List of problems:

Solve one problem from each of these three sets by developing MPI programs.

Set 1:

1. Estimate the value of e, the base of the natural logarithm, using definition that e = 1+ 2/2! + 3/3! + 4/4! + …. Your program should take as input the accuracy to be achieved.
2. Use the numerical identity that the sum of the reciprocals of the squares of integers converges to π2/6. …. Your program should take as input the accuracy to be achieved.
3. Write a program to check if a number is prime. Read about the sieve of Eratosthenes and implement this strategy.

Set 2:

1. Write a program to find the inverse of a square matrix using the row reduction method. You can assume that the input matrix is non-singular.
2. Write a program to find the solution to a set of linear equations using the Gauss elimination method.
3. Write a program to multiply two square matrices. You should read about Cannon’s algorithm and then write an MPI program for it.

Set 3:

1. Given an undirected graph G, find the number of triangles and the number of cycles of length four in the graph.
2. Given an undirected graph G, find a proper vertex coloring of the graph using Delta(G) + 1 colors or fewer.
3. Given an undirected graph G, find a proper edge coloring of the graph using Delta(G) + 1 colors or fewer.

Other Directions:

1. You can do this homework in a group of two students. No group can have more than two students.
2. The programming language to use will depend on what ADA supports.
3. The input and output specification shall be provided soon.
4. The TA, Zia, will assign the groups and also the problems for the group. This makes it easy for our administration. Also, note that, it will not be possible to change the groups.
5. There will be only one submission required for the group. So, we will assign the same points to both members of the group.