National University of Computer & Emerging Sciences, Karachi

School of Computing (BSCS)

Lab Exam – OpenMP (Fall 2022)

10th Oct 2022, 10:45am-11:35am (5C), 11:40-12:30 (5E)

Course Code: CS3006	**Course Name: Parallel and Distributed Computing (Lab)**			
Instructor Name: Dr. Nadeem Kafi				
Student Roll No:	**Section No:**	**IP:**	**PC ID:**	**OpenMP ver:**

Time: 60 Minutes. **Max Marks**: (1.5 Marks)

Part I – Theory

Q1. Write one sentence to explain the purpose of the following openMP pragmas/clauses:

i. Parallel_____

ii. Single/master_____

iii. Critical/atomic_____

iv. Reduction_____

v. OpenMP API calls_____

Q2. Write two OpenMP code scenarios to demonstrate task parallelism and data parallelism.

Q3. Give syntax for dynamic and static scheduling with chunk size. Do you think chunk size can be used to specify granularity? Explain.

Part II – Coding on Lab PC.

Q4. Write OpenMP code snippet for the execution of the given task dependency graph. Use all possible OpenMP pragmas to ensure correct execution.

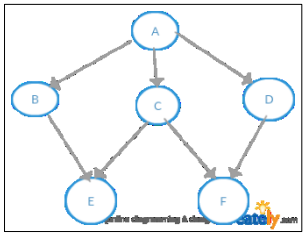

Figure 1 - Q4

Q5. Write, compile and execute OpenMP code on your Lab PC for the following code. Explain in comments the use of each OpenMP pragma.

```
void A(int array[], int size) {
  for (int s = 0; s < (size - 1); ++step) {
    int z = 0;
    for (int i = 0; i < size - (s - 1); ++i) {
      if (array[i] > array[i + 1]) {
        int temp = array[i];
        array[i] = array[i + 1];
        array[i + 1] = temp;
        z = 1;
        }
    }
    if (z == 0) break;
  }
}
```

Figure 2 - Q5

Q6. Suppose a team of four threads need to write random values to three separate arrays A, AA and AAA respectively using their ID as index values. Write, compile and execute fastest OpenMP program with comments.

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