

**Nikhil Rajendra Danappgol**  
**HPC Assignment 1**  
**2019BTECCS00036**

**Q1. Program in OpenMP to print “Hello World”.**

```
#include <omp.h>
#include <stdio.h>
#include <stdlib.h>
#include <bits/stdc++.h>

using namespace std;
// Hello World Program

int main(int argc, char *argv[])
{
    #pragma omp parallel
    {
        printf("thread No. %d Hello World\n", omp_get_thread_num());
    }
    return 0;
}
```

**Output:**

```

PS C:\HPCLAB> ./a.exe
thread No. 2 Hello World
thread No. 4 Hello World
thread No. 3 Hello World
thread No. 5 Hello World
thread No. 1 Hello World
thread No. 6 Hello World
thread No. 0 Hello World
thread No. 7 Hello World
PS C:\HPCLAB>

```

**Q2. Find the squares of first 100 numbers followed by their sum. Compare the speed in sequential and parallel algorithm.**

**Parallel Approach:**

```

HelloWorld.cpp X
HelloWorld.cpp > main(int, char *[])
19 static int sum = 0;
20
21 // This is for parallel processing ...Calculates time for parallel processes
22
23 int main(int argc, char *argv[])
24 {
25
26     double itime, ftime, exec_time;
27     itime = omp_get_wtime();
28     #pragma omp parallel
29
30     for (int i = 1; i <= 100; i++)
31     {
32         if (i % 8 == omp_get_thread_num())
33         {
34             printf("Thread No %d Number :%d Square :%d \n", omp_get_thread_num(), i, i * i);
35             sum += i * i;
36         }
37     }
38     printf("Sum is %d ", sum);
39     cout << endl;
40     ftime = omp_get_wtime();
41     exec_time = (ftime - itime);
42     printf("\n\nTime taken is %f", exec_time);
43
44     return 0;
45 }
46

```

**Output:**

```
PROBLEMS    OUTPUT    TERMINAL    JUPYTER    DEBUG CONSOLE

Thread No 3 Number :19 Square :361
Thread No 3 Number :27 Square :729
Thread No 3 Number :35 Square :1225
Thread No 3 Number :43 Square :1849
Thread No 3 Number :51 Square :2601
Thread No 3 Number :59 Square :3481
Thread No 3 Number :67 Square :4489
Thread No 3 Number :75 Square :5625
Thread No 1 Number :57 Square :3249
Thread No 3 Number :83 Square :6889
Thread No 3 Number :91 Square :8281
Thread No 3 Number :99 Square :9801
Thread No 1 Number :65 Square :4225
Thread No 1 Number :73 Square :5329
Thread No 1 Number :81 Square :6561
Thread No 1 Number :89 Square :7921
Thread No 1 Number :97 Square :9409
Sum is 338350

Time taken is 0.028000
PS C:\HPCLAB> █
```

**Sequential Approach:**

```
int main()
{
    double itime, ftime, exec_time;
    itime = omp_get_wtime();
    // #pragma omp parallel

    for (int i = 1; i <= 100; i++)
    {
        // if (i % 8 == omp_get_thread_num())
        // {
        //     printf("Thread No %d Number :%d Square :%d \n", omp_get_thread_num(), i, i * i);
        //     printf("Square is %d \n", i * i);
        //     sum += i * i;
        // }
    }
    printf("Sum is %d ", sum);
    cout << endl;
    ftime = omp_get_wtime();
    exec_time = (ftime - itime);
    printf("\n\nTime taken is %f", exec_time);

    return 0;
}
```

**Output:**

```
Square is 7056  
Square is 7225  
Square is 7396  
Square is 7569  
Square is 7744  
Square is 7921  
Square is 8100  
Square is 8281  
Square is 8464  
Square is 8649  
Square is 8836  
Square is 9025  
Square is 9216  
Square is 9409  
Square is 9604  
Square is 9801  
Square is 10000  
Sum is 338350
```

```
Time taken is 0.033000
```

```
PS C:\HPCLAB> █
```

**Github Link:**

<https://github.com/nd22052000/HPC>