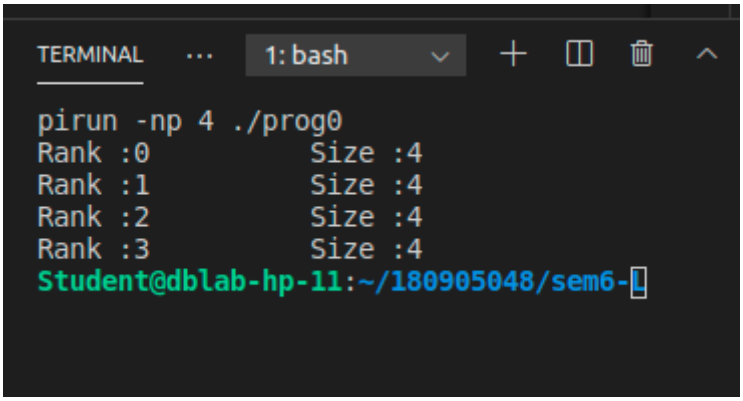
Name : Sahil Saini Salaria
Reg No. 180905048
Roll No. 11C
Batch C1

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$
```

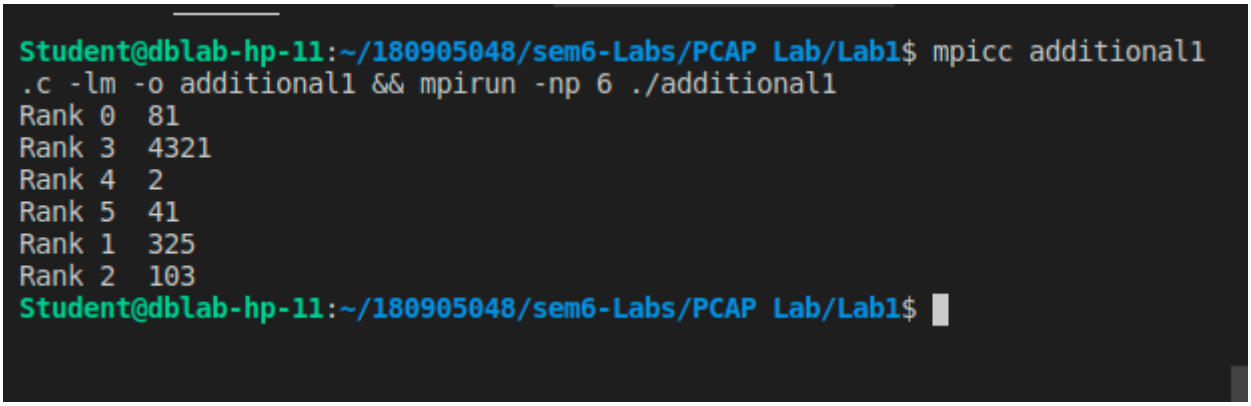
Q4

```
#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 2 ./additional2
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 Stu
dent@dblab-hp-11:~/180905048/sem6-Labs/PCAP Lab/Lab1$
```

//Ends//