

# Assignment #03

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# Compute partial sum

## Implementation

## Code

1	. . .			10000
Partial from	Partial to - 1	. . .	Partial from	Partial to - 1
<- Width ->		. . .	<- Width + a ->	

- Width = 10000 / ( # of processors )

```
1 #include <stdio.h>
2 #include <mpi.h>
3 #define FINAL 10000
4 int main(int argc, char **argv)
5 {
6     int rank, size;
7     MPI_Init(&argc, &argv);
8     MPI_Comm_rank(MPI_COMM_WORLD, &rank);
9     MPI_Comm_size(MPI_COMM_WORLD, &size);
10    int width = (int)(FINAL/size);
11    int partialto = (rank+1)*width;
12    int partialfrom = rank*width;
13    int partialsum=0;
14    int temp;
15    if(rank == size-1)
16        partialto = FINAL+1;
17    for(int i = partialfrom ; i < partialto ; i++)
18    {
19        partialsum += i;
20    }
```

## Gathering computed partial sums

- Case 1. Send to rank 0

```

21  for(int i=1;i<size;i++)
22  {
23      if(rank == i)
24          MPI_Send(&partialsum,1, MPI_INT, 0, i, MPI_COMM_WORLD);
25      else if(rank == 0)
26      {
27          MPI_Recv(&temp, 1, MPI_INT, i, i, MPI_COMM_WORLD, MPI_STATUS_IGNORE);
28          partialsum += temp;
29      }
30  }
31  if(rank == 0)
32  {
33      printf("total sum = %d\n", partialsum);
34  }
35  MPI_Finalize();

```

## Gathering computed partial sums

- Case 2. Send to next rank

```

21  for(int i=0;i<size-1;i++)
22  {
23      if(rank == i)
24          MPI_Send(&partialsum,1, MPI_INT, i+1, i, MPI_COMM_WORLD);
25      else if(rank == i+1)
26      {
27          MPI_Recv(&temp, 1, MPI_INT, i, i, MPI_COMM_WORLD, MPI_STATUS_IGNORE);
28          partialsum += temp;
29      }
30  }
31  if(rank == size-1)
32  {
33      printf("total sum = %d\n", partialsum);
34  }
35  MPI_Finalize();

```

# Run the code

## Case 1. Send to rank 0

## Case 2. Send to next rank

<pre>gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpicc 01.c -o 01.o gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 1 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 2 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 3 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 4 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 5 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 6 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 7 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 8 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 9 ./01.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 10 ./01.o total sum = 50005000</pre>	<pre>gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpicc 02.c -o 02.o gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 1 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 2 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 3 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 4 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 5 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 6 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 7 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 8 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 9 ./02.o total sum = 50005000 gaia@GAIA:/data/GAIAJOBS/CppProjects/WJY/mpi/mpi02_sum\$ mpirun -np 10 ./02.o total sum = 50005000</pre>
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