Coen 146 lab 2

Saturday, April 4, 2020 11:44 PM

Goals: Lab2

1. Learn multithreading in C using matrix multiplication
2. Learn network commands
3. Learn how to measure packet delays
4. Learn to setup client-side connection to HTTP server

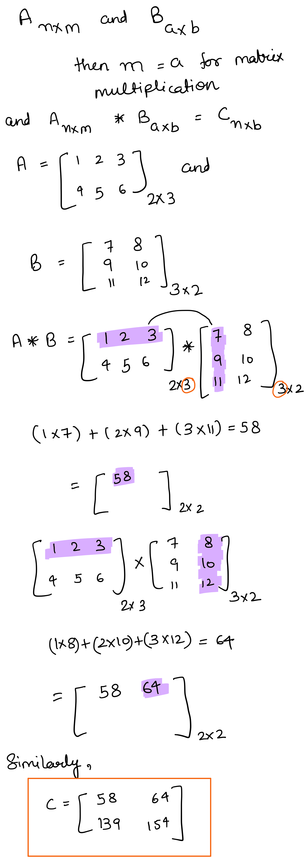
Multi-threading usage:

Used to run two or more threads simultaneously.

Task 1:

Use multi-threading for matrix multiplication.

How to multiply two matrix?



C code for matrix multiplication?

Define 2d array to store matrix

```
double matrixA[N][M], matrixB[M][L]
```

Fill matrix with random numbers:

```
srand(time(NULL)); // seed the C rand() function.
for (int i = 0; j < N; i++) // loop to traverse rows
  for (int j = 0; j < M; j++) // loop to traverse columns
    matrixA[i][j] = rand(); // (i,j)th element of matrixA
Similarly for matrixB
```

Number of threads = number of rows in matrixA

Job of each thread?

```
for (int j = 0; j < L; j++)   // loop to traverse rows
                              // L is number of rows in output matrixC
{
   double temp = 0;  // variable to store partial product
    for (int k = 0; k < M; k++)  // loop to traverse rows
                                 // M is number of coulmns in output matrixC
   {
    temp += matrixA[i][k] * matrixB[k][j];
   }
  matrixC[i][j] = temp; // final result for (i,j)th value
   }
```

* Main thread (main() function) waits for all threads.

Part 2:

1. **Network commands:**

   Run following commands on terminal with correct arguments if needed and analyze the results.

   netstat, ifconfig, hostname, ping, traceroute, telnet, host/dig, route, arp

2. Find packet loss and RTT:

To see packet loss, select three hosts in the internet (one in North America, one in Asia, and one in Europe) and ping each with different packet size.

Discuss the result of ping command based on Packet loss and RTT time.

3. Compute the numerical given in lab doc.

5. client-side connection to HTTP server:

a. Connect to gaia.cs.umass.edu using telnet (port 80) and observe
b. Send http request and observe:
   - GET /kurose_ross/interactive/index.php HTTP/1.1
   - Host: gaia.cs.umass.edu
c. Answer the questions:
   - What version of HTTP is the client running?
   - What formats of text and images, if any?

6. Use telnet to connect to 3 hosts (used to find packet loss) to different ports including port 80. And observe.