Question Paper

Exam Date & Time: 10-Feb-2021 (10:00 AM - 01:15 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL SCHOOL OF INFORMATION SCIENCES, MANIPAL
FIRST SEMESTER MASTER OF ENGINEERING - ME (EMBEDDED SYSTEMS / AUTOMOTIVE EMBEDDED SYSTEMS / CLOUD COMPUTING) DEGREE EXAMINATION - FEBRUARY 2021

Real Time Operating Systems [CSE 602]

Marks: 100 **Duration: 180 mins.**

WEDNESDAY, FEBRUARY 10, 2021

Answer all the questions.

1) Write short notes on TLO-1.1 (10)

A. System calls (3 marks)
B. Context switch (3 marks)
C. Storage pyramid (4 marks)

2) Explain process states and state transitions with the help of a neat diagram, mentioning the role of corresponding schedulers for the state transitions. TLO-1.2 (10)

3) Four jobs arrive at a computer at times 0,1,2,3 respectively. They have the estimated running times of 8,10,6 and 5 seconds. Their priorities are 3, 4, 5, and 2 respectively, with 5 being the highest priority. Draw Gantt charts and determine the turnaround-time and waiting time for each process in the following cases: TLO-1.2 (10)

A. Round robin with time slice = 3 time units, switching overhead =1unit
B. Shortest job first with preemption.
C. Priority scheduling with preemption. (4+3+3marks)

4) Explain the two models of Inter Process Communication and the benefits of IPC. TLO-2.1 (10)

5) What is a semaphore? What are the two operations associated with it? Explain them. Also explain how they could be used to achieve synchronization with the help of an (10)

example. TLO-2.1

6)	A. What is the difference between deadlock prevention and deadlock avoidance? Explain. TLO-2.2 B. What is meant by deadlock recovery? Explain the two ways of recovering from a deadlock. TLO-2.2 (2X5 marks)	(10)
7)	Draw the diagram of paging hardware with TLB and explain the significance of TLB. TLO 2.3	(10)
8)	Consider the following page reference string:1, 2, 3, 4, 2, 1, 5, 6, 5, 1, 8, 2, 1, 2, 1, 4, 2, 3, 7, 6, 3, 2, 1, 2, 6, 3 How many page faults would occur for the following replacement algorithms, assuming FOUR page frames? TLO 2.3 A. FIFO replacement B. LRU replacement C. Optimal replacement (2+4+4 marks)	(10)
9)	Given memory partitions of 215K, 600K, 300K, 400K, 250K and 700K (in order), how would each of the First-fit, Best-fit and worst fit algorithms place the memory segments of processes of 256K,526K, 220K 312K, 212K and 517K (in order)? In this case which algorithm makes most efficient use of memory? TLO 2.3	(10)
10)	List and explain the significance of real time systems. TLO 3.2	(10)

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