Midterm Examination   Academic Year : 2005
Date : 14 December 2005   Time : 9.00 - 11.00
Subject : 217-452 Real Time Software   Room : หัวหิน

Attempt all questions.

1. Describe the following issues involved in real-time software design.   (10)
   • Realtime Response
   • Recovering from Failures
   • Working with Distributed Architectures
   • Asynchronous Communication
   • Race Conditions and Timing

2. Designing realtime software involves several steps. Describe the following basic steps listed below: (10)
   • Software Architecture Definition
   • Co-Design
   • Defining Software Subsystems
   • Feature Design
   • Task Design

3. A perfect design is an enemy of a good design. A simple design may not provide best solution to a given problem but it would probably have the best chance of meeting the schedule and cost constraints with acceptable quality.

Here are some of the "reasonable and rational" design simplification techniques:

   • Use lookup tables for complex decision making

   • Use fixed size arrays whenever possible

   • Avoid dynamic memory allocation

   • Reduce the number of tasks in the system

   • Optimize the design only for the most frequently executed scenarios

Explain the design simplification techniques listed above.   (10)

4. Describe the following features offered In μC/OS-II: (10)
   • Portable
   • ROMable
   • Scalable
   • Preemptive
   • Deterministic

5. A µC/OS-II application looks just like any other DOS application. Explain the points marked by the numbers in the sample code. (10)

```
void main (void)
{
        PC_DispClrScr(DISP_FGND_WHITE + DISP_BGND_BLACK);
(1)     OSInit();
        PC_DOSSaveReturn();
(2)     PC_VectSet(uCOS, OSCtxSw);
(3)     RandomSem = OSSemCreate(1);
(4)     OSTaskCreate(TaskStart, (void *)0, (void *)&TaskStartStk[TASK_STK_SIZE-1], 0);
(5)     OSStart();
}
```

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