Lab Exercises:

1) Write a MPI program to read N values in the root process. Root process sends one value to each process. Every process receives it and finds the factorial of that number and returns it to the root process. Root process gathers the factorial and finds sum of it. Use N number of processes.

2) Write a MPI program to read an integer value M and NXM elements into an 1D array in the root process, where N is the number of processes. Root process sends M elements to each process. Each process finds average of M elements it received and sends these average values to root. Root collects all the values and finds the total average. Use collective communication routines.

3) Write a MPI program to read a string. Using N processes (string length is evenly divisible by N), find the number of non-vowels in the string. In the root process print number of non-vowels found by each process and print the total number of non-vowels.

4) Write a MPI Program to read two strings S1 and S2 of same length in the root process. Using N processes including the root (string length is evenly divisible by N), produce the resultant string as shown below. Display the resultant string in the root process. Use Collective communication routines.
Example:

String S1: string   String S2: length   Resultant String : slternigntgh

Additional Exercises:

1) Write a MPI program to read a value M and NXM number of elements into 1D array in the root, where N is the total number of processes. Find the square of first M numbers, the cube of next M numbers and so on. Print the results in the root.

3) Write a MPI program using collective communication functions, to replace all even elements of array A to 1 and replace all odd elements to 0 of size N. Display the resultant array A, count of all even and odd numbers in root process. Assume N is evenly divisible by number of processes.

Example :
Input Array (A):   1 2 3 4 5 6 7 8 9
Resultant Array (A): 0 1 0 1 0 1 0 1 0
Even (Count) = 4
Odd (Count) = 5