

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10

Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1
 - a. Define an operating system. Discuss its role with user and system viewpoints. (06 Marks)
 - b. Give the features of symmetric and asymmetric multiprocessing systems. (04 Marks)
 - c. Briefly explain the common classes of services provided by the various operating systems for helping the user and for ensuring the efficient operation of the system. (10 Marks)
- 2
 - a. With a diagram, explain the different states of a process. (06 Marks)
 - b. Differentiate between long-term and short-term schedulers. (04 Marks)
 - c. Suppose the following jobs arrive for processing at the times indicated. Each job will run the listed amount of time.

Job	1	2	3
Arrival time	0.0	0.4	1.0
Burst time	8	4	1

- i) Give a Gantt chart illustrating the execution of these jobs, using the non pre-emptive FCFS and SJF scheduling algorithms.
 - ii) What is turn around time and waiting time of each job for the above algorithms?
 - iii) Compute average turn around time if CPU is left idle for the first 1 unit and then SJF is used. (Job1 and Job2 will wait during this time) (10 Marks)
- 3
 - a. Discuss various multithreading models, with a diagram. (06 Marks)
 - b. Explain the three requirements that a solution to the critical-section problem, must satisfy. (04 Marks)
 - c. State the dining philosophers problem and give a solution for the same, using semaphores. Write the structure of philosopher i. (10 Marks)
- 4
 - a. Define the hardware instructions test and set() and swap(). And also give the algorithms for implementing mutual exclusion with these instructions. (06 Marks)
 - b. Describe the necessary conditions for a deadlock situation to arise, in a system. (04 Marks)
 - c. Consider the following snapshot of a system:

	Allocation				Maximum				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 the Banker's algorithm:

- i) What is the content of the matrix need?
- ii) Is the system in a safe state?
- iii) If a request from process P₁ arrives for (0, 4, 2, 0), can the request be granted immediately? (10 Marks)

PART - B

- 5 a. What is paging and swapping? (04 Marks)
b. With a diagram, discuss the steps involved in handling a page fault. (06 Marks)
c. Consider the following page reference string:
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
for a memory with three frames. How many page faults would occur for LRU, FIFO and optimal page replacement algorithms? Which is the most efficient among them? (10 Marks)
- 6 a. Explain the following :
i) File types
ii) File operations
iii) File attributes (12 Marks)
b. Explain the methods used for implementing directories. (08 Marks)
- 7 a. A disk drive has 200 cylinders numbered from 0 to 199. The disk head is initially at cylinder 53. The queue of pending requests in FIFO order is : 98, 183, 37, 122, 14, 124, 65, 67. Starting from the current head position, what is the total distance traveled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF, SCAN and LOOK. Illustrate with figures in each case. (12 Marks)
b. Describe the access matrix model used for protection purpose. (08 Marks)
- 8 Write short notes on :
a. Components of LINUX system
b. Interprocess communication facility in LINUX
c. SCAN and C-SCAN disk scheduling
d. Tree directory structure. (20 Marks)
