10EC842

Eighth Semester B.E. Degree Examination, Jan./Feb.2021
Real Time Operating Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. Write and explain the flow chart and the pseudocode for a basic real time service using polling technique. **(10 Marks)**
   b. Draw the timeline for RTS and define the various terms. Show the changes in the RTS timeline with hardware acceleration. **(10 Marks)**

2 a. With diagram, explain hard real time, any time and soft isochronal real time service utilities. **(12 Marks)**
   b. Write the state transition table for a thread execution including all possible states. **(08 Marks)**

3 a. Define RM Least Upper Bound. Calculate the "utility of the CPU resource achievable" for the following system of tasks:
   (i) $T_1 = 2, T_2 = 5, C_1 = 1, C_2 = 1$
   (ii) $T_1 = 2, T_2 = 5, C_1 = 1, C_2 = 2$
   Write timing diagram for each of the above. **(08 Marks)**
   b. With reference to RM LUB differentiate between Sufficient and Necessary and Sufficient (N&S) conditions for feasibility tests. **(04 Marks)**
   c. Describe the algorithms for determination of N&S feasibility. **(08 Marks)**

4 a. Explain a simple pipeline with an example of stage overlap depth = 4. **(06 Marks)**
   b. With the help of diagram, explain physical memory hierarchy for a typical Harvard architecture and how it is logically partitioned and segmented by the firmware. **(10 Marks)**
   c. Briefly explain flash file systems. **(04 Marks)**

PART – B

5 a. Mention three necessary conditions for unbounded inversion. Explain unbounded priority inversion solutions in details. **(10 Marks)**
   b. Explain how missed deadlines can be handled. **(05 Marks)**
   c. Explain availability and quality of service. **(05 Marks)**

6 a. Describe RTOS system software mechanisms in details. **(10 Marks)**
   b. Explain the following terms:
   (i)   Exceptions
   (ii)   Single step debugging. **(10 Marks)**

7 a. Explain with the help of diagram the basic concepts of drill-down tuning in details. **(10 Marks)**
   b. Explain the basic methods for building performance monitoring into software. **(10 Marks)**

8 a. Discuss similarities and differences of reliability and availability. **(06 Marks)**
   b. Write a short note on performance tuning. **(06 Marks)**
   c. What are the issues to be considered for the design of RTOS using PIC microcontroller? **(08 Marks)**

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