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Question Paper Code : 45274

5 Year M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fourth Semester

Software Engineering

ESE 042 — OPERATING SYSTEM AND SYSTEM SOFTWARE

(Regulation 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the tasks performed by the analysis and synthesis phases of an assembler?
2. What is the syntax of a macro call? Give an example.
3. Differentiate between hard real-time and soft real-time systems.
4. Draw the process state transition diagram.
5. What are the multi threading models?
6. What are the requirements of solutions to critical section problem?
7. What are the necessary conditions for a deadlock situation to arise?
8. How does the roll-out roll-in variant of swapping work?
9. What is thrashing?
10. How is the sequential file access method different from the direct access method?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail about the elements of assembly language programming. (8)
(ii) Give the algorithms for pass I and pass II of the assembler. (8)

Or

- (b) What is a macro processor? How is a macro processor designed?
12. (a) (i) Explain in detail mainframe and multiprocessor systems. (8)
(ii) How does the IPC facility provide a mechanism to allow processes to communicate and synchronize their actions? (8)

Or

- (b) (i) Explain process creation and termination with suitable examples. (8)
(ii) Compare and contrast distributed and clustered systems. (8)
13. (a) (i) Which characteristics can be used for comparing the CPU scheduling algorithms. (4)
(ii) Consider the following set of processes with the length of the CPU-burst time given in milliseconds: (12)

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Smaller priority number implies a higher priority.

- (1) Draw the Gantt charts and calculate the average waiting time using FCFS scheduling and SJF scheduling.
(2) Draw the Gantt charts and calculate the average waiting time using non-preemptive priority scheduling and preemptive priority scheduling.
(3) Draw the Gantt chart and calculate the average waiting time using RR (quantum=1) scheduling.

Or

- (b) (i) What is a monitor? Explain monitor solution to dining philosopher problem. (8)
(ii) Discuss the issues in multi threading. (8)

14. (a) (i) Consider the following snapshot and answer the questions using Banker's algorithm: (8)

	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				

- (1) What is the content of the matrix "Need"?
 - (2) Is the system in a safe state?
 - (3) If a request from process P1 arrives for (0,4,2,0) can the request be granted immediately?
- (ii) Explain segmentation process in detail. (8)

Or

- (b) Explain in detail the concept of paging.

15. (a) (i) Explain how demand paging works. (8)
- (ii) Discuss the various schemes for defining the logical structure of the directory system. (8)

Or

- (b) Explain page replacement algorithms with suitable examples.