

B.E/B.TECH. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APR/MAY 2014

COMPUTER SCIENCE AND ENGINEERING

EIGHTH SEMESTER

CS9077 / REAL TIME SYSTEMS

(REGULATION 2008)

Time: 3 hours

Max. Marks: 100

ANSWER ALL QUESTIONS

Part – A (10 x 2 = 20 Marks)

1. Difference between hard and soft Real time systems?
2. How to overcome the blocking of lower priority by higher priority task?
3. What is MISS and HIT?
4. What is the drawback of AED algorithm?
5. List out the Network Architecture issues?
6. What is Buffer space constraint?
7. What are the classifications of fault types?
8. Define Byzantine failures?
9. What is CAN?
10. How to map perfect clock and actual clock for real time system?

Part – B (5 x 16 = 80 Marks)

11. (i) Explain the Issues in Real time computing? (6)

(ii) Consider the real time train management. Network dispatchers regulate the railway by Sequencing the train movements and setting the routes with the aim of ensuring smooth train Movements and limiting as much as possible existing delay. The usual policy still consists of Scheduling trains following the order in the timetable or according to pre-determined dispatching Rules. The railway system has automatic traffic control system. It is assumed that each small Station consists of two tracks and each junction consists of four tracks. In between each station it is possible to go through only single line. Due to some problem train delay by 30 minutes. But normally each fifteen minutes local train arrive the stations express will arrive every one Hour. If any delay happen due to accident or technical problem or signal not working properly. Explain the Performability of the above system. (10)
12. a. (i) Write Ada code to control a water pump that must be turned on when the water level in an Overhead tank falls below level L1, and must be turned off when the water level rises above level L2. Assume you have a sensor that samples the water level every 100 ms. (8)

(ii) Write short notes about Task scheduling. (8)

Or

b. (i) A system contains three periodic tasks T_i (p_i, e_i) = { (7,3), (12,3), (20,5)}. The tasks are scheduled By using Rate Monotonic Algorithm. Using iterative method determine the schedulability of the Tasks (8)

(ii) List the timing specifications for good real time language. (8)

13. a. (i) What is transaction priorities .How to solve the problem of optimal scheduling transactions (10)

(ii) Explain Real-Time vs General-purpose Databases. (6)

Or

b. (i) Explain in detail of Pessimistic and Optimistic concurrency control with one Real-Time Example? (16)

14. a. Given a five-node system, assume that the packet transmission time is 1 and the end-to-end Network delay is 4. This means that to meet its deadline of d , a packet must start its transmission no Later than $d-5$. use the VTCSMA-D algorithm to do the following.

(i) Construct a situation (arrival times and deadlines) in which all packets are transmitted successfully if $n=10$, but some packets miss their deadlines if $n=4$ (8)

(ii) Construct another situation in which all packets are transmitted successfully if $n=4$, but where Some packets miss their deadlines if $n=10$. (8)

Or

b.(i) Consider the use of the timed-token protocol in the following situation. We have five nodes in the System. The real-time requirement is that node n_i be able to put out up to b_i bits over each period of Duration p_i , where b_i and p_i are as given in the following table.

Node	b_i	p_i
n1	1k	10,000
n2	4k	50,000
n3	16k	90,000
n4	16k	90,000

The overhead is negligible, and the system bandwidth is 1 k/unit time (That is, it takes one unit time to Transmit 1 KB of data). Choose an appropriate TTRT and obtain suitable values of f_i (8)

(ii) When two messages collide in the window protocol, due to having identical LTTT values, what would happen if the random number generators associated with the respective nodes generated the same sequence of random numbers? (8)

15. a. Explain in detail of Fault-Tolerance Techniques. (16)

Or

b. Explain in detail of Reliability Evaluation Techniques. (16)