CS 341L Fall 2009 Lab 8 (10 points)

Assigned: Monday, 30 November 2009

Due: 11:59pm, Tuesday 8 December 2009 in the body of an email to labturnin.cs341l@gmail.com

You should just send an email with your paragraph in the body of the email, no need to do it as an attachment.

No late assignments will be accepted unless circumstances warrant an extension for the whole class (e.g., server is down all weekend, etc.).

You should collect the data with your group (or you can do it individually if you do not attend the lab session), but your paragraph should be your own thoughts and your own writing.

Steps 1 to 4 are to be done with your group for all the data points you need:

Step 1: ssh to the machine assigned to you in the email Jed sent out.

Step 2: Type the following two commands:

```
export PATH="/usr/local/cuda/bin:$PATH"
export LD_LIBRARY_PATH="/usr/local/cuda/lib:$LD_LIBRARY_PATH"
```

If you get an error about export not being a command, change your shell to sh (just type "`sh`")

Step 3: Test the CUDA compiler:

```
nvcc -V
```

Step 4a: Compile the CUDA code that's available on Jeff's blog, and time how long it takes to run:

```
nvcc matMul.cu
time ./a.out
```

--and-- (do both 4a and 4b for each matrix size)

Step 4b: Compile the CUDA code in emulation mode, which means it will run on the CPU instead of the GPU, and calculate how long it takes to run:

```
nvcc -deviceemu matMul.cu
time ./a.out
```

You should repeat both steps 4a and 4b for the following matrix sizes (by changing the `BLOCK_SIZE` constant variable):

50, 100, 1000, 10000, and 20000

Step 5 is to be done as an individual effort.

Step 5: Write up your results in an email (just in the body of the email, send it to the gmail account for turning in your labs). Include the raw data, *i.e.*, the times for all five sizes for both the CPU and GPU. Then write a paragraph to explain your results. Your explanation should fully explain the results, i.e., why one should be faster than the other. Think about Figure 6.9 on page 585. You should also relate the results to Amdahl's law.