

CSCI 596\_HW2

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Source Code:

```
Users > Clarisse > csci572 > hw2 > C global_avg.c
1  #include "mpi.h"
2  #include <stdio.h>
3
4  int nprocs; /* Number of processes */
5  int myid; /* My rank */
6
7  double global_sum(double partial) {
8  /* Refer to MPI-VG.pdf slide p20 - 25 */
9      double mydone, hisdone;
10     int bitvalue, partner;
11     MPI_Status status;
12     mydone = partial;
13
14     for ( bitvalue = 1; bitvalue < nprocs ; bitvalue *= 2) {
15         partner = myid ^ bitvalue;
16         MPI_Send(&mydone, 1, MPI_DOUBLE, partner , bitvalue , MPI_COMM_WORLD);
17         MPI_Recv(&hisdone , 1, MPI_DOUBLE, partner , bitvalue , MPI_COMM_WORLD, &status);
18         mydone += hisdone;
19     }
20 }
```

```
21
22 int main(int argc, char *argv[]) {
23     double partial, sum, avg;
24     double cpu1, cpu2;
25
26     MPI_Init(&argc, &argv);
27     MPI_Comm_rank(MPI_COMM_WORLD, &myid);
28     MPI_Comm_size(MPI_COMM_WORLD, &nprocs);
29
30     partial = (double) myid;
31     printf("Node %d has %le\n", myid, partial);
32
33     cpu1 = MPI_Wtime();
34     sum = global_sum(partial);
35     cpu2 = MPI_Wtime();
36
37
38     if (myid == 0) {
39         avg = sum/nprocs;
40         printf("Global average = %le\n", avg);
41         printf("Execution time (s) = %le \n", cpu2 - cpu1);
42     }
43     MPI_Finalize();
44     return 0;
45 }
```

Running Result with global average and execution time.

```
[cancan@discovery1 ~]$ more global_avg.out
=====
SLURM_JOB_ID = 5917622
SLURM_JOB_NODELIST = d05-[31-32]
TMPDIR = /tmp/SLURM_5917622
=====
Node 1 has 1.000000e+00
Node 2 has 2.000000e+00
Node 3 has 3.000000e+00
Node 0 has 0.000000e+00
Node 4 has 4.000000e+00
Node 7 has 7.000000e+00
Node 5 has 5.000000e+00
Node 6 has 6.000000e+00
Global average = 3.500000e+00
Execution time (s) = 4.509608e-02
Node 1 has 1.000000e+00
Node 3 has 3.000000e+00
Node 2 has 2.000000e+00
Node 0 has 0.000000e+00
Global average = 1.500000e+00
Execution time (s) = 6.193600e-05
```