

ELEC 2220 - Homework Assignment #1

Prerequisite Review

Due Friday, May 22, 2020

1. Write and execute a short computer program that reads integer numbers, entered from a keyboard, until the same number is entered twice in a row. Then identify and print the smallest number, the largest number, and the average value (don't count the final duplicate number in the average). Numbers are all to be within the range [-32768 ... +32767]. You may use any computer language you wish (C, C++, or Java are preferred.) If you use Matlab, write and execute the program as an ".m file", and not simply enter commands from the user interface.

Execute the program, entering 12-15 values, *scattered across the above range* (both positive and negative values).

Example:

```
400
-2500
18000
-40
-40
Smallest = -2500
Largest = 18000
Average = 3965
```

2. Eight light-emitting diodes (LEDs) are designated as LED0, LED1, LED2, LED3, LED4, LED5, LED6, and LED7. These LEDs are "active low", that is, they are illuminated by applying a voltage to them corresponding to "logic 0", and darkened by applying a voltage to them corresponding to "logic 1".

A computer generates a 5-bit number (*address*) $A = a_4a_3a_2a_1a_0$. Design and sketch a digital logic circuit that will illuminate at most one LED as follows:

LED0 when $A=11000$	LED4 when $A=11100$
LED1 when $A=11001$	LED5 when $A=11101$
LED2 when $A=11010$	LED6 when $A=11110$
LED3 when $A=11011$	LED7 when $A=11111$

For any other value of A, all eight LEDs should be dark. You may use decoders and/or logic gates for your circuit. (If you use a decoder module, show its logic symbol rather than drawing its gate-level circuit, with all module input/output pins labelled.) Clearly show all wires, and label all LEDs, signal lines and module input/output pins.

SUBMIT (upload to Canvas): A file containing the source program, the entered numbers, and the results for Part 1, and a scan or photo of your design work and circuit for Part 2.