Dated : Assessment No. : 3

SCENARIO - I

Write a simple OpenMP program to employ a *'reduction'* clause to express the reduction of a for loop. In order to specify the reduction in OpenMP, we must provide

- 1. An operation (+/*/o)
- 2. A reduction variable (sum / product / reduction). This variable holds the result of the computation.

Example:

Let's parallelize the following for loop:

```
sum = 0;
#pragma omp parallel for shared(sum, a) reduction(+: sum)
for (auto i = 0; i < 9; i++)
{
    sum += a[i]
}</pre>
```

Each thread has sumloc, which is a local copy of the reduction variable. The threads then perform the following computations

• Thread 1

```
sumloc_1 = a[0] + a[1] + a[2]
```

Thread 2

```
sumloc_2 = a[3] + a[4] + a[5]
```

Thread 3

```
sumloc_3 = a[6] + a[7] + a[8]
```

In the end, when the treads join together, OpenMP reduces local copies to the shared reduction variable

```
sum = sumloc_1 + sumloc_2 + sumloc_3
```

1. Show the complete code execution of above logic using C/C++

BRIEF ABOUT YOUR APPROACH:

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SOURCE CODE:	
EVECTION.	
EXECUTION:	

RESULTS:

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SCENARIO – II

Write an OpenMP program to find the smallest element in a list of numbers using OpenMP REDUCTION clause.

Description

Largest element in a list of numbers is found using OpenMP PARALLEL DO directive and REDUCTION clause. Reductions are a sufficiently common type of operation. OpenMP includes a reduction data scope clause just to handle the variable. In reduction, we repeatedly apply a binary operator to a variable and some other value, and store the result back in the variable. In this example we have added the clause REDUCTION (MAX: LargeNumber), which tells the compiler that LargeNumber is the target of a sum reduction operation.

BRIEF ABOUT YOUR APPROACH:

SOURCE CODE:

EXECUTION:

RESULTS:

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SCENARIO – III

Write an OpenMP program to find the Max and Min elements in a list of numbers using OpenMP Critical clause to understand:

Hint: As Max & Min value is easily prone to change by another thread after comparing with Array [Index], the use of 'critical' section is highly demanded to execute such computation on one thread at a time.

Example:

BRIEF ABOUT YOUR APPROACH:

SOURCE CODE:

EXECUTION:

RESULTS: