

Section two

อบรมหลักสูตร

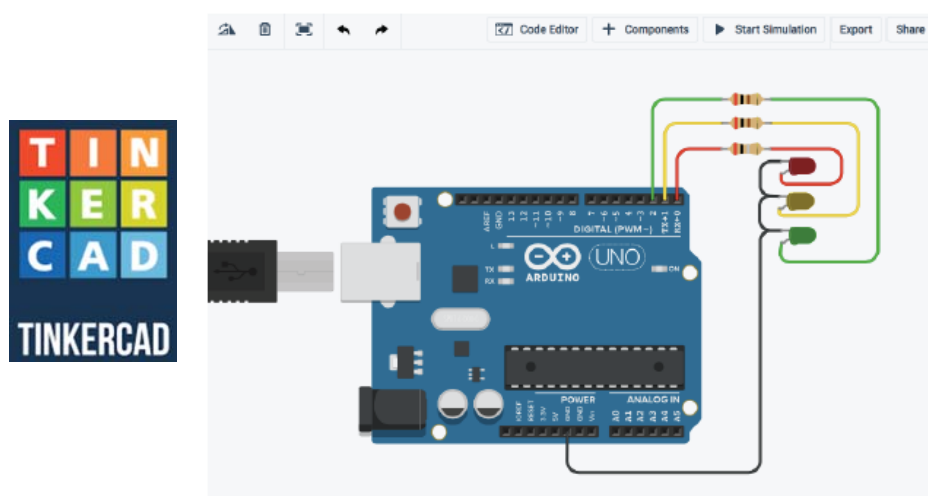
การประยุกต์ระบบ IoT เพิ่มผลผลิตการผลิต (Productivity) ด้วยโปรแกรม Arduino

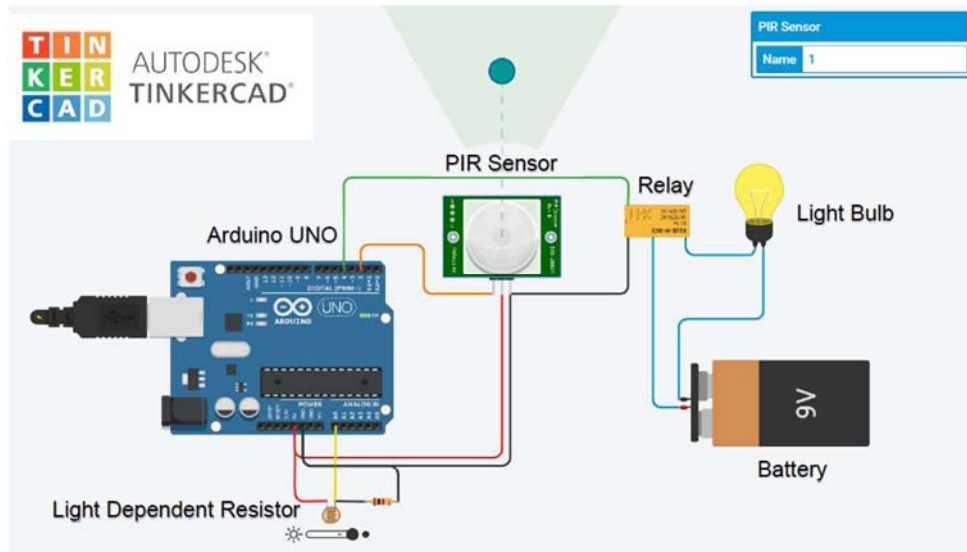
ผ่านระบบออนไลน์ จำนวน **80** ท่าน **ฟรี**

วันที่ 7 - 9 กันยายน 2564 เวลา 9.00-16.00 น

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Arduino simulator: Tinkercad.com



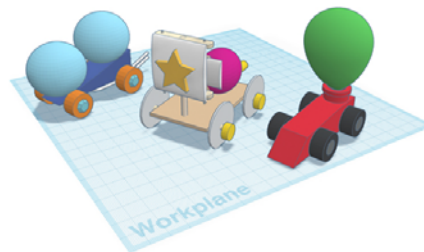


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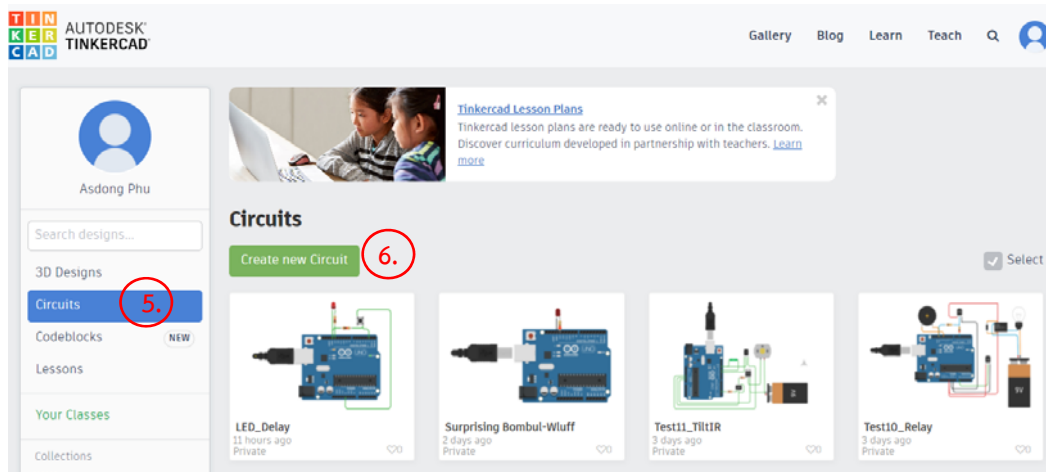
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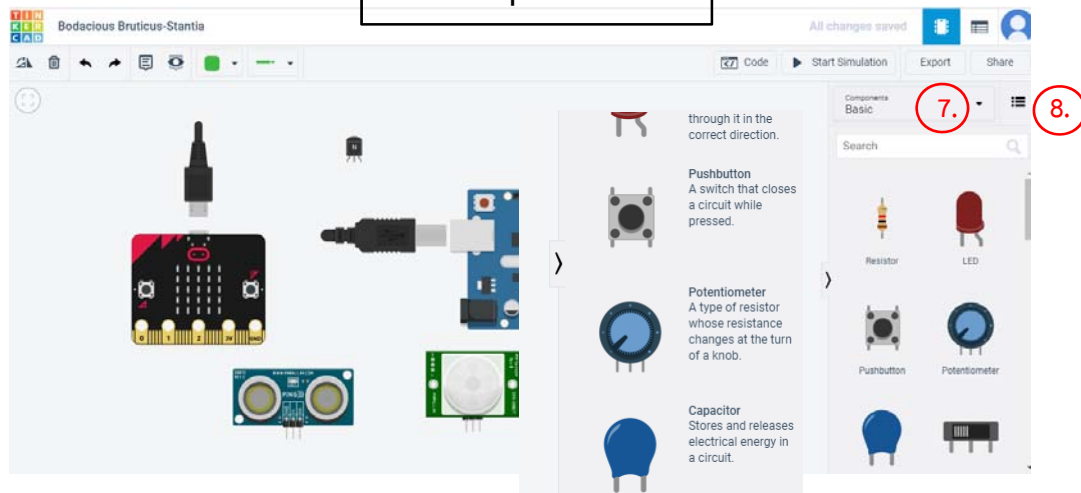
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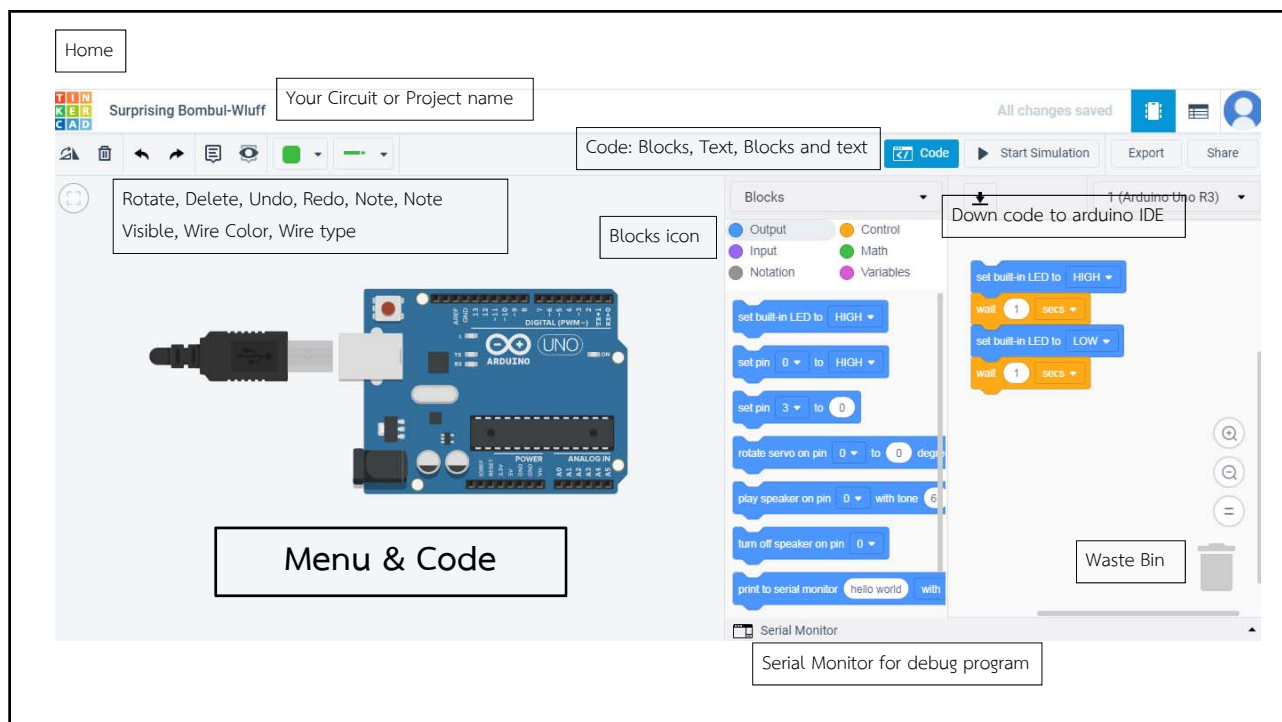
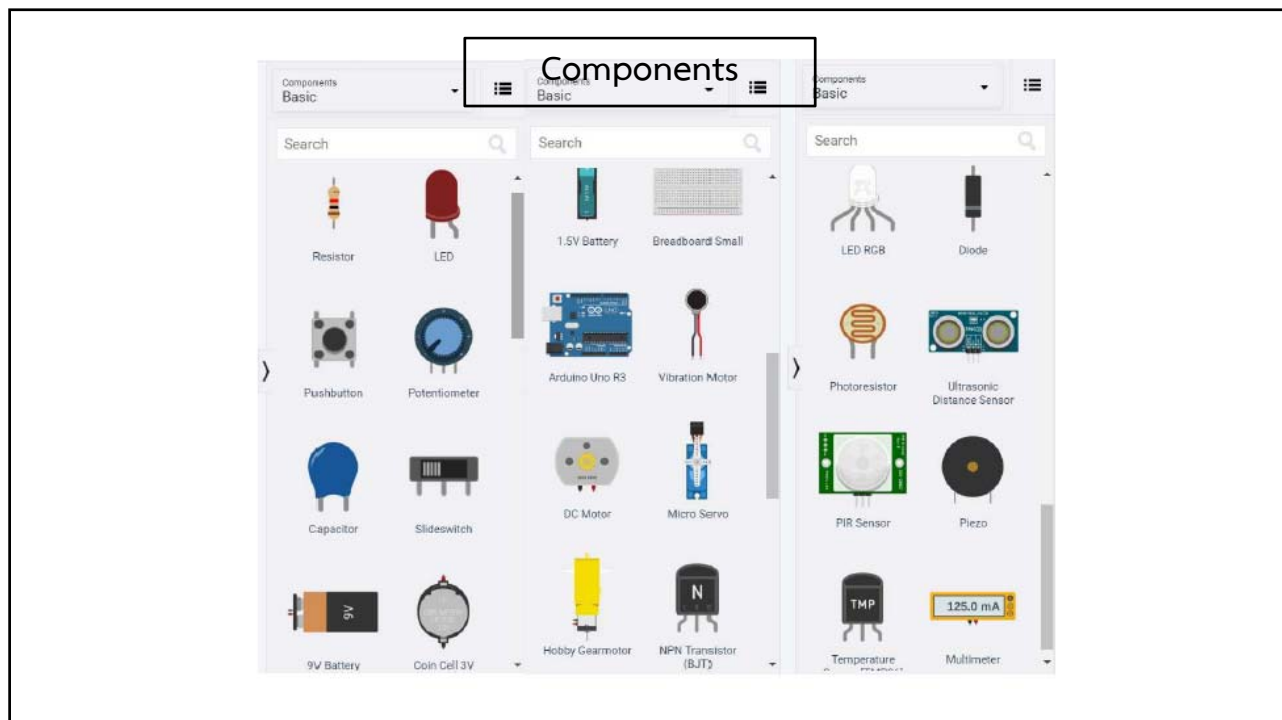
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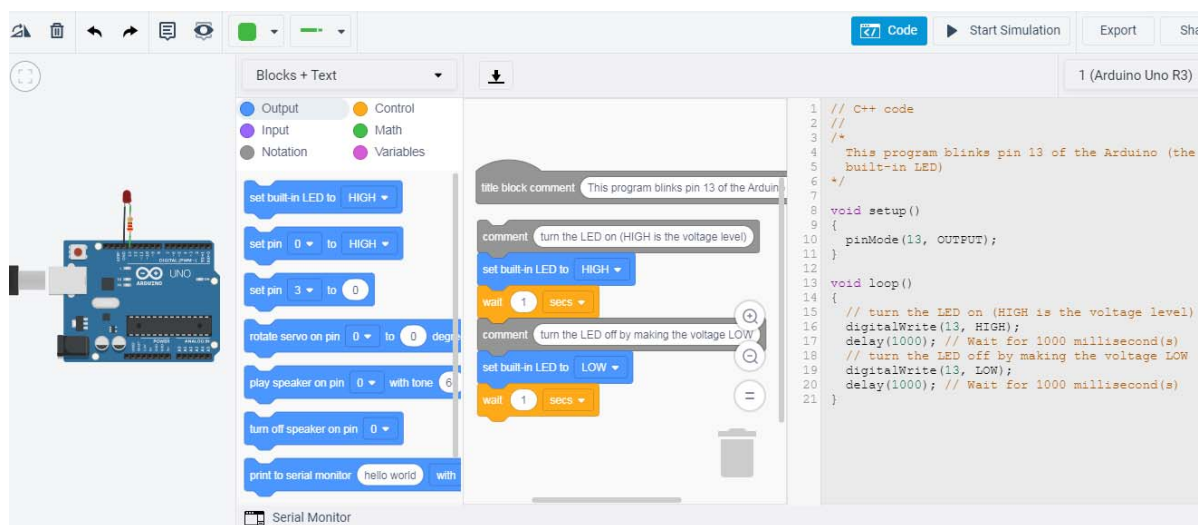
Create New Circuit project



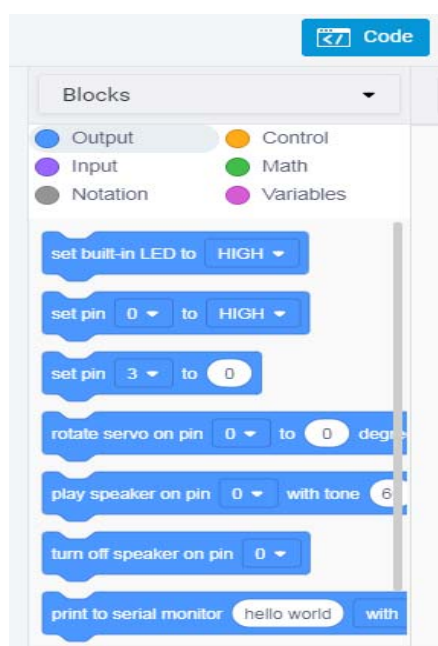
Components







Blink 1 on pin13



ตั้ง LED บนบอร์ด หรือขา13 เป็น Logic 1

ตั้งพอร์ต0 เป็น Logic 1

ส่งค่าออกพอร์ต3 เป็นตัวเลข 0 ใช้กับขาPWM 3,5,6,9,10,11

ตั้งพอร์ตและองศาการหมุนของServo Motor

พิมพ์ค่าออก Serial Monitor

The image shows the Scratch 'Code' tab with a list of blocks on the left and their corresponding C++ code on the right.

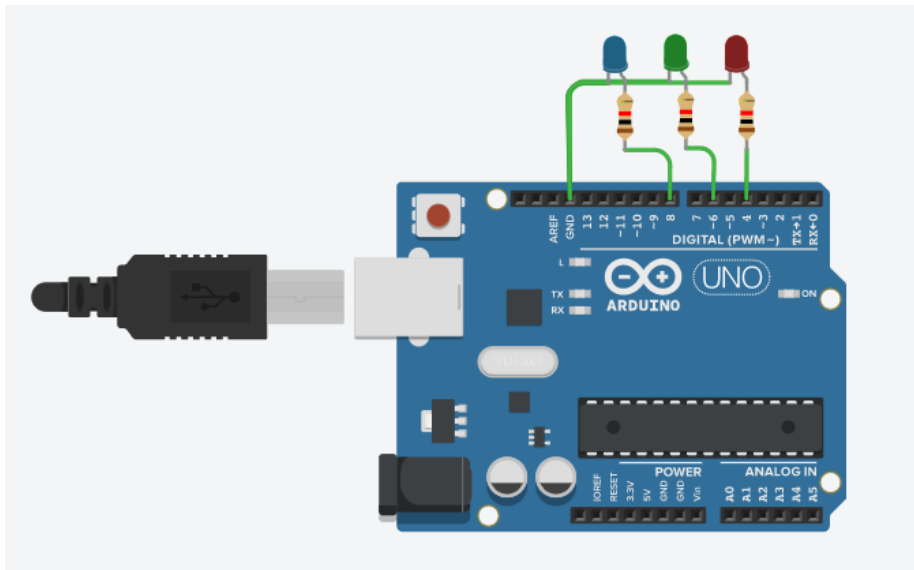
- wait 1 secs** block corresponds to `delay (1000);`
- repeat 10 times** block corresponds to `do (function) while (condition);`
- repeat while** block corresponds to `do (function) while (condition);`
- if then** block corresponds to `if (condition) { (function); }`
- if then else** block corresponds to `if (condition) { (function); } else (function);`
- count up by 1 for i from** block corresponds to `for (i = 1; i <= 1; i++) { }`

The image shows the Scratch 'Code' tab with a list of blocks on the left and their corresponding C++ code on the right.

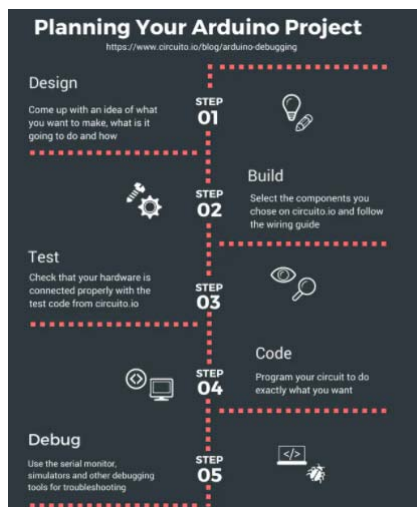
- read digital pin 0** block corresponds to `อ่านสถานะพอร์ตดิจิทัล ได้ค่า 0 หรือ 1`
- read analog pin A0** block corresponds to `อ่านค่าพอร์ตอะนาล็อก ได้ค่า 0-1023`
- read degrees of servo on pin 0** block corresponds to `อ่านพอร์ตดิจิทัลจากเซนเซอร์ ultrasonic`
- number of serial characters available** block corresponds to `อ่านค่าพอร์ตอะนาล็อก A0 จากเซนเซอร์อุณหภูมิ องศา C`
- read from serial** block corresponds to `อ่านค่าพอร์ตอะนาล็อก A0 จากเซนเซอร์อุณหภูมิ องศา C`
- read ultrasonic distance sensor on trigger pin** block corresponds to `อ่านพอร์ตดิจิทัลจากเซนเซอร์ ultrasonic`
- read temperature sensor on pin A0** block corresponds to `อ่านค่าพอร์ตอะนาล็อก A0 จากเซนเซอร์อุณหภูมิ องศา C`

Additional text boxes in the image:

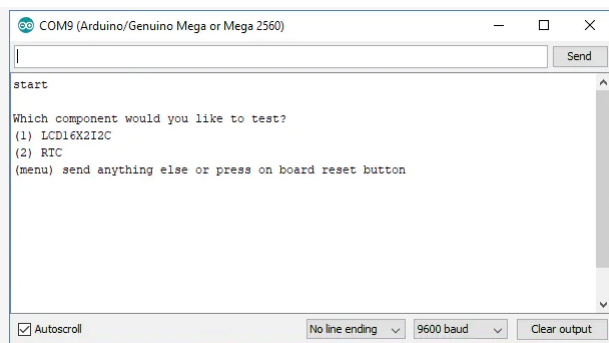
- เป็น text หรือ คำอธิบาย โปรแกรม ไม่มีการคำนวณ
- title block comment describe your code here
- comment helpful single-line comment here

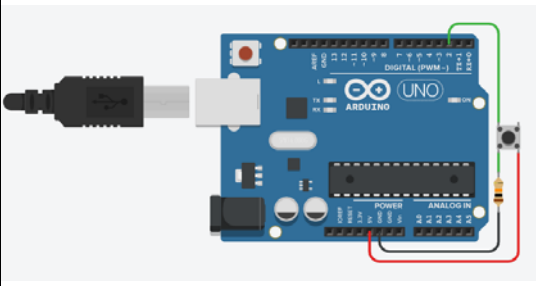


Test_Blink 3 on pin4,6,8



Why to debug Program ?





Toggle Switch

Blocks

- Output
- Input
- Notation
- Control
- Math
- Variables

1 (Arduino Uno R3)

title block comment Button Turns on and off a light emitting dio..

comment read the state of the pushbutton value

set buttonState to read digital pin 2

comment check if pushbutton is pressed. if it is, the...

if buttonState == HIGH then

comment turn LED on

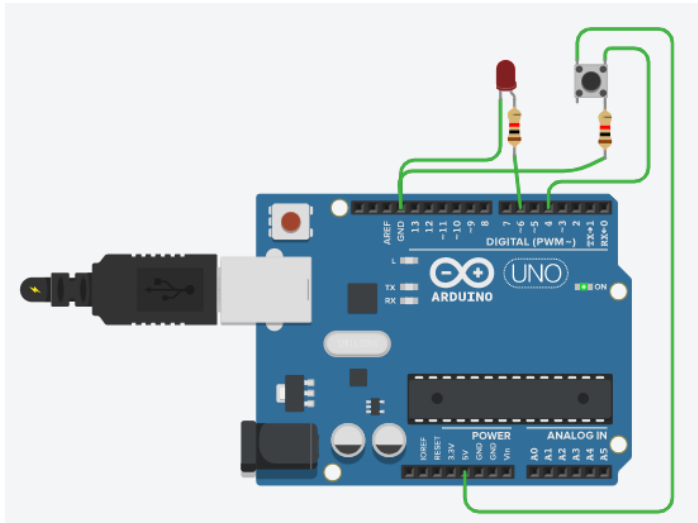
set built-in LED to HIGH

else

comment turn LED off

set built-in LED to LOW

print to serial monitor hello world with



Test_LED_on&off

Test_Piezo

A top-down view of an Arduino Uno R3 board. A piezo buzzer is connected to digital pin 6 (positive) and pin 5 (negative). The board is connected to a USB Type-C cable on the left and a DC power jack at the bottom.

Blocks

- Output
- Input
- Notation
- Control
- Math
- Variables

wait 1 secs

repeat 10 times

repeat while

if then

1 (Arduino Uno R3)

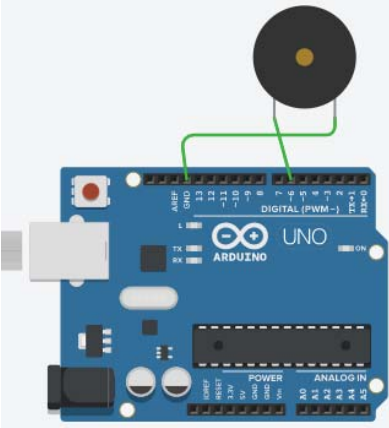
play speaker on pin 6 with tone 50 for 1 sec

wait 1 secs

turn off speaker on pin 6

wait 1 secs

Piezo_on&off

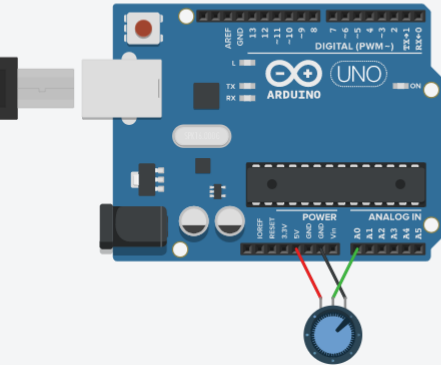


```

1 // C++ code
2 //
3
4 int PZ = 6;
5
6 void setup()
7 {
8   pinMode(PZ, OUTPUT);
9 }
10
11 void loop()
12 {
13   tone(PZ, 500);
14   delay(500);
15   noTone(PZ);
16   delay(500);
17 }

```

analogRead (Sample)



Blocks

- Output
- Input
- Notation
- Control
- Math
- Variables

```

set built-in LED to HIGH
set pin 0 to HIGH
set pin 3 to 0
rotate servo on pin 0 to 0 deg
play speaker on pin 0 with tone 6
turn off speaker on pin 0
print to serial monitor hello world with

```

1 (Arduino Uno R3)

title block comment Analog Input Demonstrates analog input by r...

comment read the value from the sensor

set sensorValue to read analog pin A0

comment turn the LED on

set built-in LED to HIGH

comment stop the program for the <sensorValue> millise...

wait sensorValue milliseconds

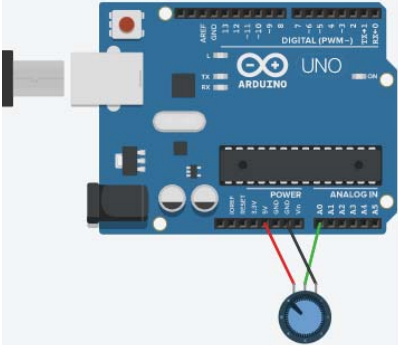
comment turn the LED off

set built-in LED to LOW

comment stop the program for the <sensorValue> millise...

wait sensorValue milliseconds

analogRead (Sample)

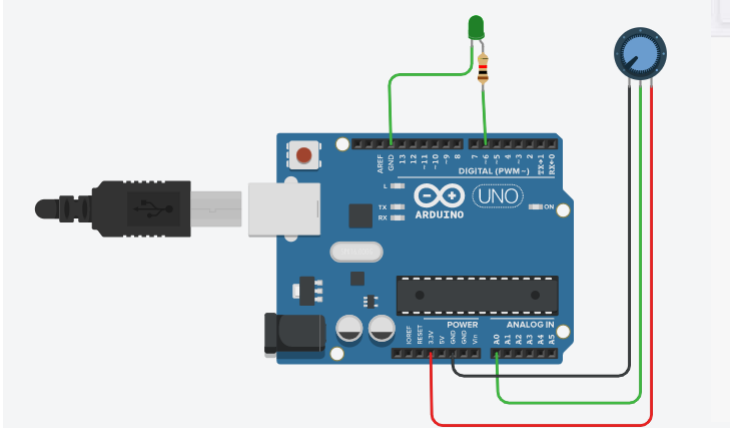


```

1  /*
2  ReadAnalogVoltage
3  Reads an analog input on pin 0, converts it to voltage, and pr
4
5  OPEN THE SERIAL MONITOR TO VIEW THE OUTPUT >>
6  Attach the center pin of a potentiometer to pin A0, and the ou
7
8  This example code is in the public domain.
9  */
10
11
12 // the setup routine runs once when you press reset:
13 void setup() {
14   // initialize serial communication at 9600 bits per second:
15   Serial.begin(9600);
16 }
17
18 // the loop routine runs over and over again forever:
19 void loop() {
20   // read the input on analog pin 0:
21   int sensorValue = analogRead(A0);
22   // Convert the analog reading (which goes from 0 - 1023) to a
23   float voltage = sensorValue * (5.0 / 1023.0);
24   // print out the value you read:
25   Serial.println(voltage);
26 }

```

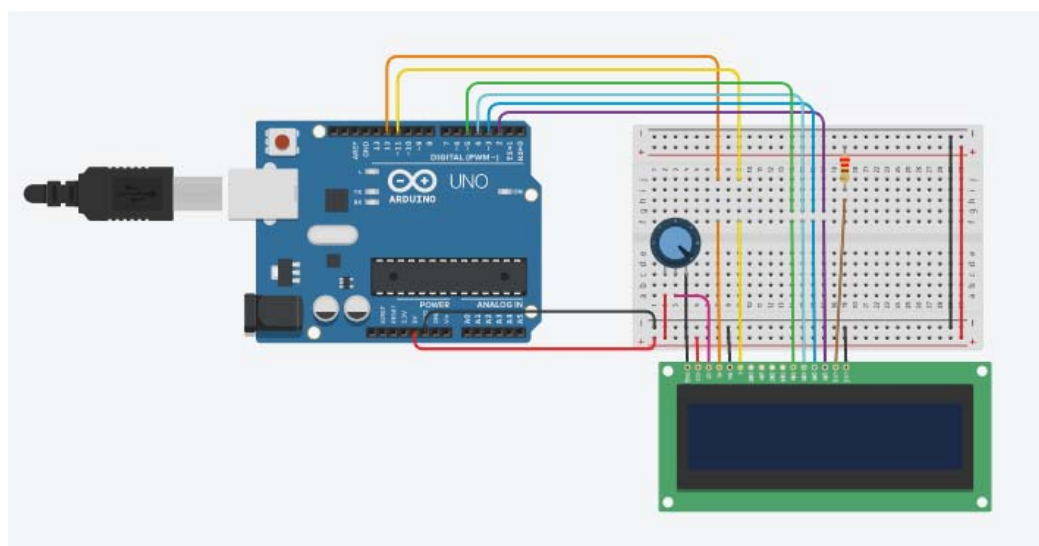
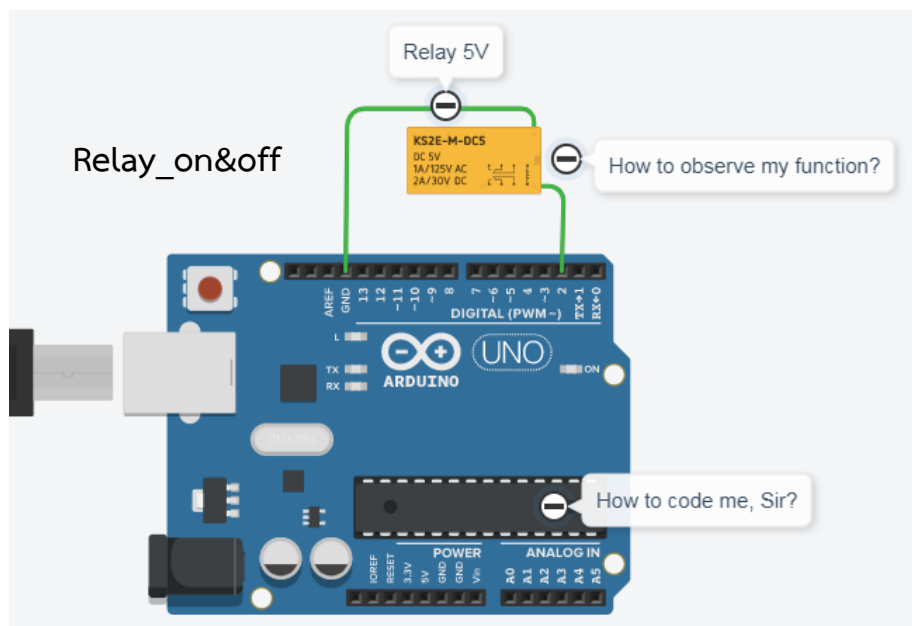
PWM



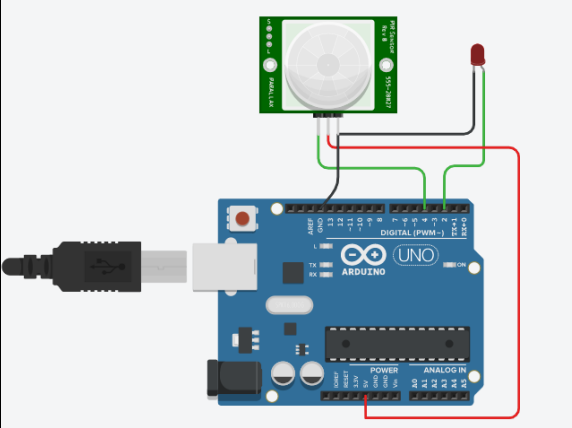
```

1  // C++ code
2  //
3  int ledPin = 6;
4  int val = 0;
5
6  void setup()
7  {
8     pinMode(ledPin, OUTPUT);
9  }
10
11 void loop()
12 {
13     val = analogRead(A0);
14     analogWrite(ledPin, val);
15 }

```



LCD "Hello World" (sample)



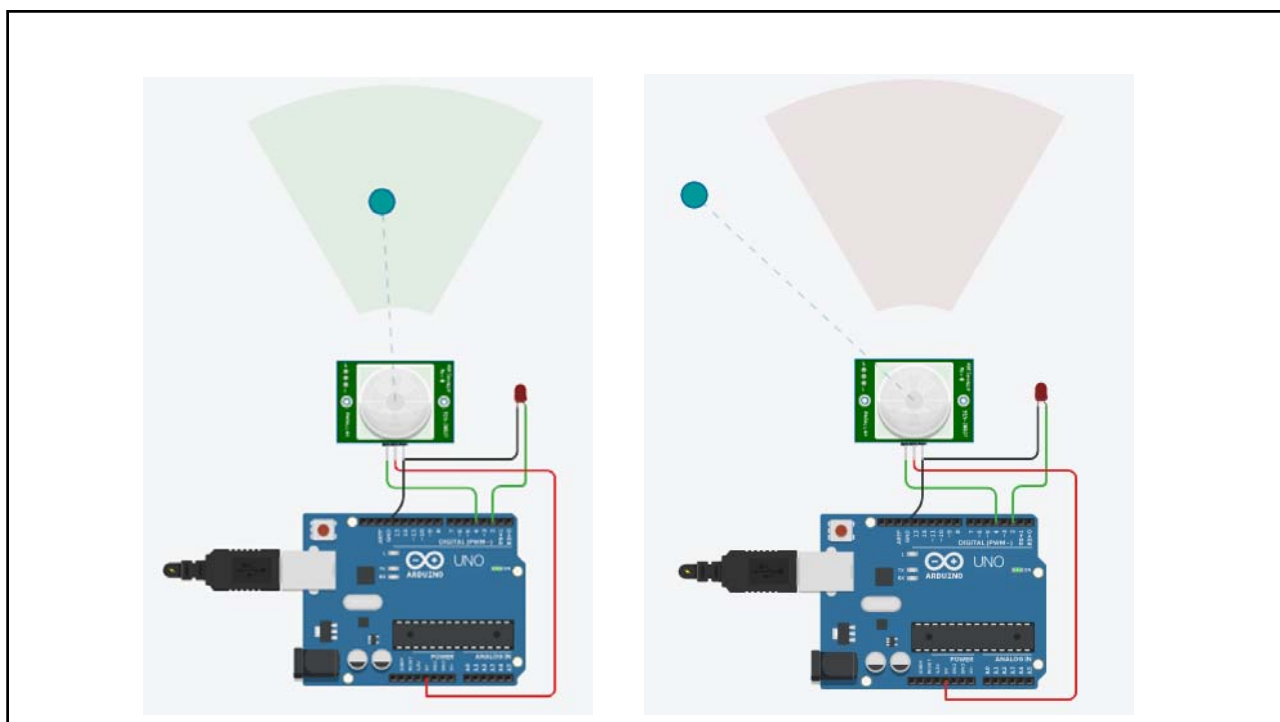
PIR

```

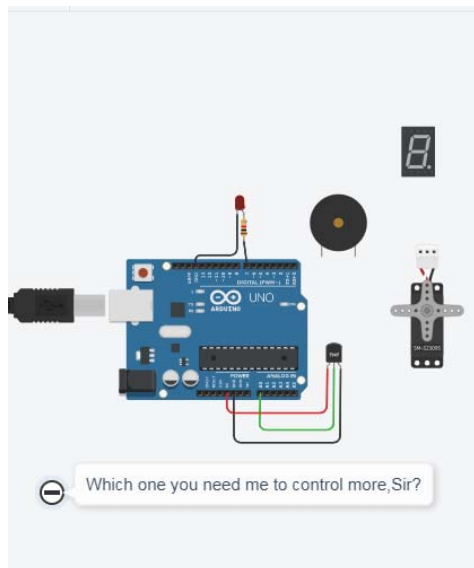
Text
1 (Arduino Uno R3)

1 int pirPin = 4;
2 int ledPin = 2;
3 bool val=0;
4
5 void setup(){
6
7   Serial.begin(9600);
8   pinMode(pirPin, INPUT);
9   pinMode(ledPin, OUTPUT);
10 }
11
12 void loop(){
13
14   val = digitalRead(pirPin); //low = no motion, high = motion
15   if (val == HIGH)
16   {
17     digitalWrite(ledPin, HIGH);
18     Serial.println("Motion detected");
19     delay(1000);
20   }
21   else
22   {
23     digitalWrite(ledPin, LOW);
24     Serial.println("No motion detected");
25     delay(1000);
26   }
27 }

```



TMP36_LED



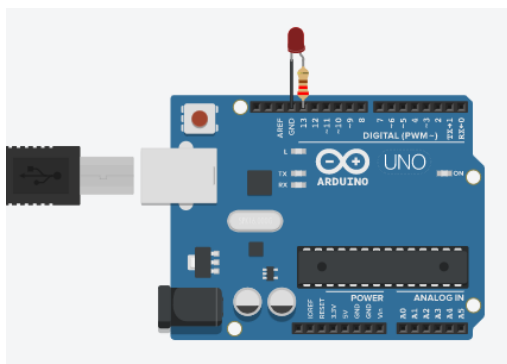
Which one you need me to control more, Sir?

```

1 // C++ code
2 //
3 #define LED 7
4
5 void setup()
6 {
7   pinMode(A0, INPUT);
8   pinMode(LED, OUTPUT);
9   Serial.begin(9600);
10 }
11
12 void loop()
13 {
14   int val = analogRead(A0);
15   int temp = map(val, 0, (1.75/5)*1024, -50, 125);
16   if (temp >= 40) {
17     digitalWrite(LED, HIGH);
18     Serial.println("LED ON");
19     Serial.println(temp);
20     delay(500);
21   }
22   else if (temp <= 20) {
23     digitalWrite(LED, LOW);
24     Serial.println("LED ON");
25     Serial.println(temp);
26     delay(500);
27   }
28 }

```

Blink without delay



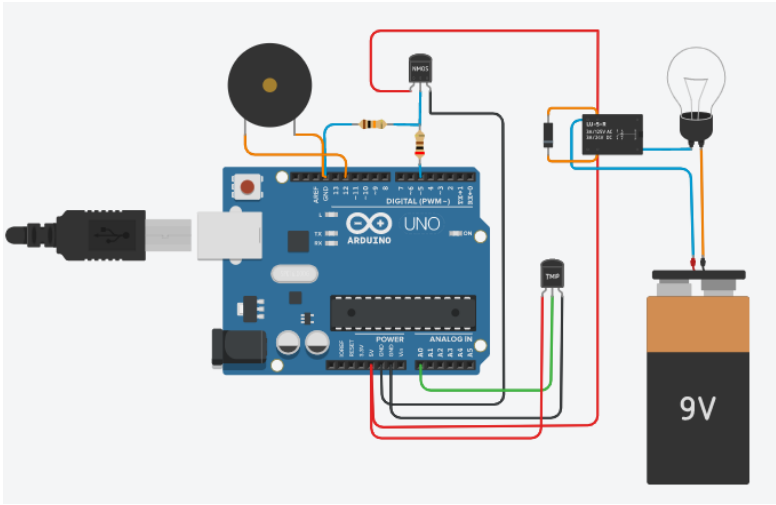
```

const int ledPin = LED_BUILTIN; // the number of the LED pin Variables will change :
int ledState = LOW; // ledState used to set the LED
// Generally, you should use "unsigned long" for variables that hold time
// The value will quickly become too large for an int to store
unsigned long previousMillis = 0; // will store last time LED was updated
const long interval = 1000; // interval at which to blink (milliseconds)

void setup() {
  pinMode(ledPin, OUTPUT);
}

void loop() {
  unsigned long currentMillis = millis();
  if (currentMillis - previousMillis >= interval) {
    // save the last time you blinked the LED
    previousMillis = currentMillis;
    // if the LED is off turn it on and vice-versa:
    if (ledState == LOW) { ledState = HIGH; }
    else { ledState = LOW; }
    // set the LED with the ledState of the variable:
    digitalWrite(ledPin, ledState);
  }
}

```



Try: Relay based on Temp

