

```

#include <stdio.h>

#include "mpi.h"

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

    int num[20]; //N=20, n=4

    MPI_Init(&argc, &argv);

    MPI_Comm_rank(MPI_COMM_WORLD, &rank);

    MPI_Comm_size(MPI_COMM_WORLD, &size);

    for(int i=0;i<20;i++)

        num[i]=i+1;

    if(rank == 0){
        int s[4];

        printf("Distribution at rank %d \n", rank);

        for(int i=1;i<4;i++)

            MPI_Send(&num[i*5], 5, MPI_INT, i, 1, MPI_COMM_WORLD); //N/n i.e. 20/4=5

        int sum=0, local_sum=0;

        for(int i=0;i<5;i++)

        {
            local_sum=local_sum+num[i];
        }

        for(int i=1;i<4;i++)

        {
            MPI_Recv(&s[i], 1, MPI_INT, i, 1, MPI_COMM_WORLD,
            MPI_STATUS_IGNORE);
        }

        printf("local sum at rank %d is %d\n", rank,local_sum);

        sum=local_sum;

        for(int i=1;i<4;i++)

            sum=sum+s[i];

        printf("final sum = %d\n\n",sum);
    }

    else

    {

```

```
int k[5];

MPI_Recv(k, 5, MPI_INT, 0, 1, MPI_COMM_WORLD, MPI_STATUS_IGNORE);

int local_sum=0;

for(int i=0;i<5;i++)
{
    local_sum=local_sum+k[i];
}

printf("local sum at rank %d is %d\n", rank, local_sum);

MPI_Send(&local_sum, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);

}

MPI_Finalize();

return 0;

}
```

```
Applications Terminal Mar 5 12:14 PM 100 B/s 1.862 B/s 83 %
manish@manish-Lenovo-IdeaPad-S340-14API: ~/Downloads/openmpi-4.1.2
manish@manish-Lenovo-IdeaPad-S340-14API:~/Downloads/openmpi-4.1.2$ ./configure --prefix=$HOME/opt/openmpi
checking for perl... perl

=====
== Configuring Open MPI
=====

*** Startup tests
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking target system type... x86_64-pc-linux-gnu
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking whether gcc understands -c and -o together... yes
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
checking for ANSI C header files... yes
checking for sys/types.h... yes
checking for sys/stat.h... yes
checking for stdlib.h... yes
checking for string.h... yes
checking for memory.h... yes
checking for strings.h... yes
checking for inttypes.h... yes
checking for stdint.h... yes
checking forunistd.h... yes
checking minix/config.h usability... no
checking minix/config.h presence... no
checking for minix/config.h... no
checking whether it is safe to define _EXTENSIONS... yes
```

```
Applications Terminal Mar 5 12:09 PM 0 B/s 1.0 B/s 77 %
manish@manish-Lenovo-IdeaPad-S340-14API: ~/Downloads/openmpi-4.1.2
manish@manish-Lenovo-IdeaPad-S340-14API:~/Downloads/openmpi-4.1.2$ mptexec --oversubscribe -n 4 ./2
at rank 1
Sending message containing: 10 from rank 0
at rank 2
Received message containing: 10 at rank 1
at rank 3
```