Q2

PART 1

(px, py)= (1,1), (2,1), (4,1), (8,1), and (16,1),

mpirun -np 1 /home/akash91/HW2/obj 1026 1026 1 1 >> q2a.txt

mpirun -np 2 /home/akash91/HW2/obj 1026 1026 2 1 >> q2b.txt

mpirun -np 4 /home/akash91/HW2/obj 1026 1026 4 1 >> q2c.txt

mpirun -np 8 /home/akash91/HW2/obj 1026 1026 8 1 >> q2d.txt

mpirun -np 16 /home/akash91/HW2/obj 1026 1026 16 1 >> q2e.txt

/q2a.txt:Total time = 32.751333

./q2b.txt:Total time = 24.772755

./q2c.txt:Total time = 10.986322

./q2d.txt:Total time = 21.508163

./q2e.txt:Total time = 39.393656

We find the max speed up with 4 processes which suggests that with larger no of process their might be overhead in communication through MPI.

PART 2

(px, py)= (1,1), (1,2), (2,2), (2,4), and (4,4),

mpirun -np 1 /home/akash91/HW2/obj 1026 1026 1 1 >> q1a.txt

mpirun -np 2 /home/akash91/HW2/obj 1026 1026 1 2 >> q1b.txt

mpirun -np 4 /home/akash91/HW2/obj 1026 1026 2 2 >> q1c.txt

mpirun -np 8 /home/akash91/HW2/obj 1026 1026 2 4 >> q1d.txt

mpirun -np 16 /home/akash91/HW2/obj 1026 1026 4 4 >> q1e.txt

./q1a.txt:Total time = 16.379108

./q1b.txt:Total time = 10.435353

./q1c.txt:Total time = 7.408477

./q1d.txt:Total time = 6.407217

./q1e.txt:Total time = 8.176371

As we distribute the computation across px,py we find the speedup increases with no of increasing of processors.

Q3..

PART A

mpirun -np 16 /home/akash91/HW2/obj 258 258 16 1 >> q3a\_a.txt

mpirun -np 16 /home/akash91/HW2/obj 514 514 16 1 >> q3a\_b.txt

mpirun -np 16 /home/akash91/HW2/obj 1026 1026 16 1 >> q3a\_c.txt

mpirun -np 16 /home/akash91/HW2/obj 2050 2050 16 1 >> q3a\_d.txt

./q3a\_a.txt:Total time = 344.665952

./q3a\_b.txt:Total time = 295.336914

./q3a\_c.txt:Total time = 328.783932

./q3a\_d.txt:Total time = 448.169404

PART B

mpirun -np 16 /home/akash91/HW2/obj 258 258 4 4 >> q3b\_a.txt

mpirun -np 16 /home/akash91/HW2/obj 514 514 4 4 >> q3b\_b.txt

mpirun -np 16 /home/akash91/HW2/obj 1026 1026 4 4 >> q3b\_c.txt

mpirun -np 16 /home/akash91/HW2/obj 2050 2050 4 4 >> q3b\_d.txt

./q3b\_a.txt:Total time = 97.000805

./q3b\_b.txt:Total time = 269.880580

./q3b\_c.txt:Total time = 438.027957

./q3b\_d.txt:Total time = 29.542479

We see with increasing amount of computation size the speed up decreases