

CS452/552 - Real-Time Operating Systems

Lab Assignment #1

Spring 2016

The purpose of this assignment is to introduce you to the software tools we will use for the AVR microprocessor, and to give you a better understanding of the run-time environment that a C program operates under.

For this assignment, you will write a main program and a subroutine - both in C. The subroutine should do the following:

1. Monitor a port (your choice) that is connected to a switch. Wait until the switch is pressed.
2. Once pressed, the routine should keep track of how long the switch is held down.
3. Wait for approximately one second.
4. Using another port (your choice) connected to a LED, turn on the LED for the same amount of time that the switch was pressed earlier.

Using this “wait loop” approach, and using a high level language like C, it is somewhat difficult to match the execution timing of the two loops. For this assignment, the difference between the two loops should be “imperceptible” - it may be necessary to “pad” one of the loops by adding NOP instructions to make them execute for an equal amount of time. A second possibility is to analyze the translated assembly code and count the cycles required to execute each loop.

In addition to writing the code, determine the size of the code (main and both subroutines) in your program.