Walchand College of Engineering, Sangli
Department of Computer Science and Engineering

Class: Final Year (Computer Science and Engineering)

Year: 2021-22 **Semester:** 1

Course: High Performance Computing lab

ESE Exam

22/11/2021 01.00 PM – 04.00 PM

Exam Seat No:

Name: Rutuja Shivaji Patil
Exam Seat Number: 2018BTECS00018

Problem Statement 1

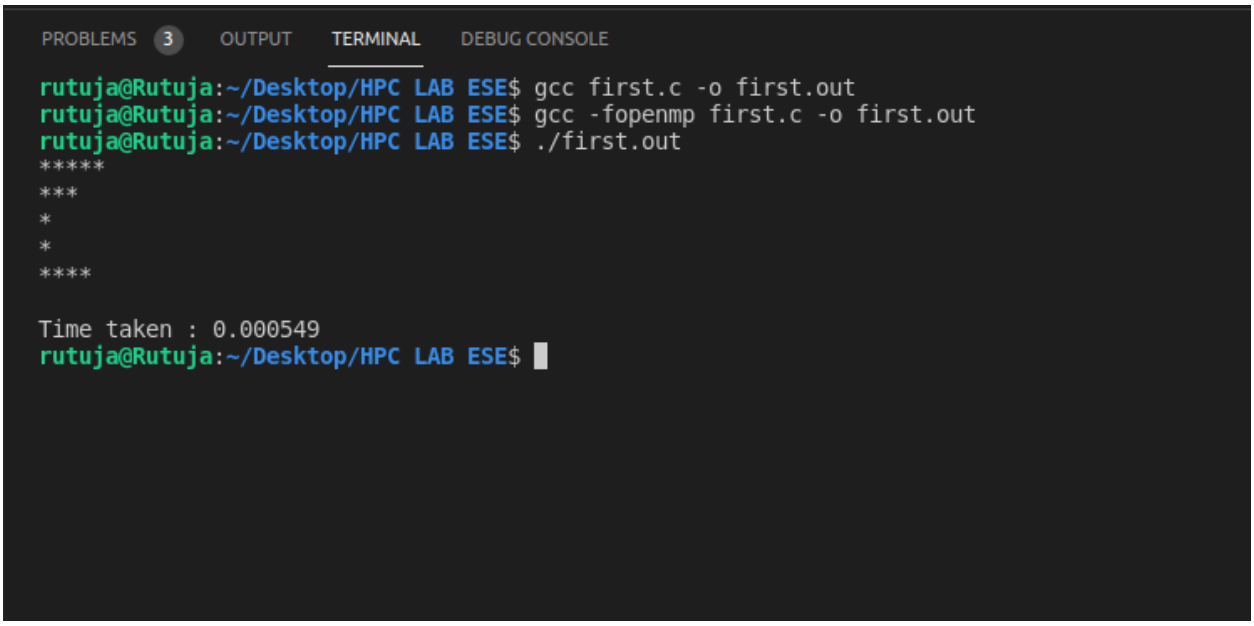
Statement: Write an OpenMP program to print inverted pyramid using *.

Screenshot 1:

```c
#include <stdio.h>
#include <omp.h>
#define N 5
#include <stdlib.h>
#include <time.h>

int main()
{
    clock_t start, end;
    start = clock();
    int i, j;
#pragma omp parallel for num_threads(10) shared(i, j)
    for (i = N; i >= 1; i--)
    {
        for (j = 1; j <= i; j++)
        {
            printf("*");
        }
        printf("\n");
    }

    end = clock();
    double time_taken = (double)(end - start) / (double)(CLOCKS_PER_SEC);
    printf("\nTime taken : %0.6f\n", time_taken);
}
```

Information 1: Program for inverting pyramid using openmp

Screenshot 2:



Information 2:output

Problem Statement 2

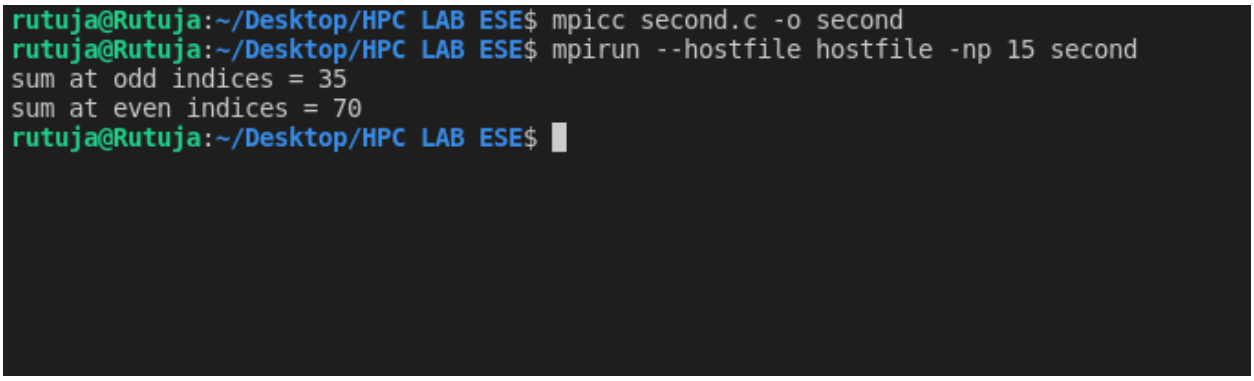
Statement: Implement MPI program to reduce the data from n processes to root process.

Screenshot 1:

```c
#include <stdio.h>
#include <stdlib.h>
#include <mpi.h>

int main(int argc, char **argv)
{
    int size, rank;

    MPI_Init(&argc, &argv);
    MPI_Comm_size(MPI_COMM_WORLD, &size);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    int localsum[2] = {0, 0};
    int globalsum[2] = {0, 0};

    if (rank % 2 == 1)
    {
        localsum[0] += 5;
    }
    else if (rank > 0 && (rank % 2 == 0))
    {
        localsum[1] += 10;
    }

    MPI_Reduce(localsum, globalsum, 2, MPI_INT, MPI_SUM, 0, MPI_COMM_WORLD);

    if (rank == 0)
    {
        printf("sum at odd indices = %d \n", globalsum[0]);
        printf("sum at even indices = %d \n", globalsum[1]);
    }

    MPI_Finalize();

    return (EXIT_SUCCESS);
}
```

Information 1: Program

Screenshot 2:



Information 2: output

Technologies Used: openmp,mpi
GitHub Link: https://github.com/rutuja-patil107/HPC_ESE