Question Paper

Exam Date & Time: 05-Jan-2018 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SCHOOL OF INFORMATION SCIENCES
FIRST SEMESTER MASTER OF ENGINEERING - ME (Embedded Systems / Automotive Embedded Systems)
DEGREE EXAMINATION (MAKE - UP) - JANUARY 2018
DATE : FRIDAY, JANUARY 05, 2018
TIME : 10:00AM - 1:00PM

Real Time Operating Systems [ESD 603]

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

Answer all the questions.

1) Describe the evolution of Operating systems for a uniprogramming system to multiprogramming and multitasking systems. Relate the evolution to the developments in hardware (10)

2) A. What is meant by Belady's anamoly?
B. What is meant by preemption? What is its use?
(5+5) (10)

3) With neat diagrams explain the scheduling algorithms (10)

(i) Round Robin Scheduling
(ii) Multilevel Feedback Queue Scheduling

(5+5)

4) What is meant by a race condition? Expalin with the help of an example. Also list and explain the conditions which should be satisfied by any solution ton a critical section problem.
(2+5+3) (10)

5) State the classical "Sleepy Barbers Problem" and provide a solution for the same using semaphores, giving adequate comments or explanation. Clearly indicate the number of semaphores used, their initial values and the purpose of using them. (10)

6) Describe paging as a memory management approach. Draw a diagram which indicates how logical address is converted to a physical address in this scheme. Also (10)

mentuion the benefits and drawbacks of this approach.

(3+5+2)

7) Expain the concept of virtual memory and demand paging. (10)

8) Consider the following snapshot of a system (10)

	Allocation	MAX	Available
	A B C	A B C	A B C
P0	0 1 0	0 1 1	1 5 2
P1	1 0 0	1 7 5	
P2	1 1 5	2 3 5	
P3	0 5 3	0 6 5	
P4	0 1 1	1 4 5	

A, B and C are the resource types. P0, P1. P2, P3 and P4 are the 5 processes.
The current allocation, the maximum resources required by each process and the available resources have been given. Answer the following questions using Bankers algorithm.

(i) Determine the maximum number of resourses of each type in the system.
(ii) Determine the need matrix.
(iii) List the steps in determining whether the system is safe ot not. Give the safe sequence if present.

9) What is Real Operating Systems? What are all types of RTOS, explain with examples? Define briefly characteristics of RT systems. (10)

(2+4+4)

10) Consider three processes P1, P2 and P3 are 50, 30 and 75 respectively. And their processing times are 10, 10 and 25 respectively. (10)

(i) It is possible to schedule these tasks Based on CPU utilization test?
(ii) Draw the **Gantt chart** which depicts the **Rate Monotonic scheduling** for the above processes. Do the processes meet their deadlines in this case?

(4+6)

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