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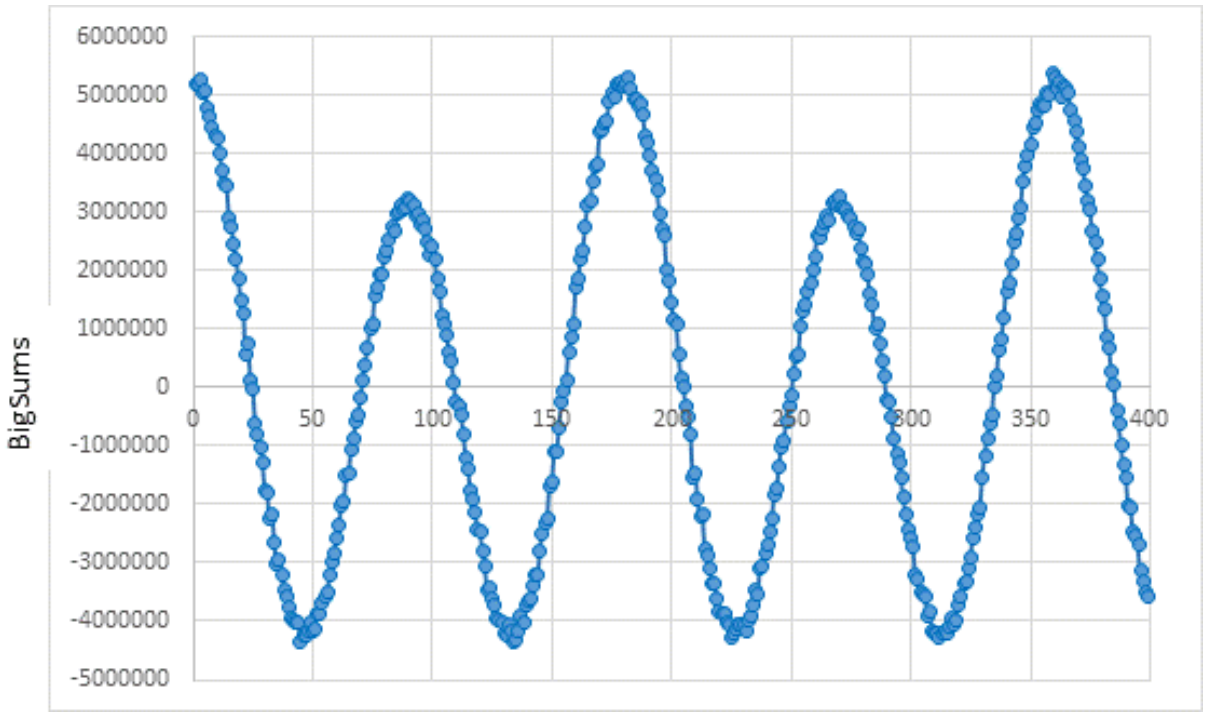
Project 07

1. Show the Sum[1] … Sums[399] vs shift scatterplot.



2. State what the two secret sine-wave period are.

   The first period is the short peak to the next tall peak.

   They are at BigSums[90] = 3233718 and BigSums[182] = 5319865.

   Therefore, the first period is 182 – 90 = 92.

   The second period is the short peak to the next short peak.

   They are at BigSums[90] = 3233718 and BigSums[270] = 3264061.

   Therefore, the first period is 270 – 90 = 180.

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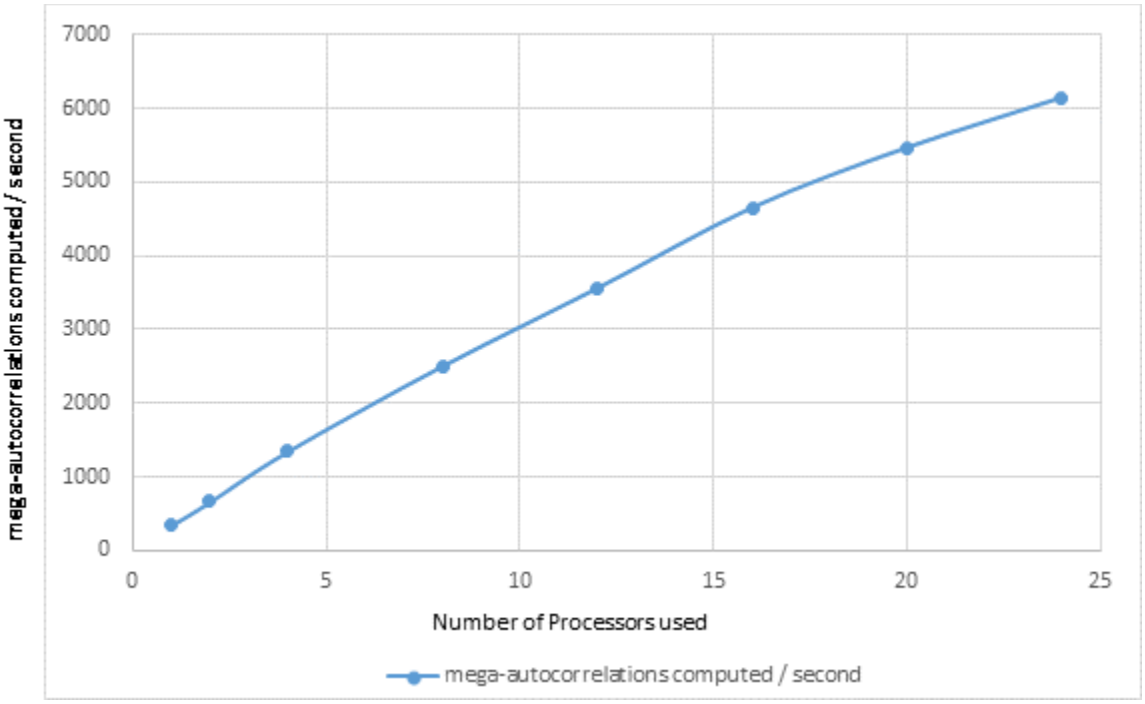
3. Show your graph of Performance vs. Number of Processors used?



4. What patterns are you seeing in the performance curves?

   Obviously, as the number of processors increases, there is a noticeable improvement in performance and almost linear. However, after a certain point around 16, the performance gains become smaller. Eventually, the performance may stabilize or even decline.

5. Why do you think the performance work this way?

   MPI allows CPUs to coordinate computations, send messages to each other. As a result, the more processors we employed, the higher the performance we got. However, when the number of processors reaches the maximum capacity that the software can handle, the performance may not be as planned due to communication overhead, load balancing issues, resource contention, and synchronization overhead.