

B033414(033)

**B. Tech. (Fourth Semester) Examination,
April-May 2021
(~~CS~~^{IT} Engg. Branch)**

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 100

Minimum Marks : 35

Note : Part (a) is compulsorily from each questions,

Attempt any two parts from (b), (c) and (d).

***All question carry equal marks except part
(a) of each question. Part (a) carry 4 marks
and rest of part carry 8 marks.***

1. (a) The services & function provided by an operating system can be divided into two main categories. Briefly describe the two categories & discuss how they differ.

[2]

- (b) Give difference between hard and soft real time operating system with their application.
- (c) What are the major component of operating system, explain with their architecture and function.
- (d) Explain concept of distributed operating system with their advantage and disadvantage.
2. (a) Explain in brief :
- (i) In Peterson's solution to the Critical-Section Problem, what does $\text{Flag}[1] == \text{true}$ imply?
- (ii) In Peterson's solution to the Critical-Section Problem, what does $\text{turn} == 0$ imply?
- (b) What is a possible problem with concurrent access to shared data, explain with suitable example?
- (c) Consider the following :

Process	Burst Time	Priority	Arrival Time
P1	10	3	0
P2	1	1	1
P3	2	5	2
P4	1	4	3
P5	5	2	4

B033414(033)

[3]

- For the set of processes directly above, draw a Gantt Chart for the SJF (Shortest Job First) scheduling algorithm and also calculate Avg waiting time and Avg. Turn around Time.
- (d) (i) In Peterson algorithm, if the flag variable is not present then which condition of critical section problem was violated and why.
- (ii) What happens to a process in the waiting state?
3. (a) A system is having 3 user processes each requiring 2 units of resource R . Calculate the minimum number of units of R such that no deadlock will occur.
- (b) Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's

B033414(033)

PTO

[4]

algorithm :

- (i) What are contents of matrix need?
 - (ii) Is the system in a safe state?
 - (iii) If a request for (0 4 2 0) arrives from process P1 can the request be granted immediately.
- (c) What are deadlock and livelock explain with their characteristics.
- (d) A system has 4 processes and 5 allocatable resource.

The current allocation and maximum needs are as follows :

	Allocated					Maximum				
A	1	0	2	1	1	1	1	2	1	3
B	2	0	1	1	0	2	2	2	1	0
C	1	1	0	1	1	2	1	3	1	1
D	1	1	1	1	0	1	1	2	2	0

If available = [0 0 X 1 1], what is the smallest value of x for which this is a safe state?

4. (a) What is Belady's anomaly?

[5]

- (b) What do you mean by Page fault? Explain the steps for handling the page fault situation.
- (c) What is the cause of thrashing? How does the system detect the thrashing? Once it detect thrashing what can the system do to eliminate this problem.
- (d) Consider the following refrence string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2. How many page fault would occur using FIFO, OPTIMAL & LRU page replacement algorithm will be used?
5. (a) A certain moving arm disk-storage device has the following specifications : Number of tracks per surface = 404, Track storage capacity = 130030 bytes. Disk speed = 3600 rpm, Average seek time = 30 m secs. Find the disk storage capacity and the data transfer rate.
- (b) Explain the difference between sequential, indexed and indexed sequential file.
- (c) Suppose tahat a disk drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving

a request at cylinder 143, and the previous request was at 125. The queue of pending request in FIFO order is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the current head position what is total distance (in cylinder) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms.

- (a) FCFS
- (b) SSTF
- (c) SCAN
- (d) LOOK
- (e) C-SCAN
- (f) C-LOOK

(d) What is Buffer, briefly explain I/O buffering techniques: