

ALCCS

Time: 3 Hours

DECEMBER 2015

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

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- Q.1**
- a. What is kernel? Differentiate the micro kernel from the macro kernel.
 - b. Explain the concurrency of process execution in a single processor environment and parallelism in shared-memory multiprocessor environment.
 - c. Why synchronization hardware is not a feasible solution in the Multi processor environment? And which is the proper alternate?
 - d. What are the different strategies involved in address binding of instructions and data to memory addresses?
 - e. In the layered approach to file system which organizes storage on disk drives, what are the roles of logical file system and file organization module?
 - f. Write down the definition of a distributed system and explain the naming and transparency of the distributed file system.
 - g. What is meant by language based protection in systems? (7×4)
- Q.2**
- a. Explain how the thread creation differs from the process creation and which is costlier? (4)
 - b. Briefly state how the process synchronization happens in Windows XP. (3)
 - c. Compare the logical and physical address spaces (4)
 - d. Briefly explain the role of Memory Management Unit with a simple schematic that shows dynamic relocation using a relocation register. (7)
- Q.3**
- a. Explain the Peterson's solution to the critical section problem. (9)
 - b. Describe the necessary requirements a solution to the critical section problem must satisfy. (9)

- Q.4** a. Apply the FIFO Page replacement policy on the following reference string and find the number of page faults
 (i) if 3 frames are used
 (ii) if 4 frames are used (4+4)

1	2	3	4	1	2	5	1	2	3	4	5
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- b. Briefly explain the following criteria to compare CPU scheduling algorithms:
 (i) CPU utilization
 (ii) Throughput
 (iii) Turnaround time
 (iv) Waiting time
 (v) Response time (2x5)
- Q.5** a. Describe how the two-memory access problem is solved by the use of fast-look up cache called TLBs and in a simple paging system. What information is stored in a typical TLB table entry? Explain. (4)
- b. Consider the following set of processes, with the length of CPU burst given in milliseconds:

<u>Process</u>	<u>Burst Time</u>	<u>Priority</u>
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 that illustrate the execution of these processes using: FCFS, SJF, nonpreemptive priority (a smaller priority number implies a higher priority) and RR (quantum = 2) (4)
- (ii) What is the turnaround time of each process for each of the scheduling algorithms in part (i)? (2.5 x 4)
- Q.6** a. (i) Why the location independence plays a critical role in naming structure of DFS system?
 (ii) Detail the different cache update policies such as write-through, delayed-write in distributed systems. (3+3)
- b. (i) Draw the schematic that shows the components of a Linux Operating System.
 (ii) Brief about the Linux kernel modules. (3+3)
- c. Explain symmetric encryption method. (6)
- Q.7** a. Explain indexed allocation method for blocks on disk. (10)
- b. Explain the main characteristics of
 (i) real time systems (ii) multimedia systems (4+4)