

Questions for Quiz nr 1

In this document we describe the assignment to be completed before taking Quiz 1. Each part of the assignment should be solved in the online Arduino simulator Tinkercad. In this simulator, you are able to create circuits in the browser using drag and drop of components. You can go the tab “Code” and write the C code for the circuit created. Finally you simulate the circuit by clicking on “Start Simulation”.

Please study the Arduino API for more information regarding the coding functions

<https://www.arduino.cc/reference/en/>

You first step is to register on <https://www.tinkercad.com> after this, solve the questions in parts 1 to 5 in this document. After this you can complete Quiz 1 on the Coursera page.

Part 1

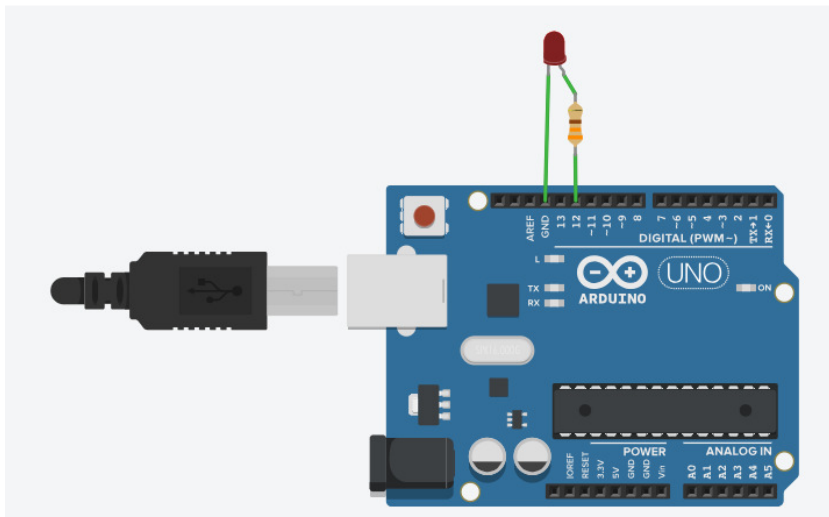
Consider the following circuit and the following code:

Create a new Tinkercad project with the circuit in the figure and paste in the provided code.

Make sure your circuit works by verifying that the led is blinking when you run the simulation.

Study the code and make sure you understand its functionality.

Resistor used. 220 Ohm.



```
void setup()
{
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
}

void loop()
{
  digitalWrite(13, HIGH);
  digitalWrite(12, HIGH);
  delay(1000); // Wait for 1000 millisecond(s)
  digitalWrite(13, LOW);
  digitalWrite(12, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```

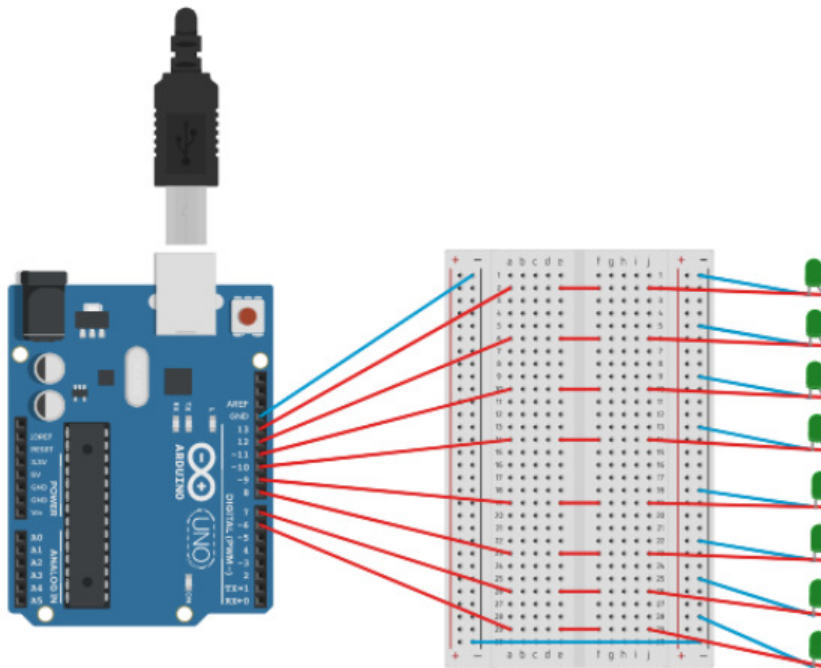
Part 2

Consider the following circuit and the following code:

Create a new Tinkercad project with the circuit in the figure and paste in the provided code.

Make sure your circuit works by verifying that the leds is blinking one after the other when you run the simulation.

Study the code and make sure you understand its functionality.



```
const int SPEED = 200;
const int OFF = 50;

void setup()
{
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(6, OUTPUT);
}

void loop()
{
  for(int i = 13; i > 6; i--){
    digitalWrite(i, HIGH);
    delay(SPEED);
    digitalWrite(i, LOW);
    delay(OFF);
  }

  for(int i = 6; i < 13; i++){
    digitalWrite(i, HIGH);
    delay(SPEED);
    digitalWrite(i, LOW);
  }
}
```

```

    delay(OFF);
  }
}

```

Part 3

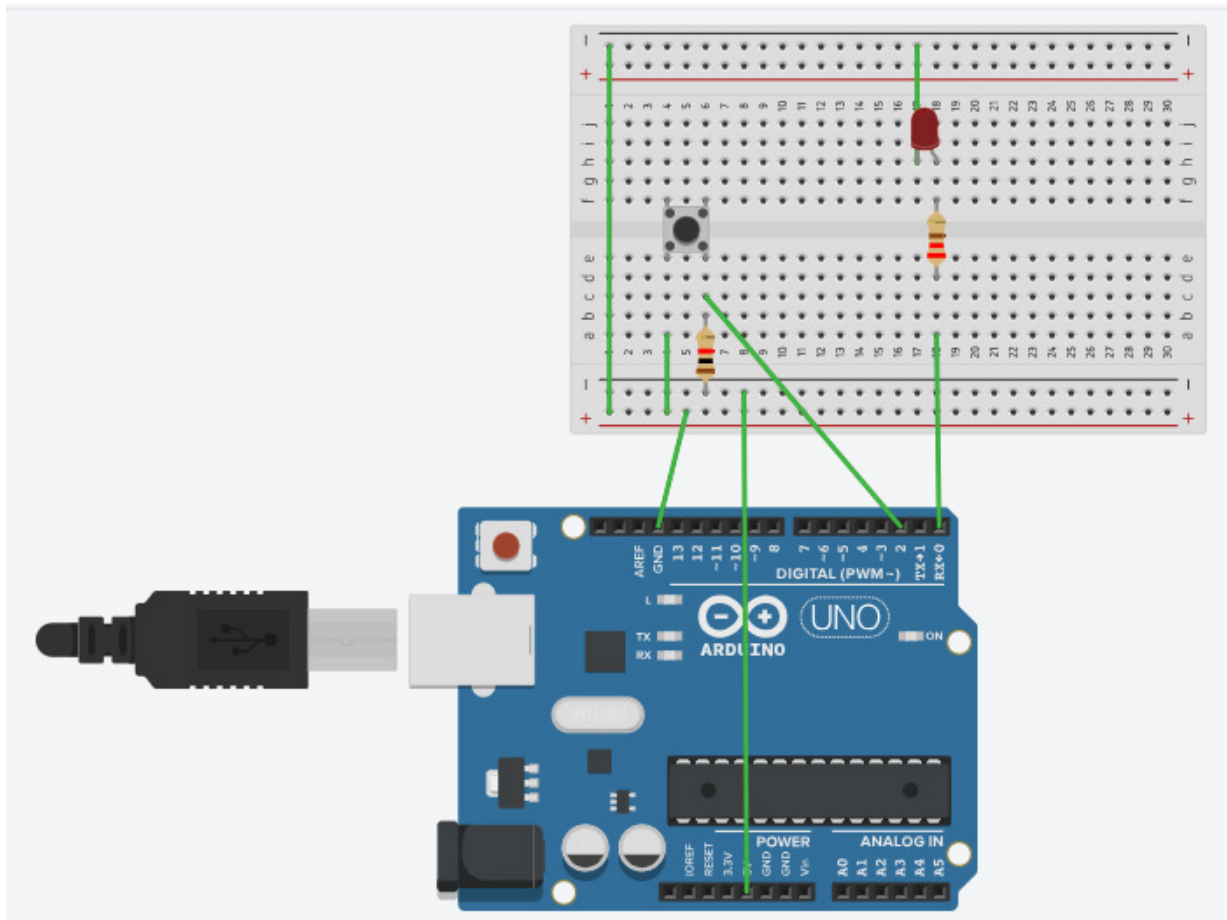
Consider the following circuit and the following code:

Create a new Tinkercad project with the circuit in the figure and paste in the provided code.

Run the simulation and verify that the led is shut down when the button is pressed.

Study the code and make sure you understand its functionality.

Resistors used: 1k Ohm and 220 Ohm



```

volatile int state = HIGH;
void setup() {
  pinMode(0, OUTPUT);
  attachInterrupt(0, blink, CHANGE);
}
int led = 0;

void loop() {
  digitalWrite(0, state);
}
void blink() {
  state = !state;
}

```

Part 4

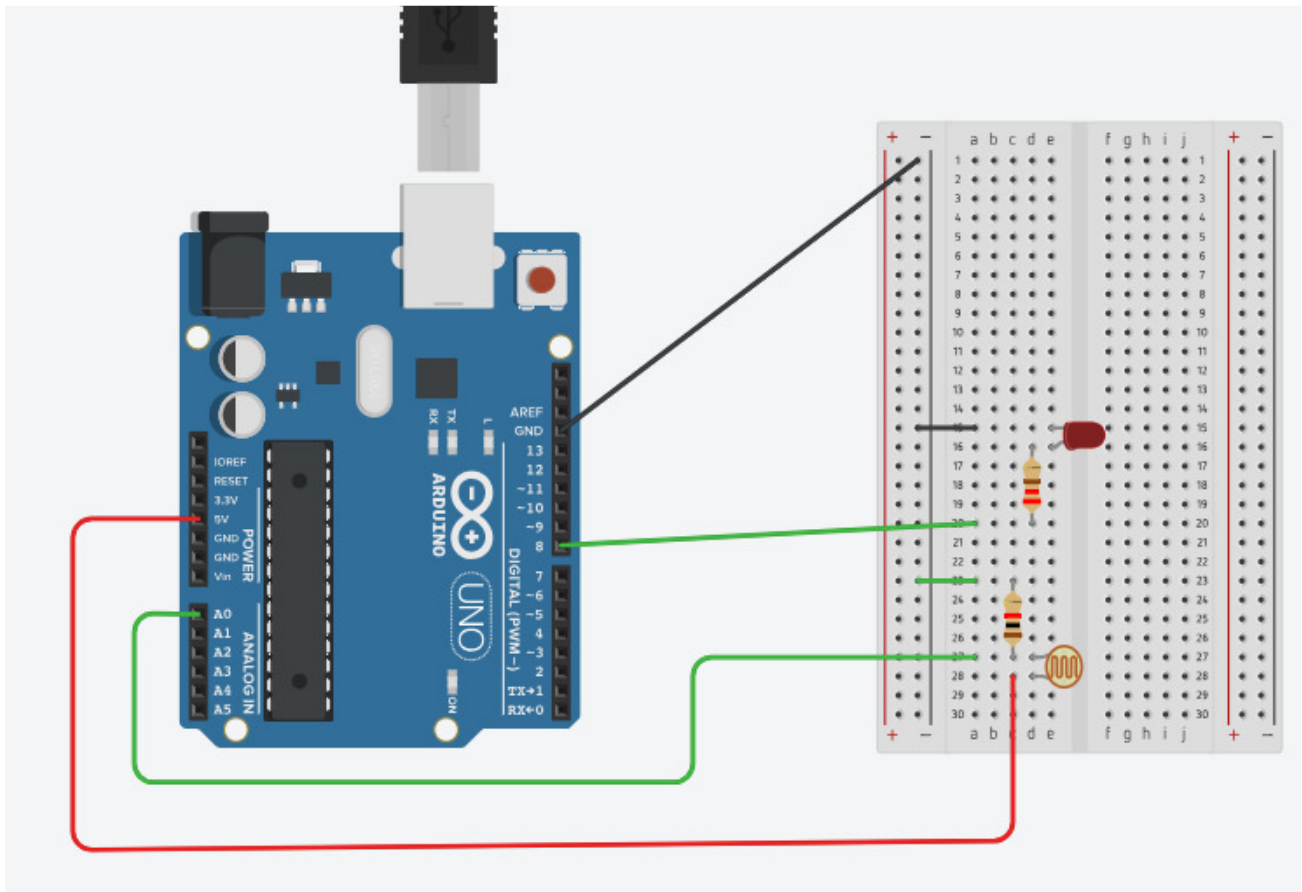
Consider the following circuit and the following code:

Create a new Tinkercad project with the circuit in the figure and paste in the provided code.

Make sure the led is lighting up depending on the resistance of the light sensor.

Study the code and make sure you understand its functionality.

Resistors used: 220 Ohm and 1k Ohm



```
void setup()
{
  pinMode(A0, INPUT);
  pinMode(8, OUTPUT);
}

void loop()
{
  if (analogRead(A0) < 150) {
    digitalWrite(8, HIGH);
  }
  digitalWrite(8, LOW);
  delay(10);
}
```

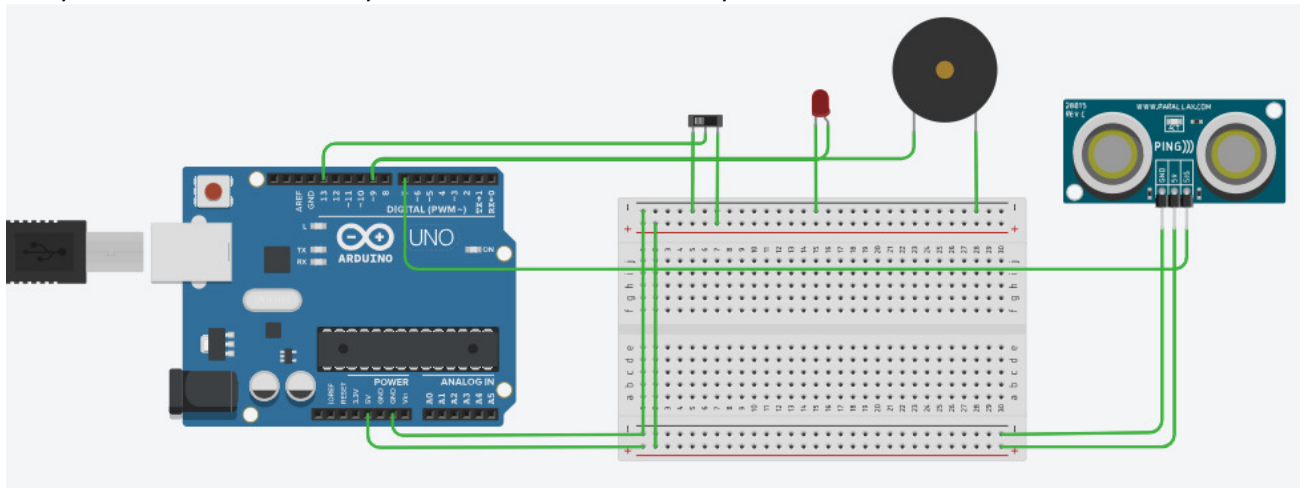
Part 5

Consider the following circuit and the following code:

Create a new Tinkercad project with the circuit in the figure and paste in the provided code.

Make sure the speaker is beeping when the distance sensor measures an object close by.

Study the code and make sure you understand its functionality.



```
unsigned long echo = 0;
int ultraSoundSignal = 7;                                     // Ultrasound signal pin
unsigned long ultrasoundValue = 0;
int val;
void setup()
{
    Serial.begin(9600);
    pinMode(ultraSoundSignal, OUTPUT);
    pinMode(9, OUTPUT);
    pinMode(13, INPUT);
}
unsigned long ping()
{
    pinMode(ultraSoundSignal, OUTPUT);                       // Switch signalpin to output
    digitalWrite(ultraSoundSignal, LOW);                      // Send low pulse
    delayMicroseconds(2);                                     // Wait for 2 microseconds
    digitalWrite(ultraSoundSignal, HIGH);                    // Send high pulse
    delayMicroseconds(5);                                     // Wait for 5 microseconds
    digitalWrite(ultraSoundSignal, LOW);                     // Holdoff
    pinMode(ultraSoundSignal, INPUT);                         // Switch signalpin to input
    digitalWrite(ultraSoundSignal, HIGH);                    // Turn on pullup resistor
    echo = pulseIn(ultraSoundSignal, HIGH);                  // Listen for echo
    ultrasoundValue = (float)echo * 0.01723;                 // convert to CM then to inches
    return ultrasoundValue;
}
void loop()
{
    val=digitalRead(13);
    int x = 0;
    if(val==HIGH)
    {
        x = ping();
        Serial.println(x);
        if(x<12)
        {
            digitalWrite(9,HIGH);
            delay(100);
        }
    }
}
```

```
        digitalWrite(9,LOW);  
        delay(100);  
    }  
    else  
        digitalWrite(9,LOW);  
    delay(250);  
}  
}
```