

Walchand College of Engineering, Sangli
Department of Computer Science & Engineering
Class : Final Year(Computer Science and Engineering)
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Semester 1

Course: High Performance Computing Lab

Name : Siddharth Mukkanawar

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Batch: B4

Q1) Write a program to print Hello World using OpenMp

```
#include<omp.h>
```

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
int main(int argc, char* argv[]){
```

```
    #pragma omp parallel
```

```
    {
```

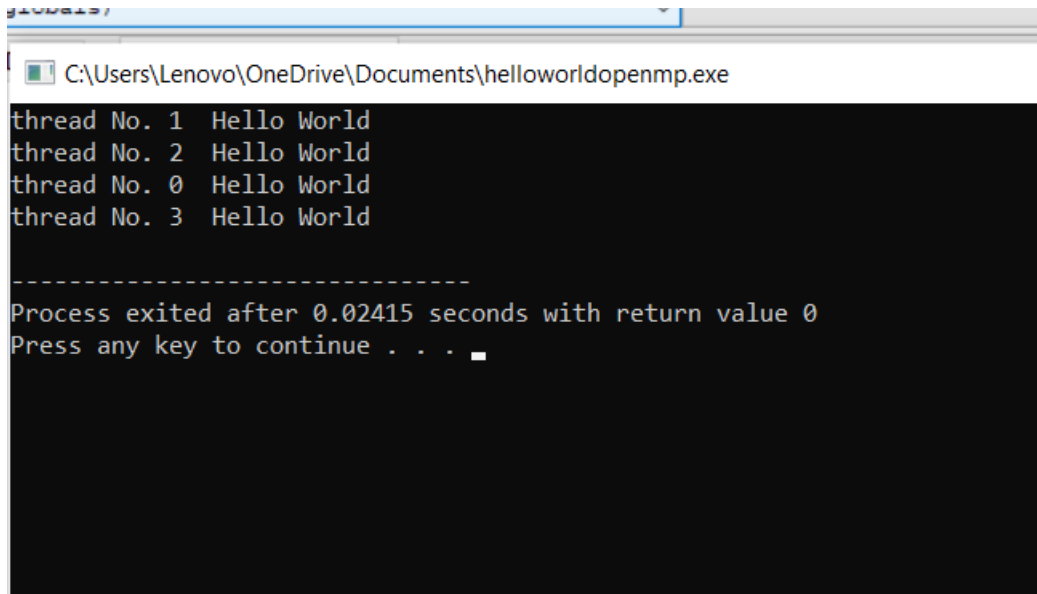
```
        printf("thread No. %d Hello World\n", omp_get_thread_num());
```

```

    }

    return 0;
}

```



```

C:\Users\Lenovo\OneDrive\Documents\helloworldopenmp.exe
thread No. 1 Hello World
thread No. 2 Hello World
thread No. 0 Hello World
thread No. 3 Hello World

-----
Process exited after 0.02415 seconds with return value 0
Press any key to continue . . .

```

Q 2) Write a program to print the sum of squares of numbers from 1 to hundred using OpenMp

```

#include<omp.h>

#include<stdio.h>

#include<stdlib.h>

#include<bits/stdc++.h>

using namespace std;

static int sum =0;

int main()
{
    #pragma omp parallel

```

```
{

for(int i=1; i<=100;i++)

{

    if(i%4==omp_get_thread_num())

    {

        printf("thread No. %d Number : %d Square : %d\n", omp_get_thread_num(), i, i *

i);

        sum+=i*i;

        printf("Sum is %d ",sum);

        cout<<endl;

    }

}

}

return 0;

}
```

C:\Users\Lenovo\OneDrive\Documents\HPCLab\ASSg1Squares.exe

```
thread No. 1 Number : 81 Square : 6561
Sum is 236534
thread No. 1 Number : 85 Square : 7225
Sum is 243759
thread No. 1 Number : 89 Square : 7921
Sum is 251680
thread No. 2 Number : 86 Square : 7396
Sum is 259076
thread No. 3 Number : 87 Square : 7569
Sum is 266645
thread No. 1 Number : 93 Square : 8649
Sum is 275294
thread No. 2 Number : 90 Square : 8100
Sum is 283394
thread No. 3 Number : 91 Square : 8281
Sum is 291675
thread No. 3 Number : 95 Square : 9025
Sum is 300700
thread No. 3 Number : 99 Square : 9801
Sum is 310501
thread No. 1 Number : 97 Square : 9409
Sum is 319910 thread No. 2 Number : 94 Square : 8836

Sum is 328746
thread No. 2 Number : 98 Square : 9604
Sum is 338350
```

Q3) Write a programme to calculate the 5th speedup in parallel and sequential execution

1) Parallel execution:

```
#include<omp.h>
```

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
#include<bits/stdc++.h>

using namespace std;


int main(){

    long long sum = 0;


    double getInTime = omp_get_wtime();


    #pragma omp parallel for reduction(+ : sum)


    for(int i=1;i<=100000000;i++){

        sum += (i*i);

    }


    double getOutTime = omp_get_wtime();



    double exptTime = getOutTime - getInTime;


    printf("Time Required For Execution in Parallel : %f\n",exptTime);


    printf("Answer is : %lld",sum);


    return 0;
```

```
}
```

 C:\Users\Lenovo\OneDrive\Documents\HPCLab\PARALLELTIME.exe

```
ime Required For Execution in Parallel : 0.101000
nswer is : 20049330185600
-----
rocess exited after 1.097 seconds with return value 0
ress any key to continue . . . █
```

2) Sequential execution

```
#include<omp.h>
#include<stdio.h>
#include<stdlib.h>
#include<bits/stdc++.h>
using namespace std;
```

```
int main(){

    long long sum = 0;

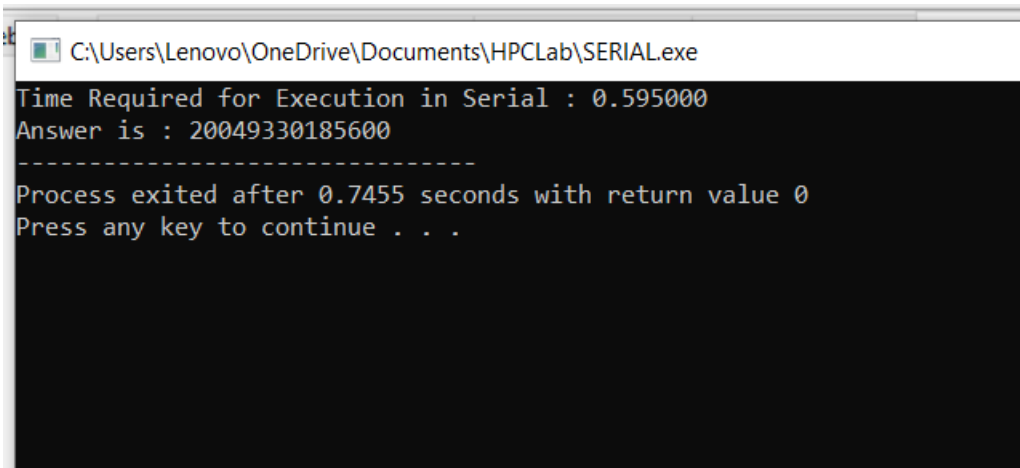
    double inTime = omp_get_wtime();

    int i;
    for(i=1;i<=1000000000;i++){
        sum += (i*i);
    }

    double outTime = omp_get_wtime();

    double expcTime = outTime - inTime;
```

```
printf("Time Required for Execution in Serial : %f\n",expcTime);  
printf("Answer is : %lld",sum);  
  
return 0;  
}
```



```
C:\Users\Lenovo\OneDrive\Documents\HPCLab\SERIAL.exe  
Time Required for Execution in Serial : 0.595000  
Answer is : 20049330185600  
-----  
Process exited after 0.7455 seconds with return value 0  
Press any key to continue . . .
```

Speedup = Sequential time / Parallel time
= 0.59500 / 0.10100
Speedup = 5.89

Github link: https://github.com/SiddharthM29/HPC_lab/tree/main/Assignment1