School of Advanced Technology

CST8227 Lab 1: Protoboard Layout & Creating Arduino Development Environment

Lab Objectives:

1. Become familiar with a protoboard orientation.
2. Layout several series and parallel resistive circuits.
3. Layout pushbutton circuits in the "pull-up" and "pull-down" configurations
4. Download and install the Arduino IDE and the Teensyduino plugin

Required Equipment:

- protoboard
- several resistors
- pushbutton

Part A: Protoboard Preparation and Layouts

1. Remove the protoboard from its packaging. Remove the "sticky-tape" from the bottom of the protoboard and attach the conductive plate.

2. Open the "Circuit Diagrams" pdf document found in the "Online Quizzes" link in the course section of Blackboard.

3. Implement each circuit 1-7 on your protoboard and have them checked off.

4. Refer to the circuit diagram from the uploaded document "16W CST8216 Lab Week Two.pdf". In the top left side of the page in the "Counter Control" box, there is a circuit known as a "pull-up" resistor configuration. Using the pushbutton and a resistor, implement both the "pull-up" and "pull-down" circuit configurations and have them checked off.

Part B: Download, install and configure the Arduino IDE

The Arduino IDE is available for all major platforms (Linux, MS-Win, OS-X). It is a single file download and has a simple install procedure.

1. Download the most current version of the Arduino IDE for your OS (eg. Win10, XP, 32 or 64 bit Linux) from: http://arduino.cc/en/Main/Software (for Teensyduino compatibility notes refer to http://www.pjrc.com/teensy/teensyduino.html).
2. Follow the instructions provided on that site for installing the IDE. (It should be just a simple matter of unzipping the file, preferably to a location such as **C:**
3. For simplicity in the future, it's recommended that you create a desktop shortcut to the arduino.exe program.
4. Download the Teensy add-on from http://www.pjrc.com/teensy/td_download.html. The software revision history is specified below on this page, for future reference. Follow the

instructions provided on that site for installing the IDE. You will need to locate the appropriate installation directory for the Arduino IDE as identified in the installation instructions.

5. In order to correctly communicate with the Teensy board, the Arduino IDE needs to know the specific model of board being used. This parameter can be set from within the Arduino IDE. You'll need to make sure this is done correctly, particularly because the Teensy is an Arduino-*compatible* board rather than a brand-name Arduino.

6. The version of board you will have is the Teensyduino 3.2. This can be seen, based on the silk screen markings found somewhere on the board.

7. Explore the menu bar in the IDE. Find the menu with the **Tools -> Board** entry. Select your model in the list of boards presented. (see http://www.pjrc.com/teensy/td_usage.html)

8. Identify the desired behavior of the board's USB interface, in the **USB: Type** menu selection (*serial only* for today).

9. Choose a CPU Speed of 72 MHz. Remember though: faster chip = more power consumed.

Demonstrations:

1. Circuits 1-7 on the protoboard [1 mark * 7 circuits = 7 marks].
2. The "pull-up" and "pull-up" configurations on the protoboard 1 mark * 2 circuits = 2 marks]..
3. Show the Arduino IDE installed on your computer [2 marks].

Postlabs:

Complete the three uploaded online quizzes – due dates are specified

.