PDC - Lab 5

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[redacted]

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Question 1

A Sample Hello World program

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

int main(int argc, char **argv) {
    int node;
    MPI_Init(&argc,&argv);
    MPI_Comm_rank(MPI_COMM_WORLD, &node);
    printf("Hello World from Node %d\n",node);
    MPI_Finalize();
}
```

```
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpicc p1.c
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpirun -np 2 a.out
Hello World from Node 0
Hello World from Node 1
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$
```

Question 2

Sorting by Rank

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

```
int main(int argc, char *argv[])
{
    int rank, size, len,message=999;
MPI_Init(&argc, &argv);
MPI_Comm_size(MPI_COMM_WORLD, &size);
MPI_Comm_rank(MPI_COMM_WORLD, &rank);
if (rank == 0) {
    MPI_Send(&message, 1, MPI_INT, 1, 0, MPI_COMM_WORLD);
    printf("1 SIZE = %d RANK = %d MESSAGE = %d
\n",size,rank, message);
} else {
    int buffer;
    MPI_Status status;
    MPI_Probe(MPI_ANY_SOURCE, 0, MPI_COMM_WORLD,
&status);
    MPI_Get_count(&status, MPI_INT, &buffer);
    if (buffer == 1) {
        printf("2 SIZE = %d RANK = %d MESSAGE = %d
\n",size,rank, message);
        MPI_Recv(&message, buffer, MPI_INT,
MPI_ANY_SOURCE, 0, MPI_COMM_WORLD, &status);
        if (rank + 1 != size) {
            MPI_Send(&message, 1, MPI_INT, ++rank, 0,
MPI_COMM_WORLD);
        }}}
MPI_Finalize();
    return 0;
}
```

```
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpicc p2.c
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpirun -np 2 a.out
1 SIZE = 2 RANK = 0 MESSAGE = 999
2 SIZE = 2 RANK = 1 MESSAGE = 999
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$
```

Question 3

Simple addition and sorting of rank

```
#include <mpi.h>
#include <stdio.h>
int main(int argc, char **argv)
{
int len,node,sum=0;
char name[MPI_MAX_PROCESSOR_NAME];
MPI_Init(&argc,&argv);
MPI_Comm_rank(MPI_COMM_WORLD, &node);
MPI_Get_processor_name(name,&len);
printf("hello from Node %s my rank is%d\n",name,node);
MPI_Reduce(&node, &sum, 1, MPI_INT, MPI_SUM, 0,
MPI_COMM_WORLD);
    if(node == 0)
    {
        printf("The sum of all ranks is %d.\n", sum);
    }
MPI_Finalize();
return 0;
}
```

```
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpicc p3.c
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$ mpirun -np 2 a.out
hello from Node Aadhityas-MacBook-Air.local my rank is0
hello from Node Aadhityas-MacBook-Air.local my rank is1
The sum of all ranks is 1.
(base) Aadhityas-MacBook-Air:29Aug2020 aadhitya$
```