

```
1 //-----
2 // synchronous blocking ring = DEADLOCK !!!!!!!!!!!!!!!!
3 //-----
4 #if (defined __linux__ || (defined _AIX)
5     #include <sys/types.h>
6     #include <sys/stat.h>
7     #include <unistd.h>
8 #elif (defined _WIN32) || (defined _WIN64)
9     #include <conio.h>
10    #include <direct.h>
11 #endif
12
13 #include<mpi.h>
14 #include<stdio.h>
15 #include <iostream>
16 using namespace std;
17
18 int main(int argc, char** argv)
19 {
20     int i, n = 0, rank, size, dest, src, mess = 0;
21     double time;
22
23     MPI_Request* request = new MPI_Request();
24     MPI_Status* status = new MPI_Status();
25
26     MPI_Init(&argc, &argv);
27     MPI_Barrier(MPI_COMM_WORLD);
28     time = -MPI_Wtime();
29
30     MPI_Comm_rank(MPI_COMM_WORLD, &rank);
31     MPI_Comm_size(MPI_COMM_WORLD, &size);
32     if (rank == 0) {
33         printf("\nThere are %d processes.\n", size);
34         mess = 333;
35         cout << "Select how many times the message " << mess << " should be shifted"
36              << " in the direction of a cycle of processes!\nIt should be n >= 0 and"
37              << " n < " << size << ".\n n = ";
38         cin >> n;
39         cout << endl;
40         fflush(stdout);
41     }
42     MPI_Bcast(&n, 1, MPI_INT, 0, MPI_COMM_WORLD);
43
44     for (i = 0; i < n; i++) {
45         dest = (rank + 1) % size;
46         cout << "process " << rank << ": i=" << i << ", stage 0" << endl;
47         MPI_Ssend(&mess, 1, MPI_INT, dest, 0, MPI_COMM_WORLD);
48         cout << "process " << rank << ": i=" << i << ", stage 1" << endl;
49         printf("send: %d->%d\n", rank, dest);
50
51         src = (rank + size - 1) % size;
52         MPI_Recv(&mess, 1, MPI_INT, src, 0, MPI_COMM_WORLD, status);
53         printf("receive: %d->%d\n", src, rank);
```

```
54     }  
55  
56     printf("processor %d: sum of messages = %d\n\n", rank, mess);  
57  
58     time += MPI_Wtime();  
59     if (rank == 0)  
60         printf("\nTime = %10.6f s\n", time);  
61  
62     fflush(stdout);  
63     MPI_Finalize();  
64  
65     delete status;  
66     delete request;  
67  
68     return 0;  
69 }
```