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18CS824

Eighth Semester B.E. Degree Examination, June/July 2023
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. **(08 Marks)**
   b. Explain Hyper-Threading Technology with a block diagram. Also explain the multi-core with Hyper-Threading Technology Processor Architecture. **(08 Marks)**
   c. Distinguish runtime virtualization and system virtualization. **(04 Marks)**

OR

2 a. Discuss with a neat figure the flow of threads in an execution environment. **(10 Marks)**
   b. Explain Amdahl's law applied to HT technology. **(06 Marks)**
   c. With the help of appropriate figure explain what happens when a thread is created? **(04 Marks)**

Module-2

3 a. What is Decomposition? Explain the different types of decomposition with examples. **(10 Marks)**
   b. What is synchronization? Explain the widely used two types of synchronization operations. **(06 Marks)**
   c. Explain the challenges faced managing multiple threads and their communication. **(04 Marks)**

OR

4 a. Discuss the error diffusion algorithm with C-language implementation. **(08 Marks)**
   b. What are locks? Discuss the various lock types. **(08 Marks)**
   c. Briefly explain the message passing model. **(04 Marks)**

Module-3

5 a. Explain the concept of thread pool with an example in .NET. **(10 Marks)**
   b. Giving the prototypes of each, describe the following Pthread APIs.
      Pthread_create( )
      Pthread_detach( )
      Pthread_join( ) **(10 Marks)**

OR

6 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)**

Module-4

7 a. Explain the four schedule schemes in openMP. **(10 Marks)**
   b. In openMP what are the different ways the memory can be declared as private? Explain with examples. **(10 Marks)**

OR

8 a. List the factors that threaded application performance with openMP is largely depended upon.   **(04 Marks)**
   b. Describe the four most heavily used openMP library functions.   **(08 Marks)**
   c. Explain the task queuing execution model.   **(08 Marks)**

Module-5

9 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. Explain why too many threads can seriously degrade program performance. **(08 Marks)**

OR

10 a. Explain ABA problem with example.   **(08 Marks)**
    b. Explain Cache-related issues and false sharing.   **(08 Marks)**
    c. How to avoid pipeline stalls on IA-32?   **(04 Marks)**

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