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M.Tech. Degree Examination, Dec.2014/Jan.2015
Real Time Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 1 a. Explain briefly the history of embedded system and write the pseudo code for basic real time service. (10 Marks)
 Define hard real-time services and soft real-time services and describe how they are different. (05 Marks)
 c. Write the pseudocode of a event driven software service. (05 Marks)
- 2 a. Given services S_1 and S_2 with periods T_1 and T_2 and execution times C_1 and C_2 . Write the timing diagram, conditions and equations with respect to RM-LUB for the following two cases:
 Case 1 : C_1 short enough to fit all 3 releases in T_2 . (10 Marks)
 Case 2 : C_1 too large to fit last release in T_2 . (10 Marks)
 b. With diagrams, explain hard real-time isochronal, soft real time, any time and soft isochronal service utilities. (10 Marks)
- 3 a. Explain the two algorithms for determining NQS feasibility. (08 Marks)
 b. For the data "1 1 0 0 0 1 0 0", using ECC memory realize the following four cases:
 Case 1 : No errors
 Case 2 : Single bit error
 Case 3 : Multi bit error
 Case 4 : Parity error (12 Marks)
- 4 a. Differentiate between dead lock and live lock. (06 Marks)
 b. Briefly, explain priority inversion. (06 Marks)
 c. Explain power management and processor clock modulation. (08 Marks)
- 5 a. Briefly explain:
 i) Message queues. (10 Marks)
 ii) Communicating and synchronized applications. (05 Marks)
 b. Mention the methods to ensure that global data is protected (OR) converted into task specific context data. (05 Marks)
 c. Differentiate between binary semaphores and mutex semaphores. (05 Marks)
- 6 a. Compare reliability and availability in real-time system. (05 Marks)
 b. With simple C-code, explain the multiple condition decision coverage. (10 Marks)
 c. Write a short note on Trace ports. (05 Marks)
- 7 a. Briefly explain Drill-down tuning. (10 Marks)
 b. Describe RTOS design issues in a PIC – microcontrollers. (10 Marks)
- 8 Write short notes on:
 a. Deadline monotonic and EDF. (10 Marks)
 b. Shared memory. (10 Marks)
 c. Methods for optimizing code segments. (10 Marks)
 d. Exceptions and assert. (20 Marks)
