# CS 4973 - Mersenne Prime Project

## Assignment 3 - Due 2019.09.09

---

**Overview**: The purpose of this assignment is to construct a program which will use the MPI send and MPI receive commands.

**Details**:

(1) In your home directory, you should see the .cpp file: MPI_sendrecv_example.cpp. Compile this program using the command

mpic++ MPI_sendrecv_example.cpp -o MPI_sendrecv_example

(2) Run this program at least once, preferably a few times to understand what is being displayed. Remember, you will need to submit it using a job file, which also means you need to keep an eye on the queue to see which partitions and servers on those partitions are available. The commands *squeue* and *sinfo -Nel* are good ones to remember.

(3) You are to modify this program to do the following:

(a) Each process will store in the variable *value* the square of their rank.
(b) Create a new integer variable called *rvalue* which is initialized to zero.
(c) Each process is to send its variable *value* to the next process, which will store this in its variable *rvalue*.
(d) The values of *value* and *rvalue* will be printed out for each process both before and after the send/recieves.

(4) As an example – process 3 will have *value* set to $3^2 = 9$. It will send this value to process 4 which will store it in its variable *rvalue*. Also, process 3 will receive process 2's *value* (which is 4) and it will be stored in process 3's variable *rvalue*.

(5) Note the special circumstance where process 0 receives process (size-1)'s value and stores it in *rvalue* while at the same time, process (size-1) sends its *value* variable to process 0's *rvalue* variable.

(6) As an example of this, if the world size is 40 (this is the $n$ in the job file), then process 39 should sent its *value* to process 0, and process 0 should receive this and store it in *rvalue*. *Hint: Mod is a nice thing....*

(7) Be sure to document your code, run it a few times, and be ready to show the output files along with the .cpp of your actual program on class Monday!