Intel Galileo Project

Traffic Lights

Difficulty: Beginner

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**Introduction**

The uOttawa Makerspace is home to the latest in microcontroller technology with Arduino Uno and Intel Galileo microcontroller boards. This guide shows students of the Makerspace the appropriate methods to use the Intel Galileo microcontroller boards by the creation of a simple electronics project that teaches students the hardware and software capacity of the Intel Galileo board. This electronic project uses the Intel Galileo board to power three LED as traffic lights.

**Resources**

The items to be used for the project are:

- Intel Galileo Board
- Laptop or computer with USB compatibility
- Three LEDs (green, amber/yellow, and red)
- Three 330 Ω (ohm) resistor (orange, orange, brown)
- USB Type A male to Type micro-B male cable
- Small Breadboard

Additional material for the project is:

- *Traffic Light* Circuit Image file
- *Traffic Light* source code (sketch)

**Procedure**

**Prepare the Circuit**

- Connect the positive end of the green LED to pin 13 on the Galileo board using a breadboard. The positive end of the LED is the one with the longer lead
- Connect the positive end of the amber LED to pin 12 on the Galileo board
- Connect the positive end of the green LED to pin 11 on the Galileo board.
- Connect one of the ends of each of the resistors to the negative end of the LEDs
- Connect the other end of the resistors together to the GND pin on the Galileo board
- Ensure the circuit is connected as shown in Figure 1 or use the provided circuit schematic

**Note:** Make sure to ground the negative end of the circuit otherwise the circuit will not work.
Upload Code

- Start the Arduino IDE for the software side of the project
- Copy and paste the Traffic_Lights sketch source code (provided in Supporting Materials) in the IDE window
- Optional: Browse through the code to understand the functionality of the software
- Click in the Verify button to make sure there are no compile time errors in the code
- Ensure the Arduino is connected via the USB port to the computer
- Click on the Upload button on the IDE to upload the code to the Intel Galileo
- Optional: If there is an error message look over the connectivity of the board
- The upload takes some time as it electronically rewrites the Intel Galileo microcontroller

Note: The source code must be verified before the code can be uploaded to the microcontroller board.
Using the Circuit

- Once the code has been uploaded to the board the three LEDs will start to function as a traffic
- Optional: Pressing the REBOOT button on the Galileo board will clear off the uploaded code on the on-board memory. You will need to re-upload the code again if this button is pressed.
- Congratulations! You have successfully created your first Intel Galileo circuit, now go ahead and create marvellous circuits!
Supporting Materials

*Intel Galileo circuit schematic*

*Figure 3: Traffic Light Circuit Diagram*
// Traffic light code
// Connect green LED to pin 13
// Connect yellow LED to pin 12
// Connect red LED to pin 11

void setup() {
    // declare pin 11, 12, 13 to be outputs:
    pinMode(11, OUTPUT);
    pinMode(12, OUTPUT);
    pinMode(13, OUTPUT);
}

void loop() {
    digitalWrite(13, HIGH); // Turns LED on pin 13 on
    delay(2000); // LED on pin 13 remains on for 5 seconds
    digitalWrite(13, LOW); // Turns LED on pin 13 off
    delay(0);
    digitalWrite(12, HIGH); // Turns LED on pin 12 on
    delay(1000); // LED on pin 12 remains on for 5 seconds
    digitalWrite(12, LOW); // Turns LED on pin 12 off
    delay(0);
    digitalWrite(11, HIGH); // Turns LED on pin 11 on
    delay(2000); // LED on pin 11 remains on for 5 seconds
    digitalWrite(11, LOW); // Turns LED on pin 11 off
    delay(0);
}