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HPC Lab
Assignment 5
Batch : B2

Title: **Installation of MPI and implementation of basic functions of MPI**

```
$ sudo apt install mpich
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libmpich-dev
Suggested packages:
  mpich-doc
The following NEW packages will be installed:
  libmpich-dev mpich
0 upgraded, 2 newly installed, 0 to remove and 5 not upgraded.
Need to get 7,571 kB of archives.
After this operation, 60.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 mpich amd64 4.0-3 [197 kB]
```

—---

1. Implement a simple hello world program by setting number of processes equal to

10.

```
#include <mpi.h>
#include <stdio.h>
int main( int argc, char *argv[] )
{
   MPI_Init( &argc, &argv );
   printf("Hello, world!\n");
   return 0;
}
```

```
$ mpirun -np 10 ./a.out
Hello, world!
Hello, world!Hello, world!
Hello, world!
Hello, world!

Hello, world!
Hello, world!Hello, world!
Hello, world!

Hello, world!
```

2. Implement a program to display rank and communicator group of five processes.

Code:

```c
#include <mpi.h>
#include <stdio.h>
int main( int argc, char *argv[] )
{
    MPI_Init( &argc, &argv );

    int rank;
    MPI_Group group;

    MPI_Comm_group(MPI_COMM_WORLD, &group);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    printf("Rank: %d, Group: %d \n", rank, group);




    MPI_Finalize();
    return 0;
}
```

```
$ mpirun -np 10 ./a.out
Rank: 1, Group: -2013265920
Rank: 2, Group: -2013265920
Rank: 3, Group: -2013265920
Rank: 6, Group: -2013265920
Rank: 7, Group: -2013265920
Rank: 5, Group: -2013265920
Rank: 9, Group: -2013265920
Rank: 8, Group: -2013265920
Rank: 4, Group: -2013265920
Rank: 0, Group: -2013265920
```

Github Link:

https://github.com/nd22052000/HPC