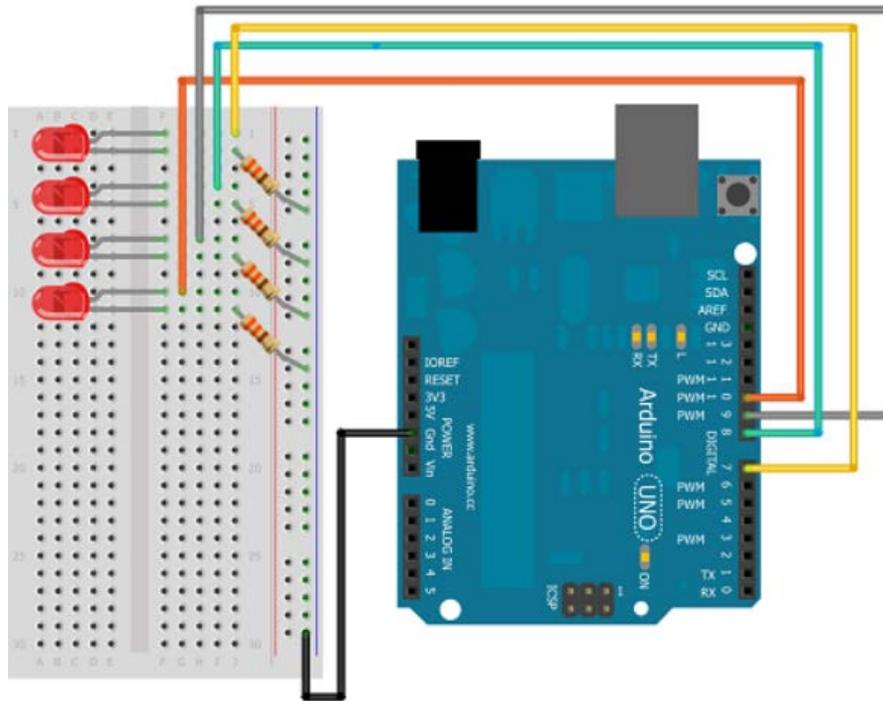


Complete the following 2 programming exercises. 5 points total.

Exercise 1:

Write a complete program to turn on 4 LEDs in sequential order with a 1.5 sec delay in between, and to turn them off sequentially with 1.5 sec delay in between. Please follow the diagram below for pin numbers.

Hint: Use of arrays and For loops can reduce the amount of code significantly.



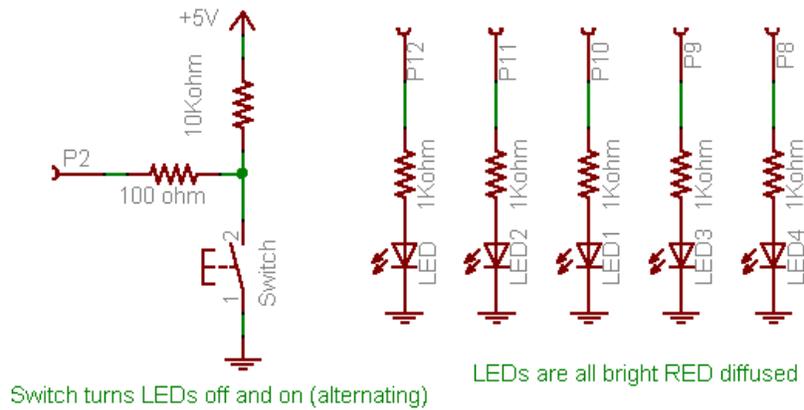
Exercise 2:

Write the lines of code that reads a pushbutton switch state and makes the pin 13 HIGH otherwise makes pin 13 LOW. Also, turns on a speaker tone of 440 hz for 2 seconds. Speaker is connected to pin 4. Given that `buttonState = digitalRead(13)`. Also display on the screen the value of the pin using the Serial Monitor at 9600bps.

Homework 2: Robotics 1

Complete the following exercise.

Bike Lite Company Inc., a company that specializes in blinky light products. We're noticing that a majority of our customers ride bicycles and they'd like to be safer. We're thinking of offering a bicycle safety light. Here is the schematic to start with:



All the bike light has to do is turn on when the button is clicked and turn off the next time the button is clicked. Write the code that will accomplish this.

Homework 3: Robotics 1

Using the circuit diagram and sample code below answer questions for homework 3-5.

1. **Modify program so that you can display the values of the flex sensor via the Serial Monitor. Knowing at what sensor values certain LEDs turn on could be very useful.**

```
//Flex Sensor Pin (flexPin)

//the analog pin the Flex Sensor is connected to
int flexPin = 0;

void setup() {
  for (int i=4; i<14; i++){
    pinMode(i, OUTPUT); //sets the led pins 4 to 13 to
    output
  } }

void loop(){
  //Ensure to turn off ALL LEDs before continuing
  for (int i=4; i<14; i++){
    digitalWrite(i, LOW);
  }

  /* Read the flex Level Adjust the value 130 to 275 to
  span 4 to 13 You may need to map the sensor values
  accordingly */

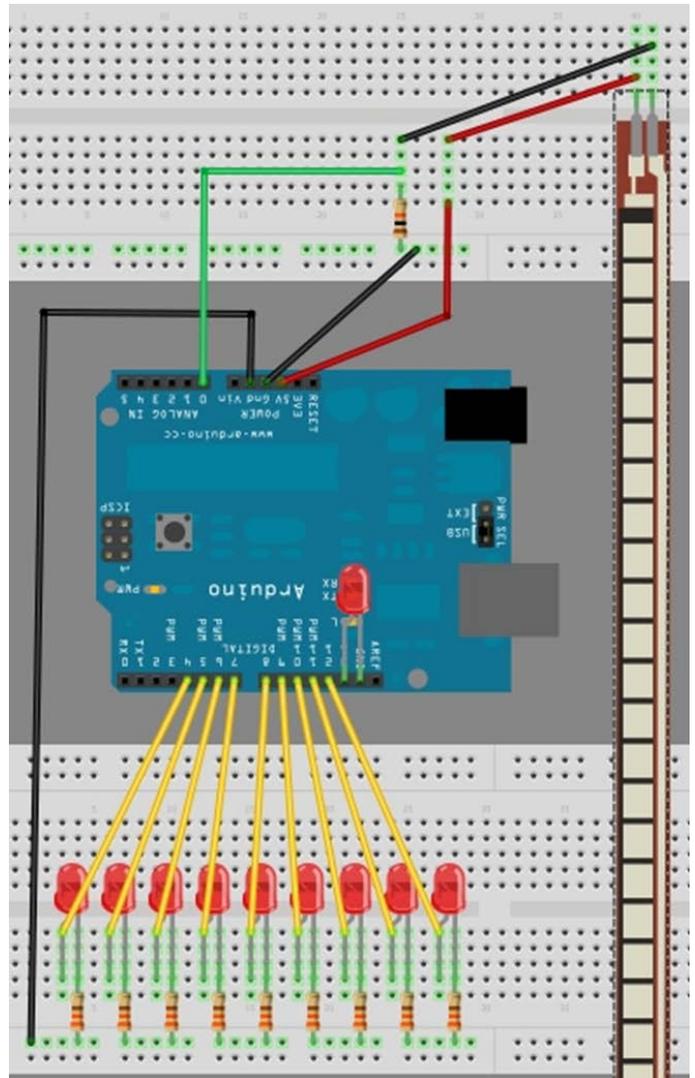
  int flexReading = map(analogRead(flexPin), 130, 275,
  4, 13);

  // Make sure the value does not go beyond 4 or 13 because those are the pins the LED are connected to!

  int LEDnum = constrain(flexReading, 4, 13);

  /*Call the blink function: this will turn the LED on for 10 milliseconds, and keep it
  off for only 1 millisecond. You can change the blink rate by changing these values,
  however, I want a quick response time when the flex sensor bends, hence the small
  values. LEDnum determines which LED gets turned on.*/

  blink(LEDnum, 10,1);
}
```



```
// The blink function - used to turn the LEDs on and off
void blink(int LEDPin, int onTime, int offTime){
    // Turn the LED on
    digitalWrite(LEDPin, HIGH);

    // Delay so that you can see the LED go On.
    delay(onTime);

    // Turn the LED Off
    digitalWrite(LEDPin, LOW);

    // Increase this Delay if you want to see an actual blinking effect.
    delay(offTime);
}
// END of Code
```


Looking at your previous programs create a program to changes the speed of a regular DC small motor like the one used in your lab when you bend the flex sensor. This could be useful as a torque or pressure sensor so a robot does not break if it goes past a certain sensor value. Don't forget that the Arduino IDE has lots of examples that can help you with this.

Your program should follow the diagrams below to match the pin numbers.

