CS 5334   Spring 2016   Name ____________________________
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In-class Activity April 5

Send, Receive, and Deadlock

1. For each of the MPI codes below, explain whether it is safe or not, safe meaning that the code is guaranteed not to deadlock. If the code is not safe, explain why not. Assume that numtasks holds the number of MPI tasks and i holds the rank of the processor executing the code.

a.
```
MPI_Send(&buf, count, MPI_DOUBLE, (i+1)%numtasks, 1, MPI_COMM_WORLD);
MPI_Recv(&buf, count, MPI_DOUBLE, (i-1+numtasks)%numtasks, 1, MPI_COMM_WORLD);
```

b.
```
MPI_Isend(&buf, count, MPI_DOUBLE, (i+1)%numtasks, 1, MPI_COMM_WORLD, &request);
MPI_Recv(&buf, count, MPI_DOUBLE, (i-1+numtasks)%numtasks, 1, MPI_COMM_WORLD, &status);
MPI_Wait(&request, &status);
```

2 Write a safe version of the above communication pattern using only MPI_Send and MPI_Recv.

3. Write a safe version of the above communication pattern using MPI_Sendrecv_replace.