Assignment 3

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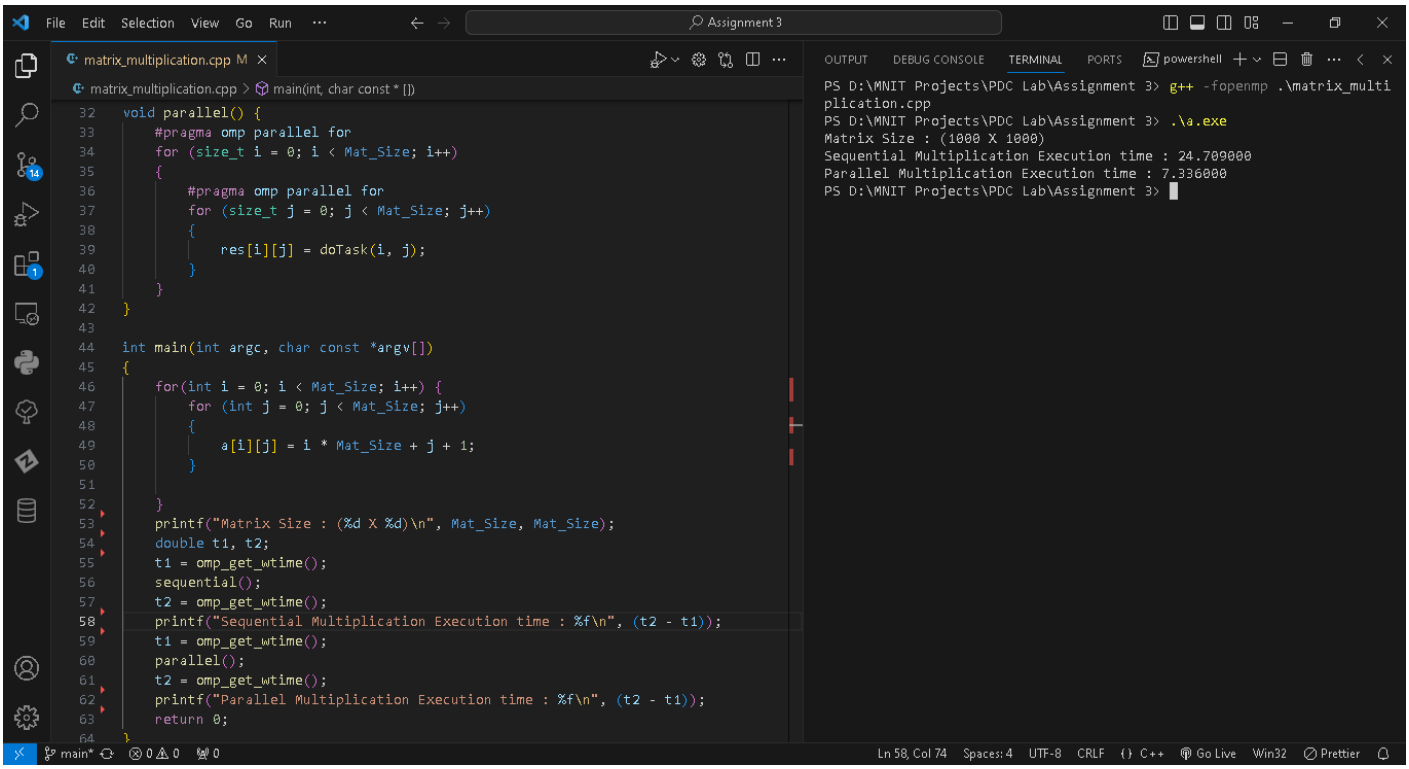
1. Write **OpenMP** parallel program for matrix multiplication and compare the performance of serial and parallel version of matrix multiplication.

Ans:

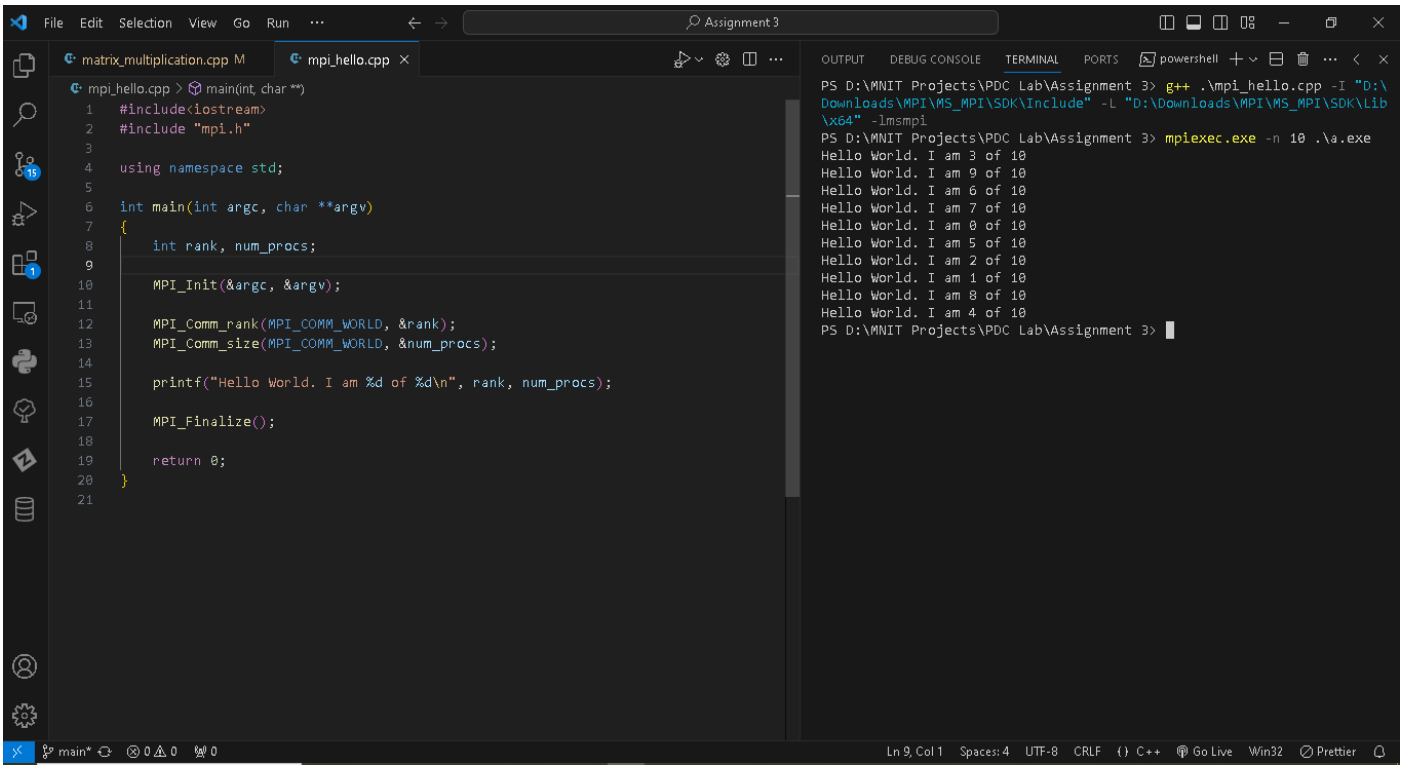


The time required to calculate matrix multiplication of matrix size using **serial computation** (1000 x 1000) is 24.7090

The time required to calculate matrix multiplication of matrix size using **parallel computation** (1000 x 1000) is 7.3360

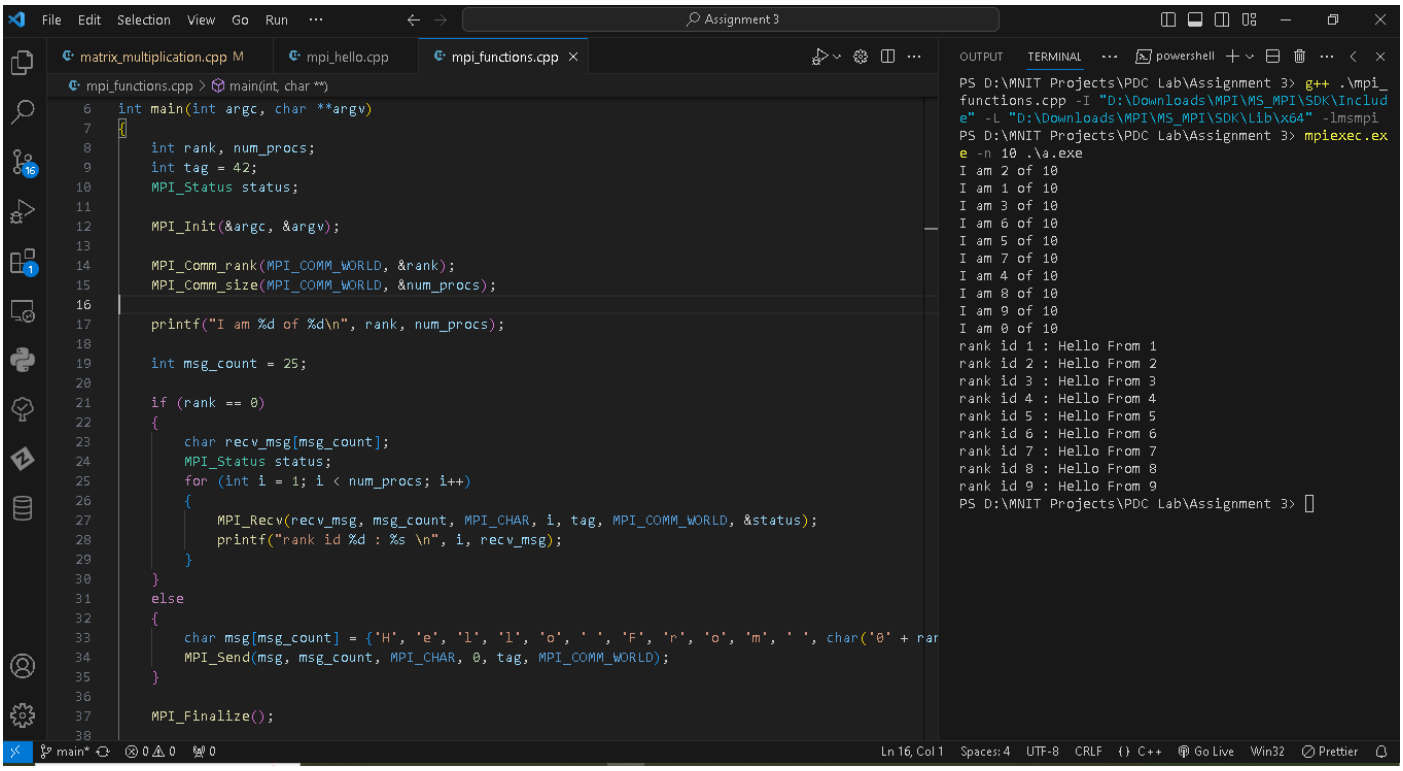
2. Write MPI hello world program. This exercise will help you to be familiar with the basic commands (compile and run) and routines of MPI programming model.

Ans.



3. Study about following basic MPI subroutines.

Ans.



Int MPI Init (int *argc, char **argv) : Initialize MPI.

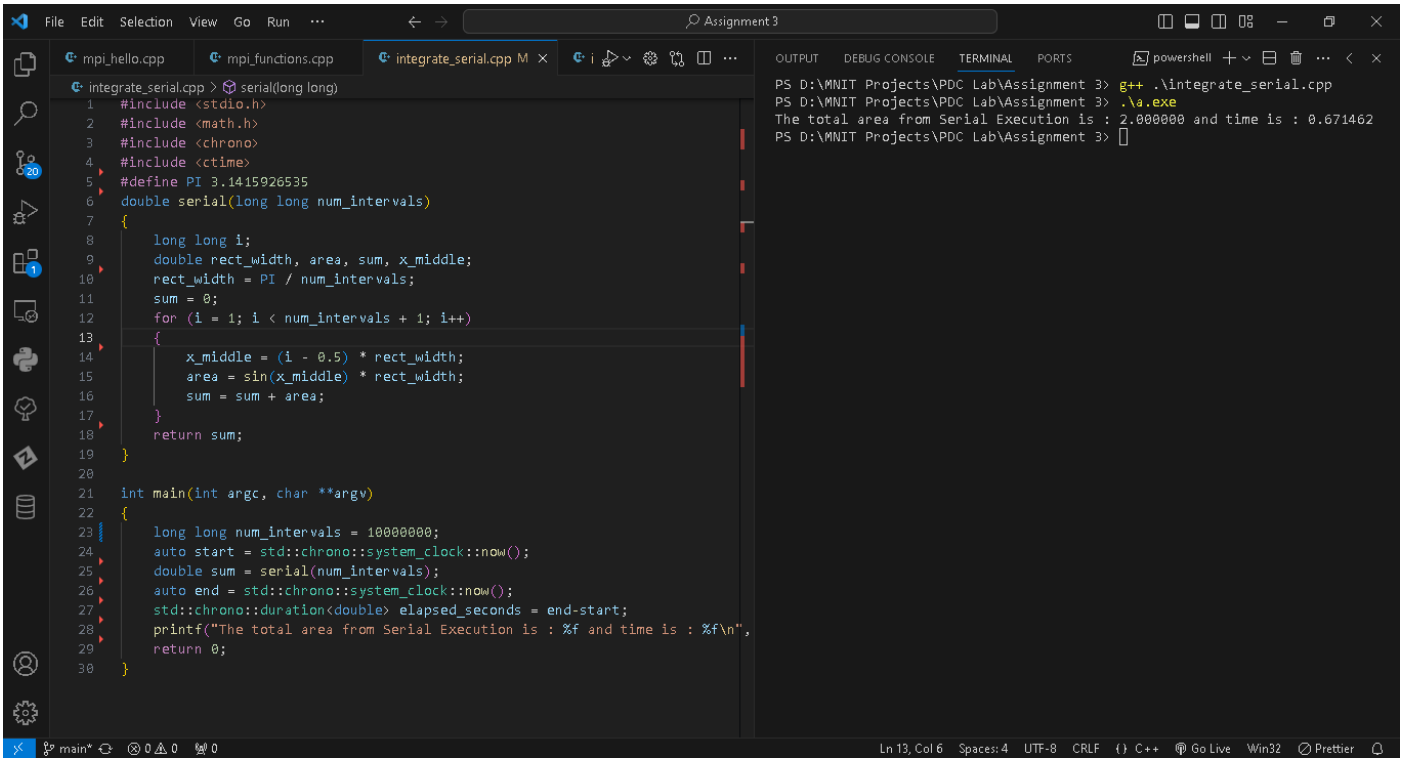
Int MPI_Finalize() : Exit MPI.

Int MPI_Comm_size(MPI_Comm comm, int *size) : Determine number of the processors within a communicator.

Int MPI_Comm_rank(MPI_Comm comm, int *rank) : Determine processor rank within a communicator.
Int MPI_Send(void *buf, int count, MPI_Datatype datatype, int dest, int tag, MPI_Comm comm) : Send a message to destination.
Int MPI_Recv(void *buf, int count, MPI_Datatype datatype, int source, int tag, MPI_Comm comm, MPI_Status *status) : Receive a message from source.

4. You need to use MPI to parallelize the serial program integrate.c (given below), which integrates function sin(X) over the range from 0 to pi using N intervals, where N is an argument of the program.

Ans. Serial Program:



Parallel Program: