Robotics/Electronics Lesson 4

Overview

In this lesson we will learn the code and wiring for a traffic light. If time permits we will learn for loops.

Plan

1. Assistants will review concepts from the previous lesson
2. Hand out traffic light code worksheet
3. Students will complete the worksheet
4. Assistants will go over worksheet with students on the board
5. Students will wire a traffic light

Activity 1: Review lesson 3

XIAOLIN & JACKIE

Blinking Led

1. **Students: Give examples in the real world that blink/flash**

- Car light's that's blinking when making a turn
- Walk light blinking
- Police lights blinking

2. **Students: Why is blinking important?**

- It acts as communication. For example a walk light blinking is telling you to hurry up. A charger blinking is telling you it's running out of battery.
- Everything around you is communicating something.

4. Draw a circuit on the board with led, wires and battery

5. **Students: How does it work?**

- Show that blinking is done by turning on and off electricity. Turn off electricity by showing a open circuit. Turn on electricity by showing a closed circuit. Ask students

what type of circuit it is when demonstrating.

6. **Students: What does it being done between turning on and off**

- Time is passing

7. **Students: What is the function in code to wait for time?**

- delay(1000);

8. **Students: What does the delay function take?**

- milliseconds

9. **Students: Test seconds/milliseconds**

- how many milliseconds are in .5, 1, 5 seconds?

- how many seconds is 2000, 5500, 200 milliseconds?

Activity 2: Traffic Light

WORKSHEET

Electronics Lesson 4

TRAFFIC LIGHT CODE

1. Green led is on. Red led is off. Yellow led is off.
2. Green led is off. Red led is off. Yellow led is blinking.
3. Green led is off. Red led is on. Yellow led is off.

Instructions: Fill in the blanks HIGH or LOW and add the missing delays

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```
int GREEN = 8;
int YELLOW = 9;
int RED = 10;

//Set the pins to OUTPUT electricity
void setup() {
  pinMode(GREEN, OUTPUT);
  pinMode(YELLOW, OUTPUT);
  pinMode(RED, OUTPUT);
}

void loop() {
  digitalWrite(GREEN, ________);

  digitalWrite(YELLOW, ________);

  digitalWrite(RED, ________);


  digitalWrite(GREEN, ________);

  digitalWrite(YELLOW, ________);

  digitalWrite(RED, ________);


  digitalWrite(YELLOW, ________);


  digitalWrite(YELLOW, ________);


  digitalWrite(YELLOW, ________);


  digitalWrite(YELLOW, ________);


  digitalWrite(GREEN, ________);

  digitalWrite(YELLOW, ________);

  digitalWrite(RED, ________);


}
```

ANSWER

```
TRAFFIC LIGHT CODE
   1. Green led is on. Red led is off. Yellow led is off.
   2. Green led is off. Red led is off. Yellow led is blinking.
   3. Green led is off. Red led is on. Yellow led is off.
-------------------------------------------------------------------------

//Set leds to the pin numbers
int GREEN = 8;
int YELLOW = 9;
int RED = 10;

//Set the pins to OUTPUT electricity
void setup() {
  pinMode(GREEN, OUTPUT);
  pinMode(YELLOW, OUTPUT);
  pinMode(RED, OUTPUT);
}

void loop() {
  //Light up GREEN led for 5 seconds
  digitalWrite(GREEN, HIGH);
  digitalWrite(YELLOW, LOW);
  digitalWrite(RED, LOW);
  delay(5000);

  //Blink YELLOW led 3 times
  digitalWrite(GREEN, LOW);
  digitalWrite(YELLOW,HIGH);
  digitalWrite(RED, LOW);
  delay(200);

  digitalWrite(YELLOW,LOW);
  delay(200);

  digitalWrite(YELLOW,HIGH);
  delay(200);

  digitalWrite(YELLOW,LOW);
  delay(200);

  digitalWrite(YELLOW,HIGH);
  delay(200);

  //Light up RED led for 5 seconds
  digitalWrite(GREEN, LOW);
  digitalWrite(YELLOW, LOW);
  digitalWrite(RED, HIGH);
  delay(5000);
}


-------------------------------------------------------------------------
```

Activity 3: Traffic Light Review

XIAOLIN, JACKIE, JOYCE will review the worksheet

Activity 4: Traffic Light Wiring

Students will wire the traffic light base on the code from the worksheet. Assistants and instructor will go around assisting students when needed.