1 Examples; Buffer Limit, Barrier, Collective Communications.

1. Determining the amount of MPI buffering; program

   - Write a program to determine the amount of buffering that MPI_Send provides. That is, write a program that determines how large a message can be sent with MPI_Send without a matching receive at the destination.

2. Benchmarking collective barrier; program

   - Write a program to measure the time it takes to perform an MPI_Barrier on MPI_COMM_WORLD. Use the same techniques as in the memcpy to average out variations and overhead in MPI_Wtime.
   - Print the size of MPI_COMM_WORLD and time for each test.
   - Make sure that both sender and reciever are ready when you begin the test.
   - How does the performance of MPI_Barrier vary with the size of MPI_COMM_WORLD?

3. Broadcast and non-blocking receive; program

   - A simple SPMD program which uses broadcast and non-blocking receive. The sender process bradcasts a message to all other processes.
   - They receive the message and send an answer back, containing the hostname of the machine on which the process is running.
   - The receiving process waits for the first reply with MPI_Waitany, and accepts messages in the order they are received.

4. MPI_Scatter; program

   - A simple SPMD program which uses MPI_Scatter to distribute an array of integer values evenly between a number of processes.

5. MPI_Gather; program

   - A simple SPMD program which uses MPI_Gather to collect an array of integer values from a number of processes.