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PP_Lab - Batch 1

P1)

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

```
int main(int argc, char** argv) {
    int x = 2;
    // Initialize the MPI environment
    MPI_Init(NULL, NULL);

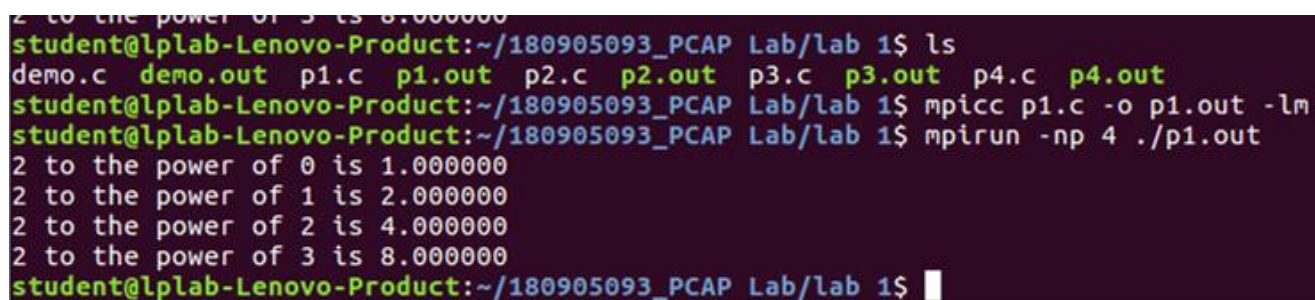
    int size;
    MPI_Comm_size(MPI_COMM_WORLD, &size);

    int rank;
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    double P = pow(x , rank);
    printf("%d to the power of %d is %f \n" , x , rank , P);

    // Finalize the MPI environment.
    MPI_Finalize();
}
```

Screen Shot of P1 Execution in Terminal :



```
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ ls
demo.c demo.out p1.c p1.out p2.c p2.out p3.c p3.out p4.c p4.out
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpicc p1.c -o p1.out -lm
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpirun -np 4 ./p1.out
2 to the power of 0 is 1.000000
2 to the power of 1 is 2.000000
2 to the power of 2 is 4.000000
2 to the power of 3 is 8.000000
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$
```

P2)

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

```
#include "mpi.h"
```

```
int main(int argc, char *argv[])
```

```
{
```

```
    int rank, size;
```

```
    MPI_Init(&argc, &argv);
```

```
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);
```

```
    MPI_Comm_size(MPI_COMM_WORLD, &size);
```

```
    if(rank%2==0)
```

```
        printf("Process %d : Hello\n",rank);
```

```
    else
```

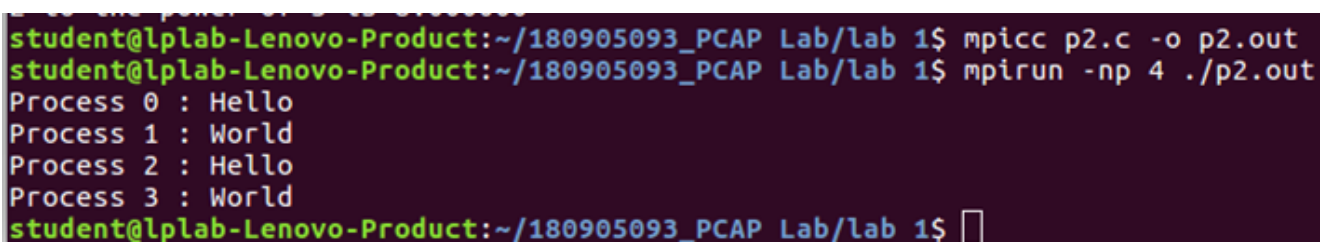
```
        printf("Process %d : World\n",rank);
```

```
    MPI_Finalize();
```

```
    return 0;
```

```
}
```

Screen Shot of P2 Execution in Terminal :

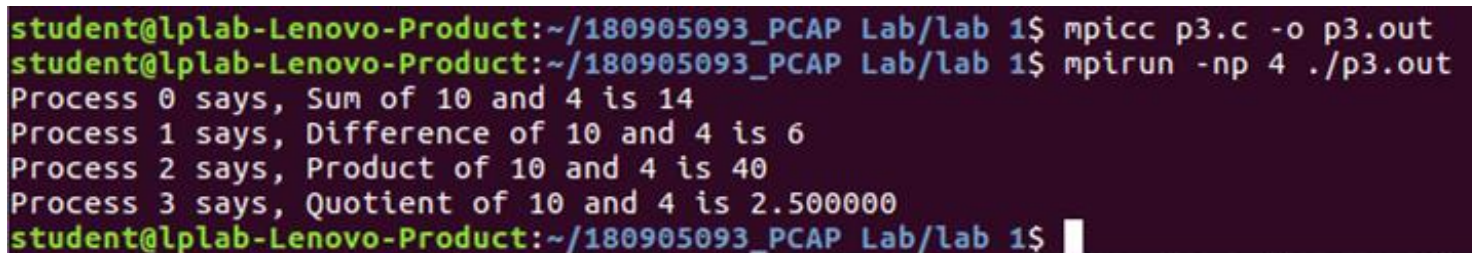


```
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpicc p2.c -o p2.out
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpirun -np 4 ./p2.out
Process 0 : Hello
Process 1 : World
Process 2 : Hello
Process 3 : World
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$
```

P3)

```
#include <mpi.h>
#include <stdio.h>
#include <math.h>
int main(int argc, char* argv[]) {
    int rank, size,a=10,b=4;
    MPI_Init(&argc,&argv);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);
    MPI_Comm_size(MPI_COMM_WORLD, &size);
    if(rank == 0)
        printf("Process %d says, Sum of %d and %d is %d\n",rank,a,b,a + b);
    if (rank == 1)
        printf("Process %d says, Difference of %d and %d is %d\n", rank, a, b, a - b);
    if (rank == 2)
        printf("Process %d says, Product of %d and %d is %d\n", rank, a, b, a * b);
    if (rank == 3)
        printf("Process %d says, Quotient of %d and %d is %f\n", rank, a, b, (double)a / b);
    MPI_Finalize();
    return 0;
}
```

Screen Shot of P3 Execution in Terminal :

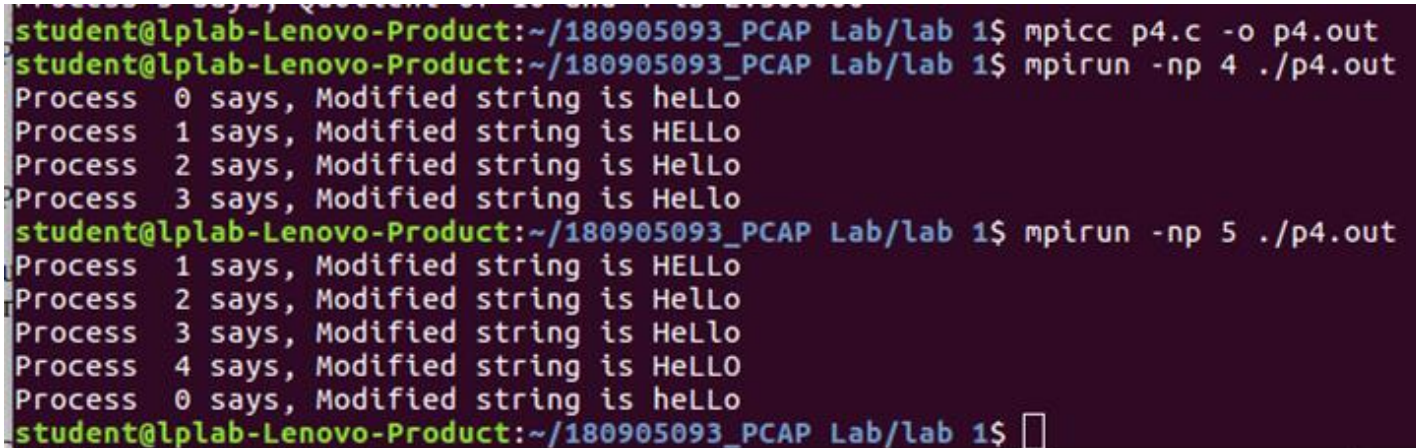


```
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpicc p3.c -o p3.out
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpirun -np 4 ./p3.out
Process 0 says, Sum of 10 and 4 is 14
Process 1 says, Difference of 10 and 4 is 6
Process 2 says, Product of 10 and 4 is 40
Process 3 says, Quotient of 10 and 4 is 2.500000
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$
```

P4)

```
#include <mpi.h>
#include <stdio.h>
#include <math.h>
int main(int argc, char* argv[]) {
    int rank, size;
    char str[6] = "HeLLo";
    MPI_Init(&argc,&argv);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);
    MPI_Comm_size(MPI_COMM_WORLD, &size);
    if (str[rank] >= 'a' && str[rank] <= 'z')
        str[rank] = str[rank] - 32;
    else
        str[rank] = str[rank] + 32;
    printf("Process % d says, Modified string is %s\n",rank,str);
    MPI_Finalize();
    return 0;
}
```

Screen Shot of P4 Execution in Terminal :



```
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpicc p4.c -o p4.out
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpirun -np 4 ./p4.out
Process 0 says, Modified string is heLLo
Process 1 says, Modified string is HELLo
Process 2 says, Modified string is Hello
Process 3 says, Modified string is HeLlo
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$ mpirun -np 5 ./p4.out
Process 1 says, Modified string is HELLo
Process 2 says, Modified string is Hello
Process 3 says, Modified string is HeLlo
Process 4 says, Modified string is HeLLo
Process 0 says, Modified string is heLLo
student@lplab-Lenovo-Product:~/180905093_PCAP Lab/lab 1$
```