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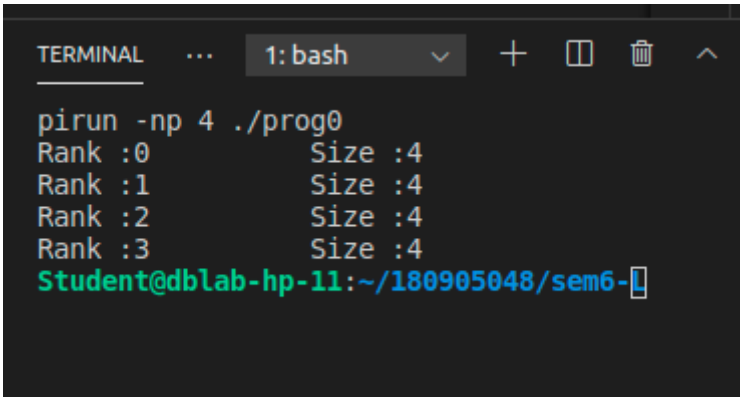
Q0

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

int main(int argc, char *agrv[])
{
   int rank,size;

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

   printf("Rank :%d \t Size :%d\n",rank,size);

   MPI_Finalize();

   return 0;
}

// mpicc prog0.c -o prog && mpirun -np 4 ./prog
```



Q1

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

int main(int argc,char *argv[])
{
   const int x=3;
```

```
    int rank;

    MPI_Init(&argc,&argv);
    MPI_Comm_rank(MPI_COMM_WORLD,&rank);
    printf("Rank %d\n",rank);

    int p=pow(x,rank);
    printf("power(%d,%d): %d\n",x,rank,p);

    MPI_Finalize();

    return 0;

}

//  mpicc prog1.c -lm -o prog1 && mpirun -np 4 ./prog1
```

```
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$ mpicc prog1.c -lm
 -o prog1 && mpirun -np 4 ./prog1
Rank 2
Rank 3
power(3,3): 27
Rank 0
power(3,0): 1
power(3,2): 9
Rank 1
power(3,1): 3
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$
```

Q2

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

    int main(int argc, char *agrv[])
{
    int rank;

    MPI_Init(&argc, &agrv);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    if (rank % 2 == 0)
    {
        printf("Hello\t Rank :%d \n", rank);
    }
    else
    {
        printf("World\t Rank :%d \n", rank);
    }
```

```
    MPI_Finalize();

    return 0;
}
```

```
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$ mpicc prog2.c -lm
 -o prog2 && mpirun -np 6 ./prog2
World    Rank :1
Hello    Rank :4
World    Rank :3
Hello    Rank :0
World    Rank :5
Hello    Rank :2
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$
```

Q3

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

int main(int argc,char *argv[])
{
    const int num1=3,num2=4;
    int res=0;
    int rank;

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

    if(rank==0)
    {
        printf("Addition of (%d , %d): %d\n",num1,num2,num1+num2);
    }
    else if (rank==1)
    {
        printf("Multiplication of (%d , %d): %d\n",num1,num2,num1*num2);
    }
    else if(rank==2)
    {
        printf("Division of (%d , %d): %f\n",num1,num2,(float)num1/(float)num2);
    }
    else if(rank==3)
    {
        printf("Subtraction of (%d , %d): %d\n",num1,num2,num1-num2);
    }

    MPI_Finalize();
```

```
    return 0;

}
```

```
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$ mpicc prog3.c -lm
 -o prog3 && mpirun -np 6 ./prog3
Addition of (3 , 4): 7
Multiplication of (3 , 4): 12
Subtraction of (3 , 4): -1
Division of (3 , 4): 0.750000
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$
```

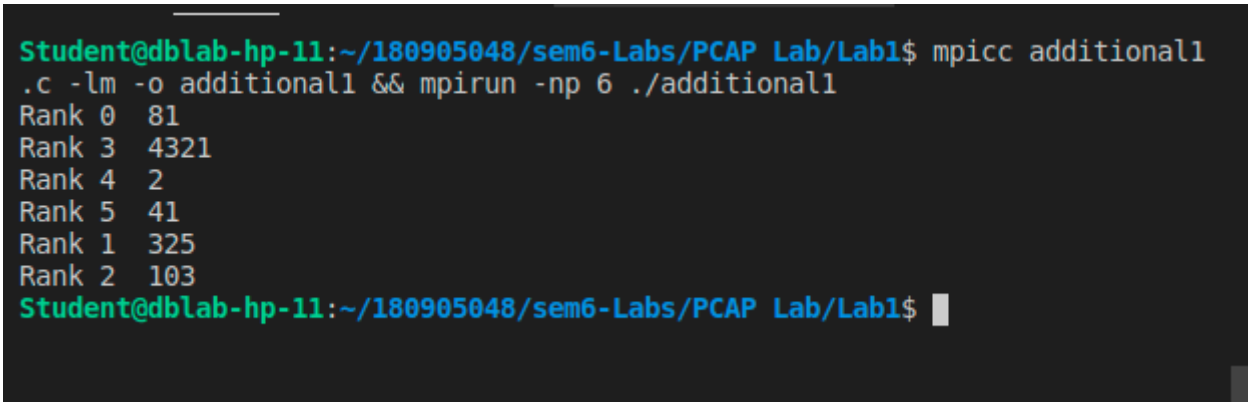
Q4

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

int main(int argc, char *argv[])
{
    char arr[6] = {'H', 'e', 'L', 'L', 'O', '\0'};
    int rank;
    MPI_Init(&argc, &argv);
    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    if (arr[rank] >= 65 && arr[rank] <= 90)
    {
        arr[rank] += 32;
    }
    else
    {
        arr[rank] -= 32;
    }
    printf("rank %d After %s\n", rank, arr);
    MPI_Finalize();

    return 0;
}
```

```
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$ mpicc prog4.c -lm
 -o prog4 && mpirun -np 6 ./prog4
rank 0 After heLLO
rank 1 After HELLO
rank 2 After HelLO
rank 3 After HeLlO
rank 4 After HeLLo
rank 5 After HeLLO
Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$
```

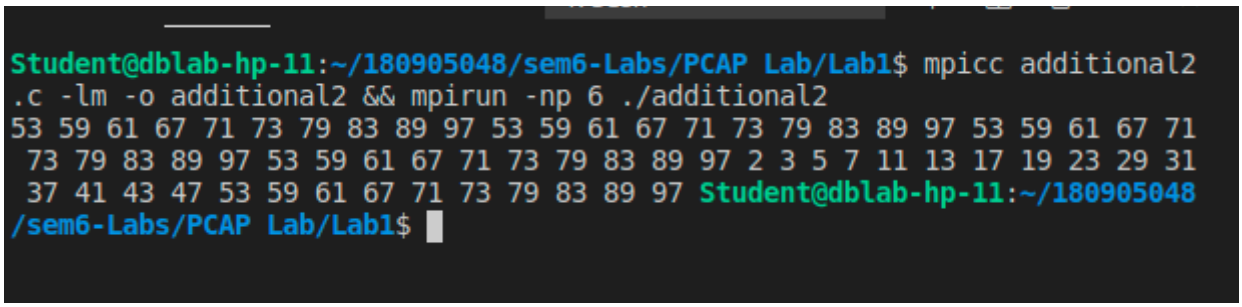
Additional Q1

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

int reverse(int num)
{
   int rev = 0;
   while (num)
   {
      int rem = num % 10;
      rev = rev * 10 + rem;
      num /= 10;
   }
   return rev;
}

int main(int argc, char *argv[])
{
   int arr[9] = {18, 523, 301, 1234, 2, 14, 108, 150, 1928};
   int rank;
   int rev;

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

   arr[rank] = reverse(arr[rank]);

   printf("Rank %d\t%d\n", rank,arr[rank]);

   MPI_Finalize();

   return 0;
}
```



Additional Ques 2

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

int isPrime(int num)
{
   for (int i = 2; i*i <= num; i++)
   {
      if(num%i==0)
      return 0;
   }
   return 1;
}

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

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

   if(rank==0)
   {
      for (int i = 2; i <=50; i++)
      {
         if(isPrime(i))
         {
            printf("%d ",i);
         }
      }

   }
   else{
      for (int i = 50; i <=100; i++)
      {
         if(isPrime(i))
         {
            printf("%d ",i);
         }
      }

   }

   MPI_Finalize();

   return 0;
}
```


Student@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$ mpicc additional2
.c -lm -o additional2 && mpirun -np 6 ./additional2
53 59 61 67 71 73 79 83 89 97 53 59 61 67 71 73 79 83 89 97 53 59 61 67 71
73 79 83 89 97 53 59 61 67 71 73 79 83 89 97 2 3 5 7 11 13 17 19 23 29 31
37 41 43 47 53 59 61 67 71 73 79 83 89 97 Student@dblab-hp-11:~/180905048
/sem6-Labs/PCAP Lab/Lab1$

//Ends//