Question Paper

MANIPAL UNIVERSITY

SCHOOL OF INFORMATION SCIENCES
FIRST SEMESTER MASTER OF ENGINEERING- ME (Embedded Systems /
Automotive Embedded Systems / Embedded and Wireless Technology /
Computing Technologies and Virtualization)
DEGREE EXAMINATION - NOVEMBER 2017
DATE : Monday, November 20, 2017
TIME : 10:00AM - 1:00PM
Real Time Operating Systems [AES 605]

Marks: 100   Duration: 180 mins.

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Answer all the questions.

Each question carries 10 marks

1) Briefly describe the five responsibilities of operating systems. **(10)**

2) Describe system calls namely fork and join. Explain how they are useful in process management. **(10)**

3) Assume that the following five processes arrive at almost the same time, with the length of the CPU burst time given in milliseconds: **(10)**

Process	CPU Burst Time
P1	10
P2	13
P3	9
P4	7
P5	16

Consider a context switch overhead of 1unit. Determine the average turnaround time and average waiting time with the help of Gantt charts, for the following scheduling algorithms
a. FCFS
b. SJF
c. RR (quantum=3)   (3+3+4)

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

5) Write the classical solution for Reader writer critical section **(10)**

problem. Clearly indicate the number of semaphores used, their initial values and the purpose of using them.

6) Explain the use of DRAG for (i) deadlock prevention (ii) deadlock avoidance. (5x2marks) (10)

7) Explain the terms (i) external fragmentation (ii) internal fragmentation (iii) Compaction (iv) Page Fault (10)

(2.5 x 4 marks)

8) Explain the basic concept of memory segmentation with a neat block diagram. (10)

9) Given memory partitions of 115K, 500K, 200K, 300K, 150K and 600K (in order), how would each of the First-fit, Best-fit and worst fit algorithms place the memory segments of processes of 156K, 120K 212K, 417K, 112K and 226K (in order)? In this case which algorithm makes most efficient use of memory? (10)

10) Compute the **response times** for the following tasks based on deadline rate monotonic algorithm. Can the processes be scheduled? Also draw the Gantt chart for the same. Note:- Higher value indicates higher priority. (10)

P	Deadline	Period T	comp. Time, C	Priority,
Task1	5	7	3	3
Task2	6	12	3	2
Task3	22	20	5	1

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