



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Information Science and Engineering

Semester End Examination; Feb. - 2021

Operating System

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Outline the operating system concepts and its functionalities.

CO2: Implementation of various CPU scheduling algorithms and process synchronization using programming languages.

CO3: Identify deadlock Occurrence, deadlock recovery in various OS and outline memory management concepts.

CO4: Compare page replacement algorithms in OS and understand fundamental file concepts.

CO5: Discuss file system structure and implement disk scheduling algorithms.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any Two sub questions (from a, b, c) for Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
I a.	List the contents of PCB block.	2	L1	CO1	PO1
b.	Define Semaphores.	2	L1	CO2	PO1
c.	Define Deadlock.	2	L1	CO3	PO1
d.	Why lazy swapper is used in demand paging?	2	L2	CO4	PO1
e.	Expand FCFS, SSTF.	2	L1	CO5	PO1
II : PART - B		90			
UNIT - I		18			
1 a.	Define operating system and with neat sketch, explain the abstract view of the components of computer system.	9	L2	CO1	PO1
b.	What is process? What are the states of process? Give the process state diagram indicating the condition for the shift from one state to another.	9	L2	CO1	PO1
c.	I. Define privileged instruction. Write which of the following instruction below is privileged? i) Change memory management registers ii) Write the program counter iii) Read the time-of-the day iv) Set the time-of-the-day	9	L3	CO1	PO1
	II. For each of the following transitions between the process states, indicate whether the transition is possible, if possible give an example of one thing that would cause it i) Run→ready ii) Run→blocked iii) Blocked→run iv) Run→terminated				

UNIT - II

18

- 2 a. Consider the process given below, find average turnaround time and average waiting time using Preemptive and Non-preemptive SJF algorithm and justify which is efficient.

Processes	Arrival Time	Burst Time
P ₁	2	1
P ₂	1	5
P ₃	4	1
P ₄	0	6
P ₅	2	3

9 L3 CO2 PO2

- b. Consider the processes given below, find average turnaround time and waiting time using Round robin scheduling algorithm with time Quantum = 2 ms and Time Quantum = 4 ms. Justify to what time quantum (whether it is 2ms or 4ms) algorithm is better with respect to context switching.

Processes	Arrival Time	Burst Time
P ₁	0	4
P ₂	1	5
P ₃	2	2
P ₄	3	1
P ₅	4	6
P ₆	6	3

9 L3 CO2 PO2

- c. Explain critical section, give the solution to it?

9 L2 CO2 PO1

UNIT - III

18

- 3 a. Explain the deadlock recovery methods.
- b. Consider the following snapshot of resource allocation at time T₁;
- Show the system is not deadlock by generating one safe sequence.
 - At time T₂, P₂ makes one additional request for instance of type C. Show whether the system is In deadlock state or not?

9 L2 CO3 PO1

Process	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	0	0	0	0	0	0
P ₁	2	0	0	2	0	2			
P ₂	3	0	3	0	0	0			
P ₃	2	1	1	1	0	0			
P ₄	0	0	2	0	0	2			

9 L3 CO3 PO2

- c. With a neat schematic representation, explain the hardware required to support segmentation.

9 L2 CO3 PO1

UNIT - IV**18**

- 4 a. Consider the following page reference string:

2, 3, 2, 1, 5, 2, 4, 5, 3, 2, 3, 5

How many page faults would occur for the second chance LRU approximation algorithm with percentage of probability of page fault?

9 L3 CO4 PO2

- b. Explain the file attributes and file operations.

9 L2 CO4 PO1

- c. Explain different types of directory structures.

9 L2 CO4 PO1

UNIT - V**18**

- 5 a. Explain different file allocation methods.

9 L2 CO5 PO1

- b. Given the following queue:

95, 180, 34, 119, 11, 123, 62, 64 with head initially at track 50 and ending at track 199, calculate the number of moves using FCFS, SSTF and CLOOK.

9 L3 CO5 PO2

Move towards 199.

- c. Explain the structure and operations used to implement file system operations.

9 L2 CO5 PO1

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