Lab Submission – 11

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20BCE1294

Program: B.Tech

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Course: CSE4001 – Parallel and Distributed Computing

Faculty: Dr. Sudha A

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Exercise: 11

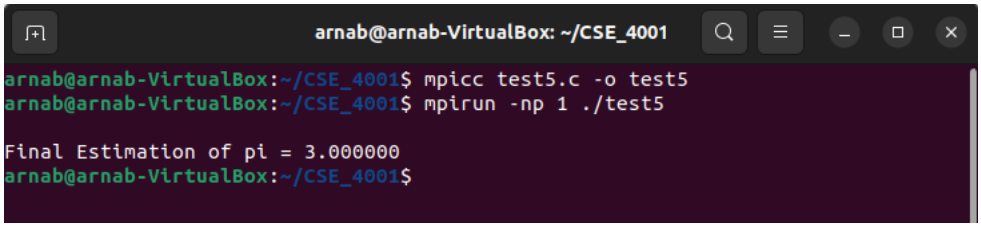
1. Estimating PI using Monte Carlo Method
2. Calculate sum of N Prime Numbers

Code1:

```c
#include <mpi.h>

#include <stdlib.h>

#include <stdio.h>

#include <unistd.h>

#include <time.h>

#define INTERVAL 10000

int main()

{

    int interval, i;
```

```
    double rand_x, rand_y, origin_dist, pi;

    int circle_points = 0, square_points = 0;

    srand(time(NULL));

    for (i = 0; i < (INTERVAL * INTERVAL); i++)
    {

        rand_x = (double)(rand() % (INTERVAL + 1)) / INTERVAL;

        rand_y = (double)(rand() % (INTERVAL + 1)) / INTERVAL;

        origin_dist = rand_x * rand_x + rand_y * rand_y;

        if (origin_dist <= 1)

            circle_points++;

        square_points++;

        pi = (4 * circle_points) / square_points;
    }

    printf("\nFinal Estimation of pi = %f\n", pi);

    return 0;
}
```

Output1:



Code 2:

```
#include <stdio.h>

#include <stdlib.h>

#include <mpi.h>

#include <unistd.h>
```

```
int check_prime(int a)

{

    int c;

    for (c = 2; c <= a - 1; c++)

    {

        if (a % c == 0)

            return 0;
    }

    return 1;
}

int main(int argc, char **argv)
{

    int np, myrank;

    int limit = 5;

    int sum = 0;

    for (int i = 2; i <= limit; i++)
    {

        if (check_prime(i) == 1)

        {

            sum += i;
        }
    }

    MPI_Status status;

    MPI_Init(&argc, &argv);

    MPI_Comm_rank(MPI_COMM_WORLD, &myrank);

    MPI_Comm_size(MPI_COMM_WORLD, &np);

    int final_sum = 0;
```

```c
    MPI_Reduce(&sum, &final_sum, 1, MPI_INT, MPI_SUM, 0, MPI_COMM_WORLD);

    if (myrank == 0)
    {

        printf("Sum: %d\n", final_sum);
    }

    MPI_Finalize();

    return 0;
}
```

Output2: