Hybrid Embedded Systems Homework #1

– Assigned August 24, 2010. Due at the beginning of class August 31, 2010

1. (50 points) Write a C program to blink the eight green LEDs in a reversing shift pattern on the DE2 board. After the last LED in each direction turns on, reverse the direction of the shift. Recall that C supports shift operations (“<<” and “>>”) and you will need a time delay in your code to see the LEDs blink.

2. (30 points) Evaluate the CPU and memory options available on the DE2 board. Compare the three NIOS II processor CPU implementation options. Determine the differences in the resources required for implementation in the FPGA fabric as far as the number of logic elements and describe the capabilities of each configuration.

3. (20 points) Evaluate the memory options on the DE2 board. Determine the speed and size tradeoffs for each technology and also provide some insight into how and when each of these would be best used in a system architecture.

(Zip your Quartus and NIOS project files for each problem so that they can be launched for evaluation and also provide instructions for launching.

Grading will be performed based on the ability to load your code into the DE2 board and demonstrate operation. Document what your code is meant to accomplish in case it does not execute to receive partial credit.)