**Project #7b**

**Autocorrelation using MPI**

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1.

2.

3. **State what the secret sine-wave period is, i.e., what change in shift gets you one complete sine wave?**

The first wave peak of the sine wave is about SUM[4] = 4175547.5, and the next wave peak is about SUM[118] =4331373.5. Therefore, 118-4=114.

4. **What patterns are you seeing in the performance graph?**

The lowest performance is 1 processor, its performance is 263.39 mega-elements computed per second. It has the lowest performance because only 1 processor is used. The second is 2 processors, 655.93 mega-elements computed per second. Then there are 4 processors with a performance of 1326.74 mega-elements computed per second. Then there are 8 processors with a performance of 2586.5 mega-elements computed per second. Then there are 16 processors with a performance of 4533.58 mega-elements computed per second. Finally, there are 32 processors with a performance of 6315.07 mega-elements computed per second. Therefore, we can clearly see that the more processors the better the performance.

5. **Why do you think the performances work this way?**

The larger number of processors can be allocated more data. Therefore, the more processors will have higher the performance, because there will be many processors processing data at the same time.