mechanisms can be opted so that system performance can be enhanced? (5)

(b) Consider the following page reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page faults would occur for the following replacement algorithms assuming two, three, or four frames?

Remember that all frames are initially empty, so your first unique pages will all cost one fault each.

- LRU replacement
- FIFO replacement
- Optimal replacement (5)

9. Explain the following concepts concerning to the I/O hardware of the system :

(i) Spooling

(ii) Buffering

(iii) Caching

SECTION – C (20 Marks)

(Compulsory)

10. (a) Describe the various attributes, operations and the types concerning to the file system and also illustrate the various access methods to access the files in the system with their advantages and disadvantages. (10)

(b) Consider the following set of processes, with the length of the CPU Burst time given in milliseconds :

Processes	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, and P_5 all at time 0.

(i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non-preemptive priority (a smaller number implies higher priority) and RR (time quantum = 1) scheduling.

P.T.O.

(ii) Calculate the turnaround time and waiting time for each process for each scheduling algorithm in part 'a'. Which of the schedules in part 'a' results in the minimum average waiting and turnaround time? (10)