Lab 2.2: Sensors/Actuators

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Credits

- https://www.arduino.cc/
- https://www.simulide.com/p/home.html
- http://simonmonk.org/
- https://create.arduino.cc/projecthub/glowascii/servo-arduino-basics-cb9266?ref=tag&ref_id=servo&offset=22
- https://create.arduino.cc/projecthub/nikhileswari/light-sensor-using-arduino-07cd9c

Sensors and Actuators

- **Sensors:**
  - ◆ Capture physical stimulus (e.g., heat, light, sound, pressure, magnetism, or other mechanical motion)
  - ◆ Typically generate a proportional electrical current
  - ◆ May require analog interface
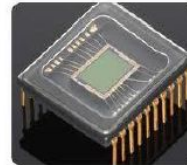
- **Actuators**
  - ◆ Convert a command to a physical stimulus (e.g., heat, light, sound, pressure, magnetism, or other mechanical motion)
  - ◆ May require analog interface

pressure

mic

speaker

radar

compass

camera

accelerometer

3

Sensors and Actuators

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- **Actuators**
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solenoid

speaker

laser diode/transistor

dc motor

LED display

Arduino Sensors

Example: Light Sensor ->

https://create.arduino.cc/projecthub/nikhileswari/light-sensor-using-arduino-07cd9c

sketch_apr01a | Arduino 1.8.13
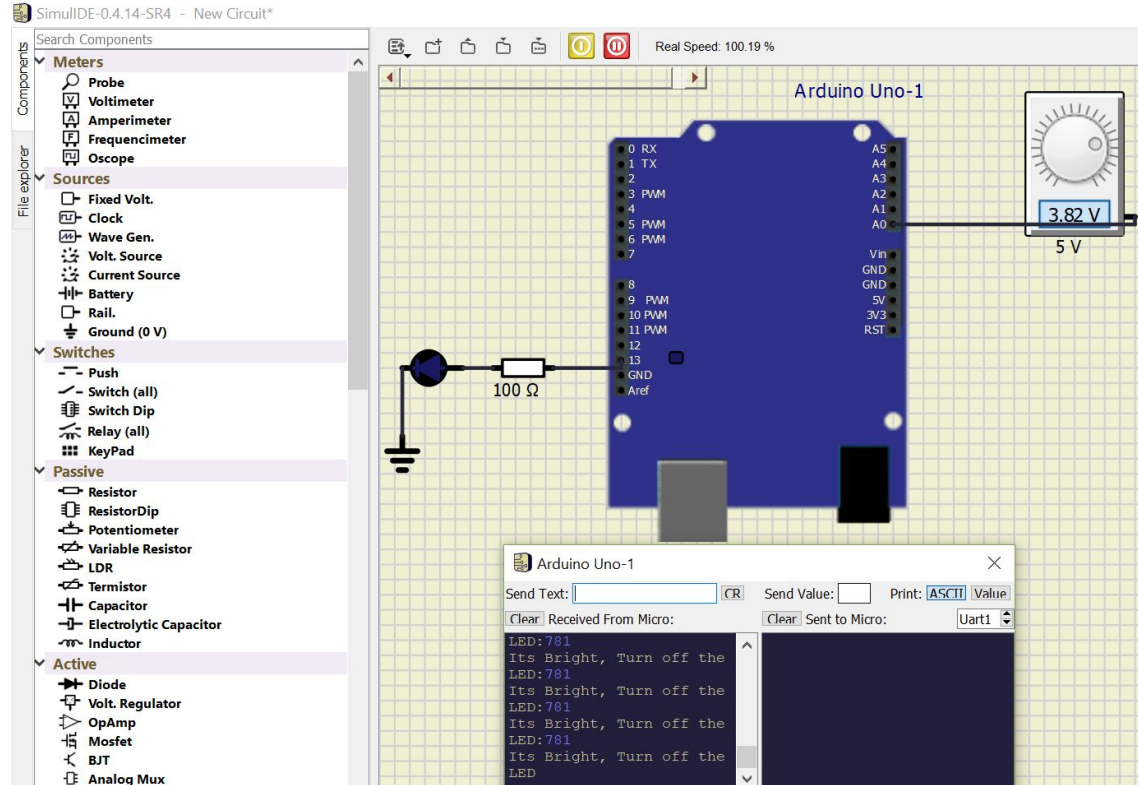
File Edit Sketch Tools Help

sketch_apr01a §

```
const int ledPin = 13;
const int ldrPin = A0;
void setup() {
  Serial.begin(9600);
  pinMode(ledPin, OUTPUT);
  pinMode(ldrPin, INPUT);
}

void loop() {
  int ldrStatus = analogRead(ldrPin);

  if (ldrStatus <= 400)
  {
    digitalWrite(ledPin, HIGH);
    Serial.print("Its Dark, Turn on the LED:");
    Serial.println(ldrStatus);

  }
  else
  {
    digitalWrite(ledPin, LOW);
    Serial.print("Its Bright, Turn off the LED:");
    Serial.println(ldrStatus);
  }

}
```

Example: Light Sensor ->

Example: Servo Motor ->

https://create.arduino.cc/projecthub/glowascii/servo-arduino-basics-cb9266?ref=tag&ref_id=servo&offset=22

servo | Arduino 1.8.13

File Edit Sketch Tools Help

servo

```
 modified 8 Nov 2013
 by Scott Fitzgerald
 http://www.arduino.cc/en/Tutorial/Sweep
*/

#include <Servo.h>

Servo myservo;  // create servo object to control a servo
                // twelve servo objects can be created on most boards

int pos = 10;    // variable to store the servo position
int pushButton = 2;
int ledPin = 13;
int clicks = 0;

void setup()
{
  Serial.begin(9600);
  myservo.attach(9);  // attaches the servo on pin 9 to the servo object
  pinMode(pushButton, INPUT_PULLUP);
  digitalWrite(ledPin, LOW);
}

void loop() {
  int buttonState = digitalRead(pushButton);
  if (buttonState == 0 && pos <= 160) {
    clicks = clicks + 1;
    Serial.print("Clicks: ");
    Serial.println(clicks);
    pos = map(clicks, 0, 29, 15, 160);
    myservo.write(pos);              // tell servo to go to position in variable 'pos'
    delay(100);
  }
  else if (buttonState == 0) {
    digitalWrite(ledPin, HIGH); // LED goes on when the button has been pressed too many times
  }
}
```

Example:Light Sensor ->