USN [   ]   **14SCS14**

First Semester M.Tech. Degree Examination, Dec.2015/Jan.2016
Multi Core Architecture and Programming

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1   a. Distinguish concurrency and parallelism, and discuss the approaches adopted to support thread-level parallelism, both in software and hardware.   **(06 Marks)**
    b. Explain Hyper-Threading Technology and with a block diagram, also explain the multi-core with Hyper – Threading Technology processor architecture.   **(10 Marks)**
    c. Distinguish runtime virtualization and system virtualization.   **(04 Marks)**

2   a. Discuss the four types of problems to be addressed when multi threading is used in programs.   **(04 Marks)**
    b. Explain the common parallel programming patterns.   **(10 Marks)**
    c. How to transform the basic error diffusion algorithm into an approach that is more conducive to a parallel solution?   **(06 Marks)**

3   a. What is synchronization? Explain the widely used two types of synchronization operations.   **(05 Marks)**
    b. Discuss the various lock types.   **(05 Marks)**
    c. Explain message passing model.   **(10 Marks)**

4   a. How does AfxBeginThread( ) differs from createThread( )?   **(05 Marks)**
    b. Why should developers be careful when calling suspendThread( )? How to safely suspend threads?   **(05 Marks)**
    c. Explain the concept of thread pool with an example in .NET.   **(10 Marks)**

5   a. Explain user-level threading package offered by windows called fibers.   **(10 Marks)**
    b. What is pthread? Explain with an example, how to create and use threads with pthreads.   **(10 Marks)**

6   a. In OpenMP, what are the different ways the memory can be declared as private?   **(04 Marks)**
    b. What are the clauses provided by OpenMP standard to accomplish the data copy in and copy out operations?   **(04 Marks)**
    c. Describe the four most heavily used OpenMP library functions.   **(08 Marks)**
    d. List the factors that threaded application performance with OpenMP is largely depended upon.   **(04 Marks)**

7   a. Explain critical and atomic programs supported by OpenMP standard with an example.   **(10 Marks)**
    b. Explain the task queuing execution model.   **(10 Marks)**

8   a. Explain convoying and priority inversion in parallel programming.   **(06 Marks)**
    b. What are non-blocking algorithms? Discuss its advantages and disadvantages.   **(06 Marks)**
    c. How do you conserve memory bandwidth and avoid memory contention in multi-core processors?   **(08 Marks)**

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