ECS081

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110851

Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

REAL TIME SYSTEM

Time : 3 Hours] [Total Marks : 100

1 Attempt any four parts : 4×5=20

(a) Explain various components of a typical real time system with block diagram.

(b) Differentiate between hard and soft real time systems.

(c) What are the traditional performance measures used for real time systems ?

(d) What system considerations are required in designing real time systems ?

(e) What do you understand by temporal constraints ? List possible task timing constraints.

(f) Explain various application areas where real time systems are useful.

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2 **Attempt any four parts :** **4×5=20**

(a) What is the difference between a performance constraint and a behavioral constraint in a real-time system ? Explain with the help of one example of each

(b) Explain scheduling point of a task scheduling algorithm ? How the scheduling points are determined in (i) clock-driven system (ii) event-driven system ?

(c) Can we consider EDF (Earliest-Deadline-First) as a dynamic priority scheduling algorithm for real-time tasks ? Justify your answer.

(d) What are the distinguishing characteristics of periodic, aperiodic and sporadic real-time tasks ?

(e) Determine whether the following set of periodic real-time tasks is schedulable on a uniprocessor using RMA (Rate Monotonic Algorithm).

Task	Start Time (ms)	Processing Time (ms)	Period (ms)	Deadline (ms)
T1	20	25	150	100
T2	40	7	40	40
T3	60	10	60	50
T4	25	10	30	20

3 **Attempt any two parts :** **2×10=20**

(a) Define Priority Inheritance Protocol (PIP) with its properties and show that PIP works as greedy algorithm.

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(b) Explain use of Priority-Ceiling Protocol in Dynamic Priority Systems. Why Round Robin Scheduling does not work for the real time application ?

(c) How are deadlocks, unbounded priority inversions, and chain blocking prevented using PCP ?

4 Attempt any two parts : 2×10=20

(a) What is the difference between hard and soft real-time communication supported by a network ? Distinguish traffic shaping and policing.

(b) Describe any two traffic specification models which can satisfactorily be used to specify bursty traffic.

(c) Define real time communication. Explain VTCSMA (Virtual Time Carrier Sensed Multiple Access protocaol) with suitable example.

5 Attempt any two parts : 2×10=20

(a) Discuss in detail which category of concurrency protocol is best suited under what circumstances ?

(b) Given that a relative consistency set R = {position, velocity, acceleration} and R_{rvi} = 100 ms, and the following data items: position = (25 m, 2500 ms, 200 ms), velocity = (300 m/s, 2550 ms, 300 ms), acceleration = (20 m/s^2, 2425 ms, 200 ms), current time = 2600 ms. Are given data items absolutely valid ? Also, are they relatively consistent ?

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(c) Explain any **two** of the following :

(i) Commercial Real Time databases

(ii) Real Time Operating Systems

(iii) Temporal Consistency.

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