

## CPSC 479 Project 1 Report

Made by Nolan Delligatta

893367896

[ndelligatta@csu.fullerton.edu](mailto:ndelligatta@csu.fullerton.edu)

### Implementation:

This project uses two rings, with the first ring being in charge of collecting the two largest numbers in an array `numbers[2]`, and the loop will assure that the larger of the two numbers will be the first element. After the MPI barrier, the ring is concluded then a new one starts where `leader_and_number` will use another ring to find which rank had the second highest number and that rank and its number ID will be recorded in `leader_and_number[0]` and `leader_and_number[1]`, respectively. Finally, after the last MPI barrier, there is a broadcast to have all processes set their `int leader` variable to `leader_and_number[0]`, which is the rank with the second highest number.

### Abstract:

This project has N processes generate random 5 digit unique NNDRR ID's. Then a ring sequence occurs for the processes to find the two highest numbers out of the processes' random ID's. Another ring occurs to find out which process had the second highest ID, and once found, that process becomes the leader rank, and broadcasts to the `Comm.World` the leader's rank.

### Run

- `mpic++ project1.cpp && mpirun -n N a.out`

where N is a number between 6 and 20 to dictate the desired number of processes for this program.

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(no group)

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Run

mpic++ project1.cpp && mpirun -n N a.out

where N is a number between 6 and 20 to dictate the desired number of processes for this program.

**^G** Get Help  
**^X** Exit

**^O** WriteOut  
**^J** Justify

**^R** Read File  
**^W** Where Is

**^Y** Prev Page  
**^V** Next Page

**^K** Cut Text  
**^U** UnCut Text

**^C** Cur Pos  
**^T** To Spell

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Rank 7's leader is 0
Rank 8's leader is 0
Rank 9's leader is 0
Rank 1's leader is 0
Rank 2's leader is 0
[ndelligatto@titavr1:~/PROJ1$ mpic++ project2.cpp && mpirun -n 10 a.out
Process 1 #45101 has recieved values [39100, 0] from 0
Process 2 #21102 has recieved values [45101, 39100] from 1
Process 3 #19103 has recieved values [45101, 39100] from 2
Process 4 #95104 has recieved values [45101, 39100] from 3
Process 5 #24005 has recieved values [95104, 45101] from 4
Process 6 #13106 has recieved values [95104, 45101] from 5
Process 7 #92007 has recieved values [95104, 45101] from 6
Process 8 #64008 has recieved values [95104, 92007] from 7
Process 9 #86009 has recieved values [95104, 92007] from 8
Process 0 #39100 has recieved values [95104, 92007] from 9
I, rank 7 #92007 have the 2nd highest number 92007 and I am the leader.
Rank 1's leader is 7
Rank 2's leader is 7
Rank 3's leader is 7
Rank 4's leader is 7
Rank 5's leader is 7
Rank 6's leader is 7
Rank 0's leader is 7
Rank 8's leader is 7
Rank 9's leader is 7
[ndelligatto@titavr1:~/PROJ1$ mpic++ project2.cpp && mpirun -n 10 a.out
Process 1 #24001 has recieved values [17100, 0] from 0
Process 2 #71102 has recieved values [24001, 17100] from 1
Process 3 #50003 has recieved values [71102, 24001] from 2
Process 4 #63104 has recieved values [71102, 50003] from 3
Process 5 #91105 has recieved values [71102, 63104] from 4
Process 6 #43106 has recieved values [91105, 71102] from 5
Process 7 #20007 has recieved values [91105, 71102] from 6
Process 8 #54008 has recieved values [91105, 71102] from 7
Process 9 #12009 has recieved values [91105, 71102] from 8
Process 0 #17100 has recieved values [91105, 71102] from 9
I, rank 2 #71102 have the 2nd highest number 71102 and I am the leader.
Rank 1's leader is 2
Rank 0's leader is 2
Rank 3's leader is 2
Rank 4's leader is 2
Rank 5's leader is 2
Rank 6's leader is 2
Rank 7's leader is 2
Rank 8's leader is 2
Rank 9's leader is 2
ndelligatto@titavr1:~/PROJ1$ mpic++ project2.cpp && mpirun -n 10 a.out

```