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## Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019

### Real Time Operating Systems

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

#### PART – A

- 1
  - a. With the help of examples explain the origin and history of real time system. (06 Marks)
  - b. Explain the concept of real time services in real time embedded system with the help of examples. Give the pseudocode outline of a basic-event driven software service. (06 Marks)
  - c. With the help of a diagram compare the service implementation for software and hardware acceleration. (08 Marks)
- 2
  - a. Which are the fundamental resources in a real time embedded systems architecture and explain how the resource analysis is critical to its design. (12 Marks)
  - b. Write in brief the following :
    - i) Important features of RTOS
    - ii) Thread safe reentrant function with example code. (08 Marks)
- 3
  - a. Define RMLUB what do you mean by sufficient feasibility test, but not necessary. Explain the same with an example. (06 Marks)
  - b. What do you understand by DEADLINE-MONOTONIC POLICY? Explain briefly with proper equations. (06 Marks)
  - c. Sketch scheduling timing diagram for the following set of services :  
 $T_1 = 2, T_2 = 5, T_3 = 7$  and  $C_1 = 1, C_2 = 1, C_3 = 2$   
 For RM, EDF and LLF scheduling policies. Give concluding remarks for the same. (08 Marks)
- 4
  - a. Explain in detail intermediate I/O which are the five overlap conditions of I/O cycles with the CPU cycles, also deduce, the axioms. (06 Marks)
  - b. Explain a simple pipeline stage overlap (Depth = 4) such that one instruction is completed (retired) every CPU clock. (06 Marks)
  - c. Explain the physical hierarchy of memory with logical partitioning and segmenting, with the help of diagram. (08 Marks)

#### PART – B

- 5
  - a. Explain with the help of a neat diagram deadlock and live lock. (05 Marks)
  - b. What are the conditions that causes unbounded priority inversion and give its solutions. (10 Marks)
  - c. Explain quality of service based upon the frequency that services produce an incorrect or late result compared to how often they function correctly. (05 Marks)
- 6
  - a. Explain boot code, derive trivers with diagram and operating system services. (05 Marks)
  - b. Give at least 5 good coding practices which are more important in RTOS compared to windows or Linux. (05 Marks)
  - c. Explain briefly single step debugging done at three different levels in most embedded systems. How are the breakpoints implemented? (10 Marks)

- 7 a. With the help of diagram explain the drill down tuning using performance profile data mining. (10 Marks)
- b. Explain briefly the basic methods for building performance monitoring capability into the hardware. (05 Marks)
- c. Write a short note on building performance monitoring into software. (05 Marks)
- 8 a. What do you understand by high reliability and high availability of a system? Justify how it can be used to indicate the system robustness and quality expectation. (05 Marks)
- b. Explain reliability using dual string, cross strapped sub system interconnection example. (10 Marks)
- c. Explain with the help of a block diagram the architecture of a P/C microcontroller. (05 Marks)

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