Question Paper

Exam Date & Time: 20-Apr-2018 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SCHOOL OF INFORMATION SCIENCES (SOIS) FIRST SEMESTER MASTER OF ENGINEERING -ME (EMBEDED SYSTEMS) DEGREE EXAMINATION - APRIL 2018 Friday, 20 April 2018 TIME :10:00am-1:00pm Real Time Operating Systems [ESD 603]

Marks: 100

Duration: 180 mins.

Answer	all the questions.			
1)	Explain the following i) Concurrent processes ii) Co-operating Concurrent Processes iii) Process switch (3+3+4 =10)	(10)		
2)	With the help of necessary diagram explain the term process from the operating system point of view.	(10)		
3)	Describe any four system calls provided by operating (1) system to manage the processes.			
4)	How race condition occurs? Explain with the help of an example. Also explain the conditions which should be satisfied by any solution to a critical section problem. (2+5+3 marks)	(10)		
5)	State any classic problem for synchronization and provide a solution for the same using semaphores, with 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 mentuion the benefits and drawbacks of this approach.	(10)		
	(3+5+2)			
7)	Describe the principles of operation of Demand Paging.	(10)		
8)	Consider the following snapshot of a system	(10)		

	<u>Allocation</u>	MAX	<u>Available</u>
	ABC	ABC	ABC
P0	010	011	152
Ρ1	100	175	
P2	115	235	
Ρ3	053	065	
Ρ4	011	145	

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.

Describe the following

(10)

i) Periodic processes

ii) Aperiodic processes

iii) Sporadic processes (3+3+4)

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

(i) Is it 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 marks)

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10)