CS4540 – Operating Systems

Assignment 2. Threads

Due November 6

Write a multithreaded program that calculates various statistical values for a list of numbers. This program will be passed a series of numbers on the command line and will then create three separate worker threads:

1) Thread 1 will determine the average of the numbers
2) Thread 2 will determine the maximum value
3) Thread 3 will determine the minimum value

For example, suppose that your program is passed the following integers: `90 81 78 95 79 72 85`. Then, the output of the program will be:

```
The number of integers: 7
90
81
78
95
79
72
85
The average is 82.000000
The maximum is 95
The minimum is 72
```

The output of the program must follow the format of the example output.

The variables representing the average, maximum, and minimum values should be stored globally. The worker threads will set these values, and the parent thread will output the values once the worker threads have exited.

Notes:

1) Staring with this assignment, you are required to use makefiles.
   A brief makefile tutorial is at: http://mrbook.org/tutorials/make/ (for C programs on Ubuntu, replace "`.cpp`" with "`.c`" and replace "`g++`" with "`gcc`")
2) Remember about the proper programming style (it will be graded!), including comments, indentation, use of blank lines, etc. Also, provide a `README` file explaining how to compile and run your file.
3) You need to use the `-lpthread` linker option for `gcc`.