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10TE765

Seventh Semester B.E. Degree Examination, June/July 2018
Embedded System Design

Time: 3 hrs.

Max. Marks:100

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

PART – A

1 a. Explain : (i) Embedded system. (ii) Hard real time system (iii) Soft real time system.
(06 Marks)

   b. With a block diagram, explain briefly the various components in a microprocessor based embedded system. **(08 Marks)**

   c. Write an explanatory note on theoretical model of finite state machine. **(06 Marks)**

2 a. Explain (i) Direct and indirect addressing mode (ii) Register direct and Register indirect addressing mode with diagram and instructions. **(08 Marks)**

   b. Compare : (i) Big Endian and Little Endian format representation
             (ii) RISC and CISC architecture.
             (iii) Truncation and Rounding errors. **(06 Marks)**

   c. Draw and explain the architecture of the Datapath and memory interface for a simple microprocessor at register transfer level. **(06 Marks)**

3 a. Compare SRAM and DRAM. **(04 Marks)**

   b. Write the inside and outside diagrams for DRAM along with timing diagram of read and write operations. **(08 Marks)**

   c. Explain the direct mapping cache management strategy with an example. What are the trade off between write through and delayed write operations? **(08 Marks)**

4 a. Explain waterfall and V-cycle model with neat diagram and steps. **(10 Marks)**

   b. What are the five steps in successful design in Embedded system? **(05 Marks)**

   c. Explain the characterizing and identifying the requirements of a system, with respect to a digital counter. **(05 Marks)**

PART – B

5 a. Define Task and Task control block. Mention major components of TCB with suitable schematic and code. **(08 Marks)**

   b. Explain the different types of operating system services and explain them briefly. **(08 Marks)**

   c. Differentiate between:
      (i)   Program and process.
      (ii) Light weight thread and Heavy weight thread. **(04 Marks)**

6 a. Write a note on:
      (i)   Real time operating system.
      (ii) Foreground / Background system. **(06 Marks)**

   b. Describe virtual model and high level model for O.S architecture. **(06 Marks)**

   c. Write the algorithm for a simple OS kernel, using C language notation, for 3 asynchronous tasks. The tasks use a common data buffer for read, increment and display operation.
(08 Marks)

7 a. Write the Amdahl's limitation for performance improvement/optimization. Consider a system with the following parameters/characteristic. The task to be analysed and improved currently executes in 100 time units and the goal is to reduce execution time to 50 units, the algorithm to be improved uses 40 time units. Determine the unknown parameter and write the interference. **(07 Marks)**

b. Write a note on Big 'O' notation. **(05 Marks)**

c. Write a C function to determine the sum of elements in any array and analyse it line by line for its time complexity. **(08 Marks)**

8 a. Describe memory loading with equation, figure and an example. **(08 Marks)**

b. What is time loading? Explain the primary methods used to compute the times. **(06 Marks)**

c. Analyse the following type of loops:
   (i) Determine number of iterations to be performed.
   (ii) Determine the number of steps per iteration of total time. **(06 Marks)**

Loop 1	Loop 2
int sum = 0;	int sum = 0;
For (int j = 0 ; j < N ; j ++)	for (int j = 0 ; j <100 ; j ++)
Sum = Sum + j ;	Sum = Sum + j ;

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