**ELTN 117 – Homework #4: Programming assignment using Digital outputs**

1. Write and test a program that does the following:
2. Configure the serial port for 9600 baud, and display the message: *LED Sequencer V1.0* one time at the top of the serial monitor screen.
3. Prompt the user for selecting three options as follows:
   1. Straight chase: 1
   2. Single dot: 2
   3. Ends to middle: 3
4. Display the selection chosen – example: *Sequence chosen: 2*
5. Based on this input value, flash the sequences shown below on five LEDs. The LED’s will be connected to outputs 2 – 6 (these do not interfere with the Tx and Rx pins). Each step should run for 250 m.s. Run the sequence 5 times and then return to the beginning of the program.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sequence 1 : "straight chase" | | |  | Step # | LED | | | | |
|  |  |  |  |  | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  | 1 |  |  |  |  |  |
|  |  |  |  | 2 |  |  |  |  |  |
|  |  |  |  | 3 |  |  |  |  |  |
|  |  |  |  | 4 |  |  |  |  |  |
|  |  |  |  | 5 |  |  |  |  |  |
|  |  |  |  | 6 |  |  |  |  |  |
|  |  |  |  | 7 |  |  |  |  |  |
|  |  |  |  | 8 |  |  |  |  |  |
|  |  |  |  | 9 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Sequence 2 : "single dot" | | |  | Step # | LED | | | | |
|  |  |  |  |  | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  | 1 |  |  |  |  |  |
|  |  |  |  | 2 |  |  |  |  |  |
|  |  |  |  | 3 |  |  |  |  |  |
|  |  |  |  | 4 |  |  |  |  |  |
|  |  |  |  | 5 |  |  |  |  |  |
|  |  |  |  | 6 |  |  |  |  |  |
|  |  |  |  | 7 |  |  |  |  |  |
|  |  |  |  | 8 |  |  |  |  |  |
|  |  |  |  | 9 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Sequence 3 : "ends to middle" | | |  | Step # | LED | | | | |
|  |  |  |  |  | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  | 1 |  |  |  |  |  |
|  |  |  |  | 2 |  |  |  |  |  |
|  |  |  |  | 3 |  |  |  |  |  |
|  |  |  |  | 4 |  |  |  |  |  |
|  |  |  |  | 5 |  |  |  |  |  |

1. Draw a simple schematic showing the connections to the LED’s and resistors.
2. Create a simple Top-Down diagram that shows the different levels of functions.
3. Include comments for the heading of the program and in the program where appropriate.

**Main digital output commands:**

pinMode(a, OUTPUT); // Used in setup to configure pin “a” as output.

digitalWrite(counter, HIGH); // Turns on output “counter”

PORTD = a; // write the value “a” to pins 0 – 7 as a single value

Extra Credit options:

1. Use functions to write information to the serial monitor, get user input, and flash the LED sequences. The main loop should have only function calls.
2. Instead of simply turning on and off outputs using digitalWrite, use the PORTD command and manipulate the values with a formula. If you choose this option, do NOT use the serial monitor – just run each sequence one after the other. Use outputs 0 – 4 and set the values using the PORTD = command. You could also create an array of the values you output.