**IT301 – Parallel Computing**

Assignment – 8

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1. Program 1 – MPI non-blocking Send and Receive
   1. Observation – Since we are using non-blocking send and receive here, the program executes without waiting to check if the data is sent/received completely.

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* 1. Observation – Here the program waits for the data to be sent/received completely because of the MPI\_wait() function

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* 1. Observation – When the tag number is different in the sending and receiving process, the MPI\_Wait() function makes the receiving process wait as it is expecting data from the sending process. Hence, this leads to a deadlock in the program.

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1. Program 2 – Bcast()
   1. Observation – The Bcast() function broadcasts the given data in the root process to all other processes.

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1. Program 3 – Reduce()
   1. Observation – The Reduce() function reduces the given data from all processes according to the given operator and stores the reduced data in the root process. Here the operation was "sum" and the data in each process was its rank, so the final value after reduction for 5 processes is 0+1+2+3+4 = 10.

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1. Program 4 – MPI\_Gather()
   1. Observation – The MPI\_Gather() function collects the given data from all processes and stores them in a given buffer at the specified process.

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1. Program 5 – MPI\_Scatter()
   1. Observation – The MPI\_Scatter() function sends chunks in a buffer from the specified process to all processes. Here we input numbers from 1 to 8 and the values are equally distributed among the 4 processes.

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1. Program 6 – MPI\_Scatter() with partial scatter
   1. Observation – As the process that sends data has more data so the program distributes the present data among the processes and remaining data is discarded.

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