190905104
PCAP

Sample

```c
#include "mpi.h"
#include <stdio.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);
printf("Rank: %d\tSize: %d\n", rank, size);
MPI_Finalize();
return 0;
}
```

```
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpicc -o sample -lm sample.c
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpiexec -n 4 ./sample
Rank: 1 Size: 4
Rank: 3 Size: 4
Rank: 2 Size: 4
Rank: 0 Size: 4
```

1)

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

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

int x=5;

int result=pow(x,rank);
printf("pow(x,rank) for process %d is %d \n",rank,result);

MPI_Finalize();
return 0;
}
```

```
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpicc -o q1 q1.c -lm
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpiexec -n 4 ./q1
pow(x,rank) for process 0 is 1
pow(x,rank) for process 2 is 25
pow(x,rank) for process 3 is 125
pow(x,rank) for process 1 is 5
```

2)

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

int main(int argc,char* argv[])
{
int rank,size;
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD, &size);
MPI_Comm_rank(MPI_COMM_WORLD,&rank);

if(rank%2==0){
printf("in process %d : Hello \n",rank);
}
else{
printf("in process %d : World \n",rank);
}
MPI_Finalize();
return 0;
}
```

```
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpicc -o q2 q2.c -lm
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpiexec -n 4 ./q2
in process 0 :  Hello
in process 1 :  World
in process 2 :  Hello
in process 3 :  World
```

3)

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

int main(int argc,char* argv[])
{
int rank,size;
int num1=30;
int num2=9;
MPI_Init(&argc,&argv);
```

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

if(rank==0){
int sum=num1+num2;
printf("Process %d: SUM of %d and %d is %d \n",rank,num1,num2,sum);
}
else if(rank==1){
int diff=num1-num2;
printf("Process %d: DIFFERENCE of %d and %d is %d \n",rank,num1,num2,diff);
}
else if(rank==2){
int mul=num1*num2;
printf("Process %d: PRODUCT of %d and %d is %d \n",rank,num1,num2,mul);
}
else if(rank==3){
float quot=num1/num2;
printf("Process %d: QUOTIENT of %d and %d is %f \n",rank,num1,num2,quot);
}
MPI_Finalize();
return 0;
}
```

```
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpicc -o q3 q3.c -lm
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpiexec -n 4 ./q3
Process 0: SUM of 30 and 9 is 39
Process 1: DIFFERENCE of 30 and 9 is 21
Process 2: PRODUCT of 30 and 9 is 270
Process 3: QUOTIENT of 30 and 9 is 3.000000
```

4)

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

char toggle(char c){
if(c >= 'a' && c <= 'z'){
return toupper(c);
}
else{
return tolower(c);
}
return c;
}
int main(int argc,char* argv[])
{
int rank,size;
```

```
char s[5]="HeLLo";
MPI_Init(&argc,&argv);
MPI_Comm_size(MPI_COMM_WORLD, &size);
MPI_Comm_rank(MPI_COMM_WORLD,&rank);


s[rank] = toggle(s[rank]);
printf("In process %d..string after toggling is %s \n",rank,s);

MPI_Finalize();
return 0;

}
```

```
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpicc -o q4 q4.c -lm
student@dblab-hp-280-10:~/190905104_ParthShukla_PCAP/week1$ mpiexec -n 5 ./q4
In process 0..string after toggling is heLLo
In process 2..string after toggling is HelLo
In process 4..string after toggling is HeLLO
In process 3..string after toggling is HeLlo
In process 1..string after toggling is HELLo
```