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18SCN/SCS152

First Semester M.Tech. Degree Examination, Dec.2018/Jan.2019
Multicore Architecture and Programming

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the Flynn's taxonomy, with the help of a suitable diagram. **(10 Marks)**
   b. Summarize Amdahl's law applied to Hyper-Threading Technology. **(10 Marks)**

OR

2 a. Illustrate a suitable program that displays the sentence "Hello world" by using the OpenMP and Pthreads libraries. **(10 Marks)**
   b. Define the team "virtualization". Explain the different virtualization used in modern computers. **(10 Marks)**

Module-2

3 a. Explain the common parallel programming patterns. **(10 Marks)**
   b. With a suitable example, explain the concept of data flow decomposition. Also discuss the different types of challenges faced to improve the performance of multi-threaded application. **(10 Marks)**

OR

4 a. What is Error Diffusion? Outline the working principle of error diffusion algorithm with an example. **(10 Marks)**
   b. Write a note on the following terms: (i) Synchronization   (ii) Critical sections **(10 Marks)**

Module-3

5 a. How does AfxBeginThread( ) differs from CreateThread( )? Also explain he functions that helps to control the thread execution. **(10 Marks)**
   b. With a program in C# language, illustrate the use of windows events as an inter-thread communication mechanism. **(10 Marks)**

OR

6 a. What do you mean by semaphore? Giving the prototypes of each, describe the following with respect to semaphore.
   - CreateSemaphore (LPSECURITY_ATTRIBUTES, LONG, LONG, LPCTSTR);
   - OpenSemaphore (DWORD, BOOL, LPCTSTR);
   - ReleaseSemaphore (HANDLE, LONG, LPLONG); **(10 Marks)**
   b. What is pthread? Illustrate with a suitable example, how to create and use threads with pthreads. **(10 Marks)**

Module-4

7 a. What are the clauses provided by OpenMP standard to accomplish the data copy in and copy out operations? Also illustrate the effective Use of Reduction Clause for threading. **(10 Marks)**
   b. Describe the Four Scheduling Schemers offered in OpenMP. **(10 Marks)**

OR

8 a. What are the difficulties in debugging an OpenMP program? Mention the guidelines for debugging OpenMP program. **(10 Marks)**
   b. List and explain the factors that threaded application performance with OpenMP is largely dependent upon. **(10 Marks)**

Module-5

9 a. Describe the Priority Inversion that are used to prevent a low priority thread blocking a high priority thread from running. **(10 Marks)**
   b. With an appropriate code, elaborate the lockless implementation of a linked stack that may suffer from ABA problem. Also illustrate its sequence. **(10 Marks)**

OR

10 a. Discuss any two issues of multi-core processors that are supposed to take care about memory. **(10 Marks)**
   b. Describe the common Idioms for using shared memory without a lock. **(10 Marks)**

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