Jerardo Velazquez
80266747

Assignment 3: Floyd-Warshall Parallel

For our 3rd and final assignment we were tasked with implementing the Floyd-Warshall algorithm in parallel. I started by implementing the algorithm in serial form then when that was completed and working, I moved on and used mpi4py to implement the serial version. Along the way I had a couple problems, most notably the last thread in my program wouldn't run, this was a problem because i wasn't updating the owner of the row. This program took me about 4 hours to complete which included familiarizing myself with the Floyd-Warshall algorithm.

Performance

1 Threads -

```
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll # mpirun -n 1  python3
p-floyd-marsh.py
Thread 0
Time:  0.39538636600264
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll #
```

2 Threads -

```
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll # mpirun -n 2  python3
p-floyd-marsh.py
Thread 0
Time:  0.25307182899996405
Thread 1
Time:  0.25292711799920653
```

4 Threads -

```
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll # mpirun -n 4  python3
p-floyd-marsh.py
Thread 3
Time:  0.25957532800021
Thread 1
Time:  0.2617365219994099
Thread 2
Time:  0.27018986500115716
Thread 0
Time:  0.2649634949993924
```

5 Threads -

```
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll # mpirun -n 5  python3
p-floyd-marsh.py
Thread 4
Time:  1.1555703789999825
Thread 2
Time:  1.1684648420014128
Thread 1
Time:  1.2094086780016369
Thread 3
Time:  1.2779467729997123
Thread 0
Time:  1.2816723420000926
```

10 Threads -

```
linux-4oae:/home/student/Desktop/parallel/parallel-floyd-warshall-alohafromhelll # mpirun -n 10  python3
 p-floyd-marsh.py
Thread 4
Time:  1.4609385100011423
Thread 6
Time:  1.450799720001669
Thread 7
Time:  1.466590100000758
Thread 3
Time:  1.4688829939987045
Thread 5
Time:  1.475225722999312
Thread 1
Time:  1.461740959002782
Thread 2
Time:  1.4771588330004306
Thread 9
Time:  1.433179666997603
Thread 8
Time:  1.4898538220004411
Thread 0
Time:  1.4813932419965568
```

For some reason using 8 threads wouldn't work the process would never complete. We can see that from 1 to two 4 threads it gets faster but at 5 threads the performance seems to actually get slower.

Cpu Info Dump -

```
student@linux-4oae:~> dumpCPUInfo.sh cpuinfo.txt
model name      : Intel(R) Core(TM) i5-4278U CPU @ 2.60GHz
      4       36      216
student@linux-4oae:~>
```