**Synthesis Questions**

1. Evaluate your performance in terms of speed-up and cost. Chart your results. Be sure to run the programs with different numbers of processors and different coordinate ranges.

1. Is the Mandelbrot set application a good choice for parallelization? Why or why not?

The Mandelbrot set is a great choice for parallelization. The exact same calculation is run multiple times on numerous elements.

1. Is the speed up what you expected? Why or why not? What are some possibilities to improving the speed up?
2. Is there any advantage to the dynamic allocation over static? Justify your answer.

5.      Did you use collective communication methods in your implementation? Why or why not?

1. Pseudo code you implementation. Could you reduce the message passing overhead? Is there a better way to partition the work among the processors?

7.      What portion of processing is sequential? Does the sequential portion scale with data set size? Which law (Amdahl’s or Gustafson’s) is more appropriate in this case?

8.      Suppose we wanted to calculate PI to thousands of digits of accuracy. Unfortunately doubles only support sixteen digits of precision. How could we overcome this problem?

9.      If we use parallel program to manipulate an image being displayed. For example, suppose we want to rotate an image in three dimensions. Do you see a bottleneck that could arise?

10.  For the following row-order matrix, what is single dimension offset of the 11, 88, and 53? What formula did you use to calculate the offsets?  
  
int A[3,2,5] = { { {14,3,8,2,1}, {22,17,18,14,95} },

{ {99, 47,33,22, 11}, {16, 88, 77, 66, 55} },

{ {44,45,46,47, 48}, {55,54,53,52,51} } }