

Final Year B. Tech., Sem VI 2021-22

High Performance Computing Lab

Assignment submission

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Batch: B3

Assignment: 1

HPC LAB Assignment1

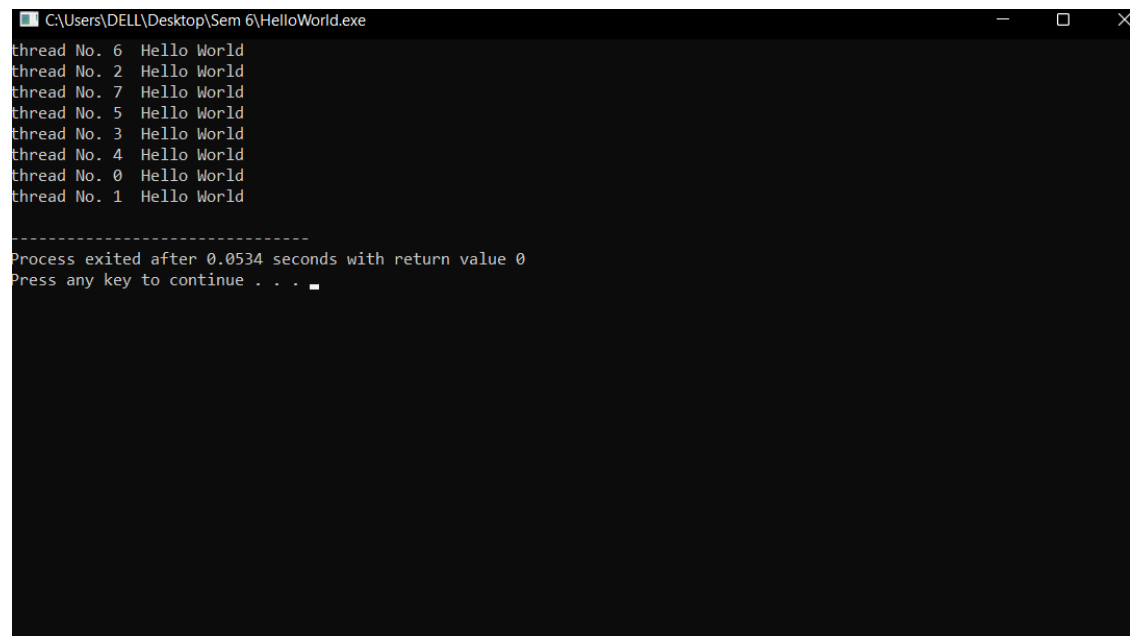
Q1.Hello world

Code:-

```
#include<omp.h>
#include<bits/stdc++.h>
int main(int argc, char* argv[]){

    #pragma omp parallel
    {
        printf("thread No. %d Hello World\n", omp_get_thread_num());
    }
    return 0;
}
```

Output:-



```
C:\Users\DELL\Desktop\Sem 6\HelloWorld.exe
thread No. 6 Hello World
thread No. 2 Hello World
thread No. 7 Hello World
thread No. 5 Hello World
thread No. 3 Hello World
thread No. 4 Hello World
thread No. 0 Hello World
thread No. 1 Hello World

-----
Process exited after 0.0534 seconds with return value 0
Press any key to continue . . .
```

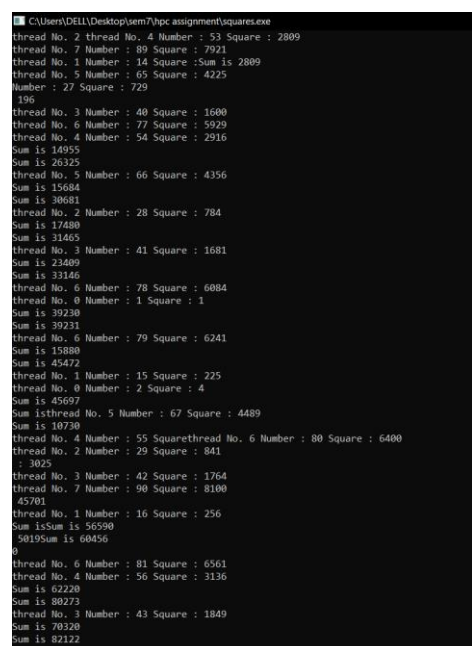
HPC LAB Assignment1

Q2.Squares

Code:-

```
#include<omp.h>
#include<bits/stdc++.h>
using namespace std;
static int sum =0;
int main()
{
    #pragma omp parallel for
    for(int i=1; i<=100;i++)
    {
        printf("thread No. %d Number : %d Square : %d\n", omp_get_thread_num(), i, i * i);
        sum+=i*i;
        printf("Sum is %d \n",sum);
    }
    printf("%d",sum);
    return 0;
}
```

Output:-



```

C:\Users\DELL\Desktop\sem7\hpc assignment\squares.exe
thread No. 2 thread No. 4 Number : 53 Square : 2809
thread No. 7 Number : 80 Square : 7921
thread No. 1 Number : 14 Square : Sum is 2809
thread No. 5 Number : 65 Square : 4225
Number : 27 Square : 729
156
thread No. 3 Number : 40 Square : 1600
thread No. 6 Number : 77 Square : 5929
thread No. 4 Number : 54 Square : 2916
Sum is 14955
Sum is 20325
thread No. 5 Number : 66 Square : 4356
Sum is 15684
Sum is 30681
thread No. 2 Number : 28 Square : 784
Sum is 17460
Sum is 31465
thread No. 3 Number : 41 Square : 1681
Sum is 23409
Sum is 33146
thread No. 6 Number : 78 Square : 6084
thread No. 0 Number : 1 Square : 1
Sum is 39230
Sum is 39231
thread No. 6 Number : 79 Square : 6241
Sum is 15880
Sum is 45472
thread No. 1 Number : 15 Square : 225
thread No. 0 Number : 2 Square : 4
Sum is 45697
Sum is 10730
thread No. 4 Number : 55 Squarethread No. 6 Number : 80 Square : 6400
thread No. 2 Number : 29 Square : 841
: 3025
thread No. 3 Number : 42 Square : 1764
thread No. 7 Number : 90 Square : 8100
45701
thread No. 1 Number : 16 Square : 256
Sum isSum is 56590
50195Sum is 60456
0
thread No. 6 Number : 81 Square : 6561
thread No. 4 Number : 56 Square : 3136
Sum is 62220
Sum is 80273
thread No. 3 Number : 43 Square : 1849
Sum is 70320
Sum is 82122
```

HPC LAB Assignment1

```
C:\Users\DELL\Desktop\lam7\ipc assignment\squares.exe
Sum is 70320
Thread No. 3 Number : 43 Square : 1849
Sum is 82122
Thread No. 7 Number : 91 Square : 8281
Sum is 70576
Sum is 90403
Thread No. 1 Number : 17 Square : 289
Thread No. 3 Number : 44 Squadthread No. 0 Number : 3 Square : 9
Sum is 9136
Thread No. 7 Number : 92 Square : 8464
Sum is 90701
Sum is 101101
Thread No. 5 Number : 68 Square : 4624
Sum is 77137
Sum is 105725
Sum is 90692
Thread No. 5 Number Sum is 92637
69 Square : 4761
Thread No. 7 Number : 93 Square : 8649
Thread No. 6 Number : 82 Square : 6724
Thread No. 4 Number : 57 Square : 3249
Thread No. 1 Number : 18 Square : 324
Sum is 110486
Sum is 125859
Thread No. 5 Number : 70 Square : 4900
Sum is 129108
Thread No. 0 Number : 4 Square : 16
Sum is thread No. 4 Number : 38 Square : 3364
Sum is 57431
Sum is 137712
Sum is 119135
Sum is 134332
Thread No. 7 Number : thread No. 2 Number : 38 Square : 900
129432
Thread No. 6 Number : 83 Square : 6889
Thread No. 5 Number : 71 Square : 5041
Thread No. 3 Number : 45 Square : 2025
Thread No. 4 Number : 59 Square : 3481
Sum is 134348
Sum is 156048
Sum is 150542
94 Square : 8836
Sum is thread No. 5 Number : 72 Square : 5184
Thread No. 1 Number : 19 Square : 361
145501
Sum is 164884
Sum is 138612
Sum is 170868 thread No. 6 Number : 84 Square : 7056
Thread No. 4 Number : 60 Square : 3600
```

```
C:\Users\DELL\Desktop>gcc assignment\sqares.exe
sum is 170429
sum is 152567

thread No. 2 Number : 31 Square : 961
sum is sum is 177485
sum is 191071

thread No. 1 Number : 20 Square : 400
thread No. 5 Number : 73 Square : 5329
thread No. 2 Number : 32 Square : 1024sum is 181085
sum is 191471

thread No. 0 Number : 5 Square : 25
190110
threa
thread No. 4 Number : 61 Square : 3721
sum is 196800
thread No. 3 Number : 46 Square : 2116
sum is 196825
thread No. 7 Number : 96 Square : 9216
sum is 197849
thread No. 1 Number : 21 Square : 441
sum is 201570
thread No. 5 Number : 7thread No. 4 Number : 62 Square : 3844
threadsum is 212902
thread No. 2 Number : 33 Square : 1089
thread No. 3 Number : 47 Square : 2209
d No. 0 Number : 6 Square : 36
sum is 213076
sum is 213343
4 Square : 5476
sum is 220485

thread No. 7 Number : 97 Square : 9409
thread No. 1 Number : 22 Square : 484
thread No. 3 Number : 48 Square : 2304
sum is 238194
d No. 6 Number : 85 Square : 7225
sum is 235406
thread No. 3 Number : 49 Square : 2401
suthread No. 2 Number : 34 Square : 1156
sum is 235890
thread No. 7 Number : 98 Square : 9604
sum is 247820
n is 220521
sum iSum is 225997
sum is 248976
sum is 251157
threads 255580

thread No. 4 Number : 63 Square : 3969
```

HPC LAB Assignment1

```
C:\Users\DELL\Desktop\sem7\hpc assignment\squares.exe
thread No. 7 Number : 99 Square : 9801
Sum is 262549
thread No. 5 Number : 75 Square : 5625
Sum is 262598
thread No. 3 Number : 50 Square : 2500
thread No. 4 Number : 64 Square : 4096
Sum 1thread No. 2 Number : 35 Square : 1225
thread No. 1 Number : 23 Square : 529
Sum is 245419
Sum is 284620
Sum is 285845
Sum is 286374
thread No. 6 Number : 86 Square : 7396
thread No. 2 Number : 36 Square : 1296
thread No. 1 Number : 24 Square : 576
Sum is 280524
thread No. 0 Number : 8 Square : Sum is 295066
Sum is 293770
64
Sum is 278024
Sum is 272399
Sum is 295706
thread No. 5 Number : 76 Square : 5776
thread No. 7 Number : 100 Square : 10000
thread No. 2 Number : 37 Square : 1369
thread No. 6 Number : 87 Square : 7569
Sum is 311482
Sum is 312851
thread No. 3 Number : 51 Square : 2601
Sum is 301482
Sum is 323821
Sum is 295642
thread No. 0 Number : 9 Square : 81
thread No. 1 Number : 25 Square : 625
Sum is 320420
thread No. 3 Number : 52 Square : 2704
Sum is 323102
thread No. 2 Number : 38 Square : 1444
Sum is 323727
thread No. 6 Number : 88 Square : 7744
Sum is 326431
thread No. 0 Number : 10 Square : 100
thread No. 1 Number : 26 Square : 676
Sum is 335619
Sum is 336295
Sum is 335719
Sum is 327875
thread No. 0 Numberthread No. 2 Number : 39 Square : 1521
: 11 Sum is 337916
```

```
C:\Users\DELL\Desktop\sem7\hpc assignment\squares.exe
thread No. 0 Numberthread No. 2 Number : 39 Square : 1521
: 11 Sum is 337916
quare : 121
Sum is 338037
thread No. 0 Number : 12 Square : 144
Sum is 338181
thread No. 0 Number : 13 Square : 169
Sum is 338350
338350
-----
Process exited after 0.471 seconds with return value 0
Press any key to continue . . .
```

HPC LAB Assignment1

Parallel Vs Serial:-

Parallel Code:-

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

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;
}
```

Serial Code:-

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

int main(){

    long long sum = 0;

    double inTime = omp_get_wtime();

    int i;
    for(i=1;i<=100000000;i++){
        sum += (i*i);
    }
}
```

HPC LAB Assignment1

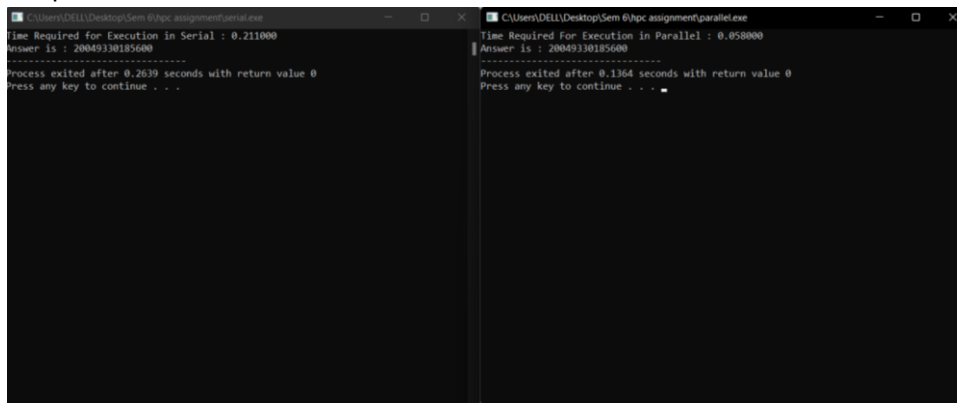
```
double outTime = omp_get_wtime();

double expcTime = outTime - inTime;

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

return 0;
}
```

Output:-



```
C:\Users\DELL\Desktop\Sem 0\hpc assignment\serial.exe
Time Required for Execution in Serial : 0.211000
Answer is : 20049330185600
-----
Process exited after 0.2639 seconds with return value 0
Press any key to continue . . .

C:\Users\DELL\Desktop\Sem 0\hpc assignment\parallel.exe
Time Required for Execution in Parallel : 0.058000
Answer is : 20049330185600
-----
Process exited after 0.1364 seconds with return value 0
Press any key to continue . . .
```