READING AND RESEARCH ASSIGNMENT

A) [15] [Max 1 page] Analyze and compare at least two cloud computing services for machine learning. And which one would you choose and why?

B) [15] The Windows 'utility' tracert, (or its Unix equivalent, traceroute) can be used to find the sequence of routers through which a message is routed. Use this to find the path from your site to some others. How well does the number of hops correlate with the RTT times from ping? How well does the number of hops correlate with geographical distance? Another Unix utility 'ping' can be used to find the RTT to various Internet hosts. Read the man page for ping, and use it to find the RTT to www.nyu.edu in New York City, and www.intel.com in California. Measure the RTT values at different times of day, and compare the results. What do you think accounts for the difference?

C) [10] How 'wide' is a bit on a 2.0-Gbps link? How long is a bit in copper wire, where the speed of propagation is 2.3x108 m/s?

EXERCISES

1) [20] Consider the following code that adds two matrices A and B and stores the result in a matrix C:

```
for (i= 0 to 15) {
   for (j= 0 to 63) {
       C[i][j] = A[i][j] + B[i][j];
    }
 }
```

If we had a quad-core multiprocessor, where the elements of the matrices A, B, C are stored in row major order, which one of the following two parallelizations is better and why? What about when they are stored in column major order?

(a) For each Pk in {0, 1, 2, 3}:

```
for (i= 0 to 15) {
   for (j= Pk*15 + Pk to (Pk+1)*15 + Pk)  {
   // Inner Loop Parallelization
      C[i][j] = A[i][j] + B[i][j];
   }
}
```

(b) For each Pk in {0, 1, 2, 3}:

```
for (i= Pk*3 + Pk to (Pk+1)*3 + Pk) {
      // Outer Loop Parallelization
      for (j= 0 to 63) {
         C[i][j] = A[i][j] + B[i][j];
      }
}
```

2) [20] Textbook(*Fifth Edition*) 5.1 (a) (b)

3) [20] Textbook(*Fifth Edition*) 5.10 (a) (b)