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10EC74

Seventh Semester B.E. Degree Examination, May 2017
Embedded System Design

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 high level flow of development process, discuss about embedded system life cycle. **(08 Marks)**

b. What are the major aspects in the development of embedded applications and important steps in developing an embedded system? **(06 Marks)**

c. Explain the architecture of a typical embedded system using microprocessor. **(06 Marks)**

2 a. Analyze how the errors propagate under (i) addition and (ii) multiplication of two perfect numbers N_1 and N_2. **(06 Marks)**

b. Express signed integer, float and three operand instructions in little endian and big endian formats. **(06 Marks)**

c. With the help of high level block diagram, consisting of logic and memory device blocks, explain finite state machine. Define Mealy and Moore machines. **(08 Marks)**

3 a. Draw typical memory chip internal architecture. With the help of timing diagram, explain memory access time. **(08 Marks)**

b. With a neat diagram, explain cache system architecture. **(06 Marks)**

c. Explain: (i) swapping, (ii) overlays, (iii) multiprogramming. **(06 Marks)**

4 a. With the help of neat diagram, explain water fall and spiral life cycle models. **(08 Marks)**

b. Discuss on cohesion and coupling. **(06 Marks)**

c. Explain formulating the hardware architecture of embedded system, considering the example of digital counter. **(06 Marks)**

PART – B

5 a. Illustrate the models of single process and multiple processes. **(08 Marks)**

b. With neat block diagram, explain single process-single thread design and multi process-multithread design. **(08 Marks)**

c. With a basic diagram, explain possible task states. **(04 Marks)**

6 a. Illustrate virtual machine and high-level operating system architectures. **(08 Marks)**

b. Explain: (i) Kernel, (ii) ISR, (iii) Masking Interrupts. **(06 Marks)**

c. Organize 64 general purpose registers: (i) As four different contexts, (ii) With overlapping contexts. **(06 Marks)**

7 a. Using Big-O arithmetic rule, explain 'For' loop and 'While' loop with example. **(08 Marks)**

b. Analyze the following algorithm and calculate complexity function f(50), f(1000)

```
int   total (int myArray[ ],  int  n)
  {
     int   j;
     int   s = 0;
     for (j = 0; j < n; j++)
          s = s+ myArray[j];
     return  s;
   }
```

(08 Marks)

c. With the block diagram, explain co-routine. **(04 Marks)**

8 a. What is time loading? Explain any two primary methods used to compute the time. **(06 Marks)**

b. Explain loop-invariant and flow of control optimization. **(06 Marks)**

c. Why cache behavior is the major problem in real time embedded application? What are the possible solutions? **(08 Marks)**

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