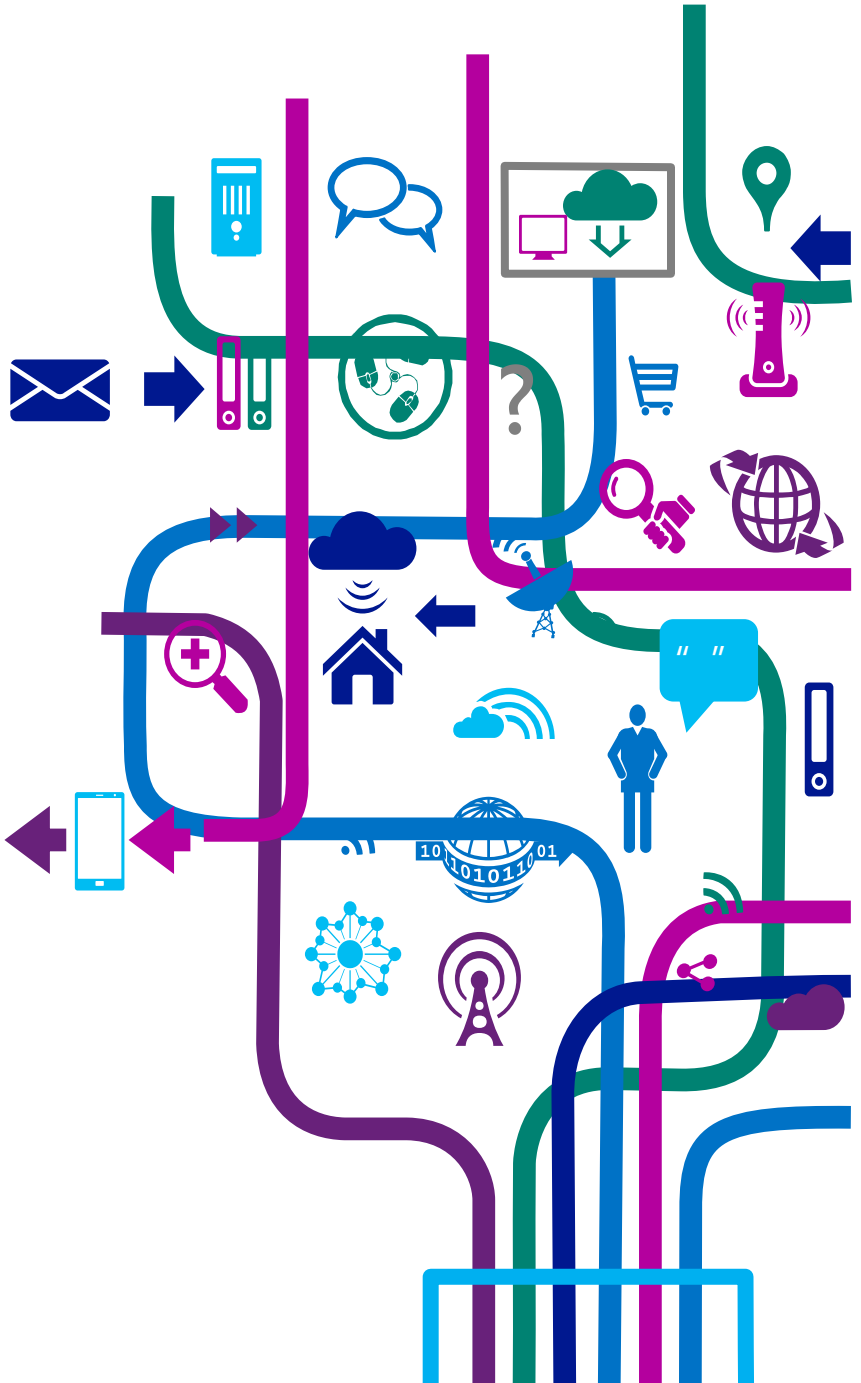
Microsoft IoT Camp #3

Sensor Hub Programming



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Arduino를 활용 예제 실습

Arduino 용어정리

"*sketch*" – a program you write to run on an Arduino board

"*pin*" – an input or output connected to something.

e.g. output to an LED, input from a knob.

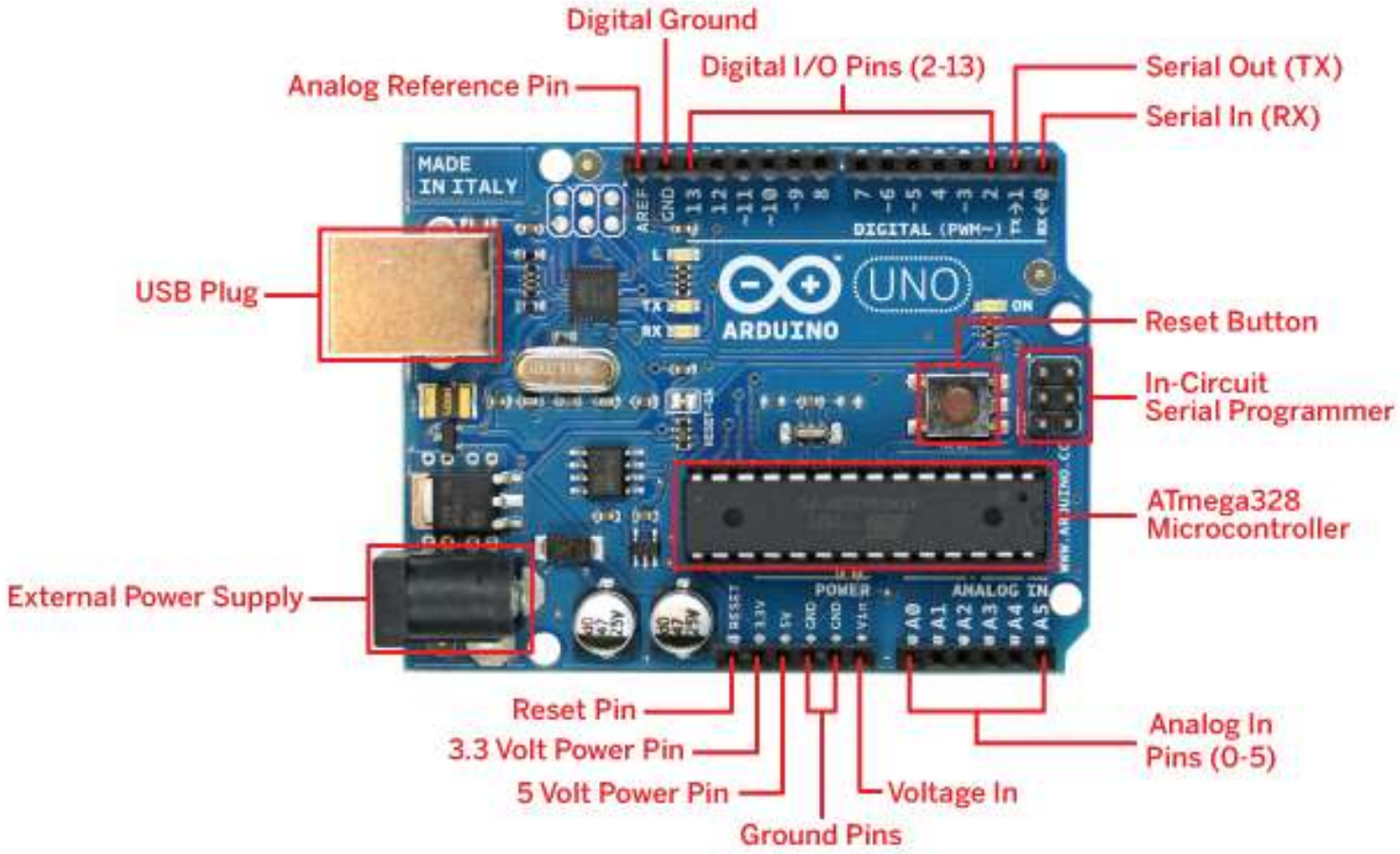
"*digital*" – value is either HIGH or LOW.

(aka on/off, one/zero) e.g. switch state

"*analog*" – value ranges, usually from 0-255.

e.g. LED brightness, motor speed, etc.

Arduino 용어정리



Arduino 기본 함수

setup()	환경을 설정하는데 사용된다.
loop()	실제 코드를 작성하는 부분
Serial.begin( )	시리얼 통신을 시작한다.
Serial.print( )	내용을 출력한다.
Serial.println( )	내용을 출력하고 한 줄 밑으로 내린다.

Arduino 기본 함수

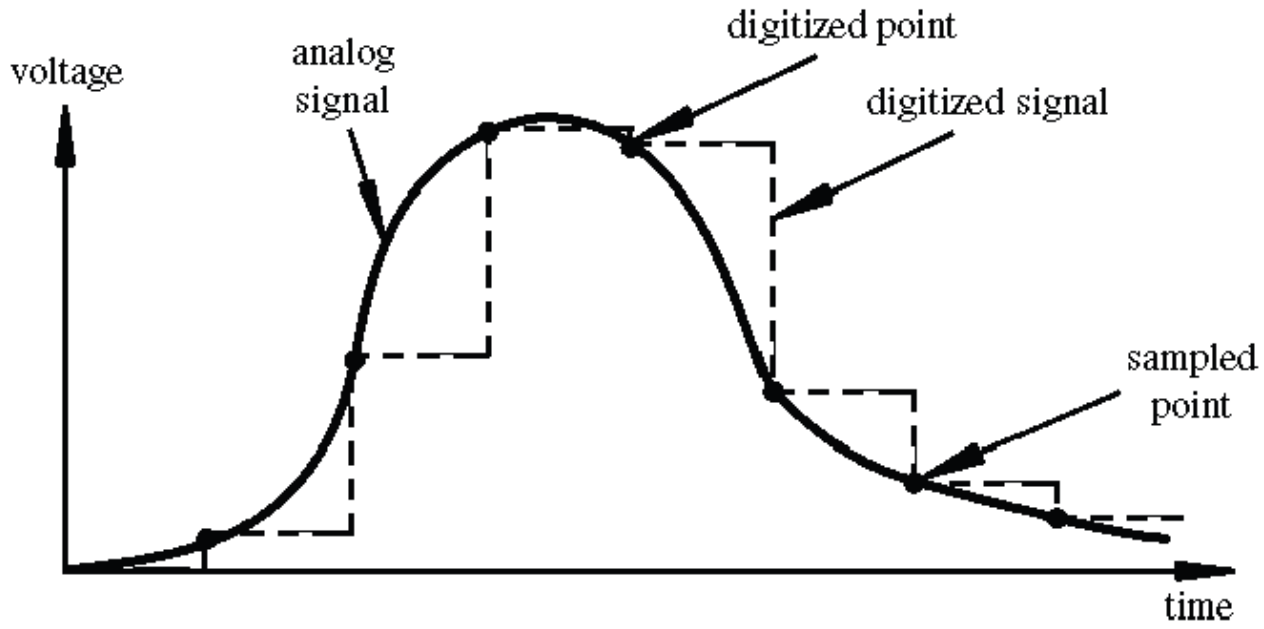
pinMode(pin, mode);
각각의 핀의 용도를 결정한다.
(ex: INPUT, OUTPUT)

digitalRead(pin);
디지털 입력을 받아들인다. (ex: LOW, HIGH)

digitalWrite(pin);
디지털 출력을 한다. (ex: LOW, HIGH)

Digital or Analog

- Digital has two values: **on** and **off**
- Analog has many (infinite) values
- Computers don't really do analog, they ***quantize***
- Remember the 6 analog input pins---here's how they work



Arduino 기본 함수

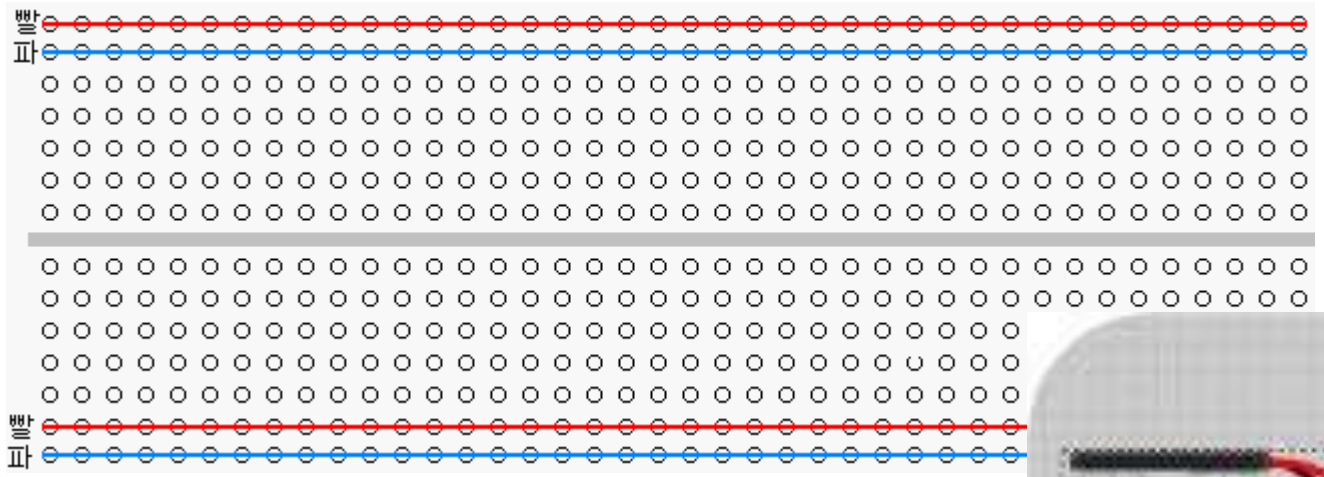
delay(ms)
주어진 시간만큼 실행을 지연 시킨다.
ex: delay(1000);

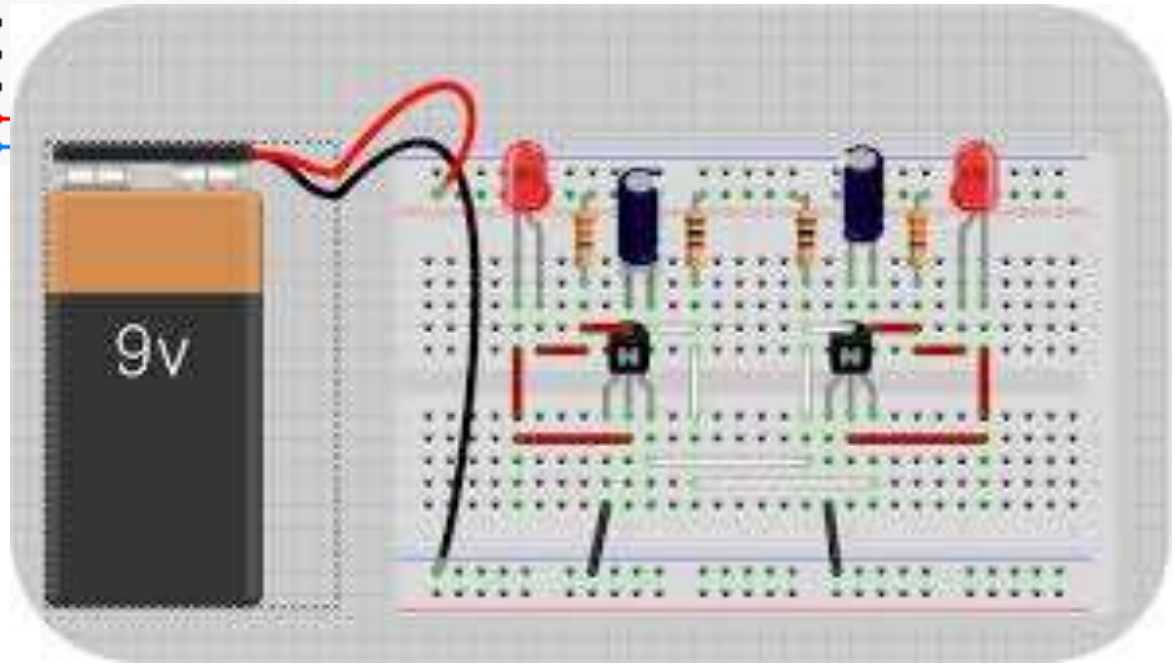
delayMicroseconds(us)
주어진 시간만큼 실행을 지연 시킨다
차이가 있다면 단위가 microseconds 이다.

첫 번째 샘플

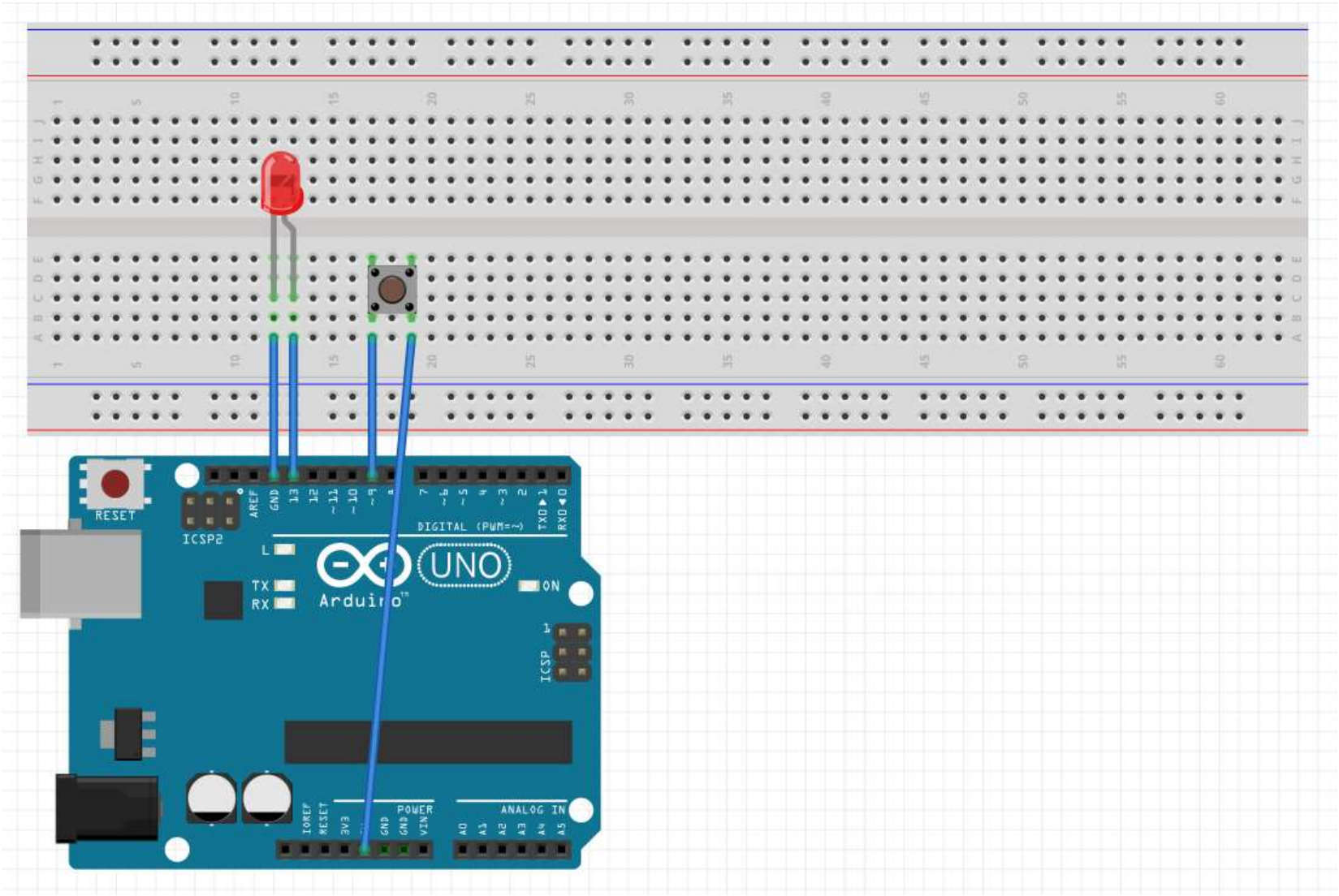
```
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);               // wait for a second
  digitalWrite(led, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);               // wait for a second
}
```

브래드 보드 (일명: 빵판)





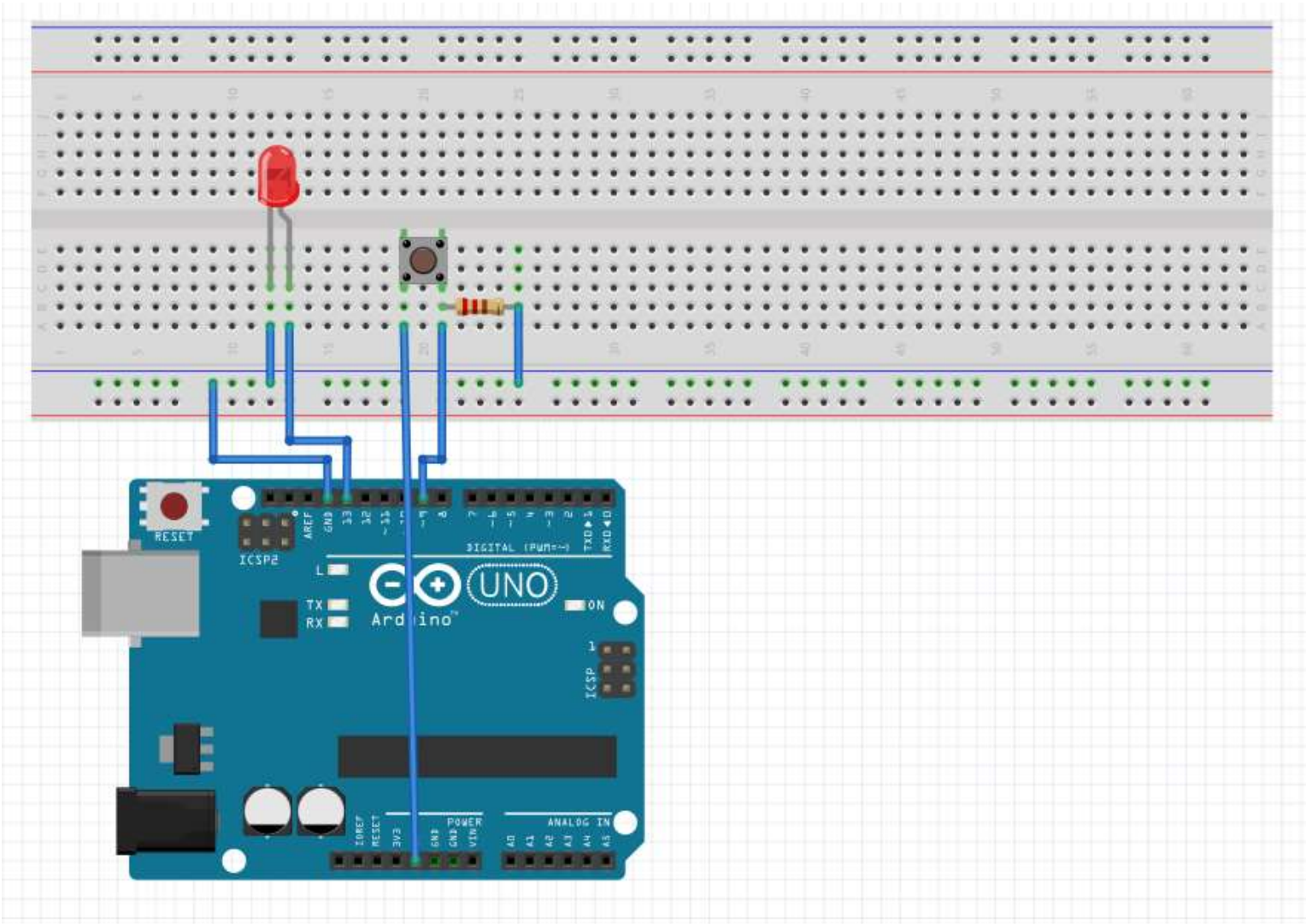
디지털 입력


RESET
ICSP2
AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM=~)
L
TX
RX
UNO
Arduino
ON
ICSP
POWER
ANALOG IN
IOREF
RESET
3V3
5V
GND
GND
VIN
A0
A1
A2
A3
A4
A5

네 번째 샘플

```
const int RED = 13;
const int BUTTON = 11;

void setup() {
  pinMode(RED, OUTPUT);
  pinMode(BUTTON, INPUT);
}

void loop() {
  if(digitalRead(BUTTON)== LOW)
  {
    digitalWrite(RED, LOW);
  }
  else
  {
    digitalWrite(RED, HIGH);
  }
}
```

디지털 입력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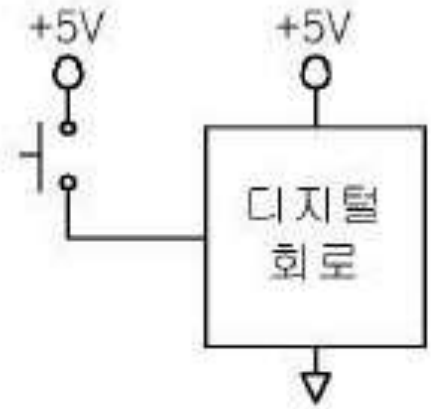
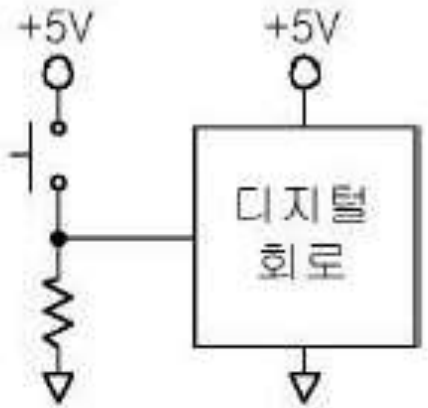
5V
GND
GND
VIN
POWER
A0
A1
A2
A3
A4
A5
ANALOG IN

디지털 입력

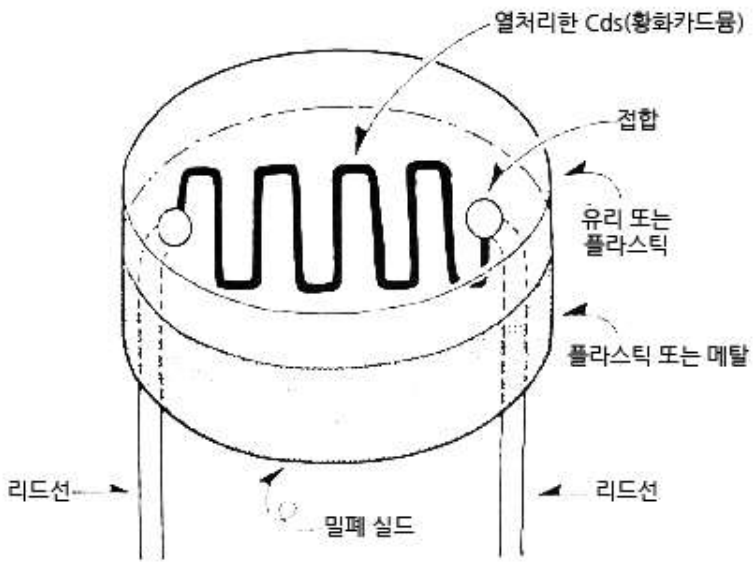


(a) 스위치 입력

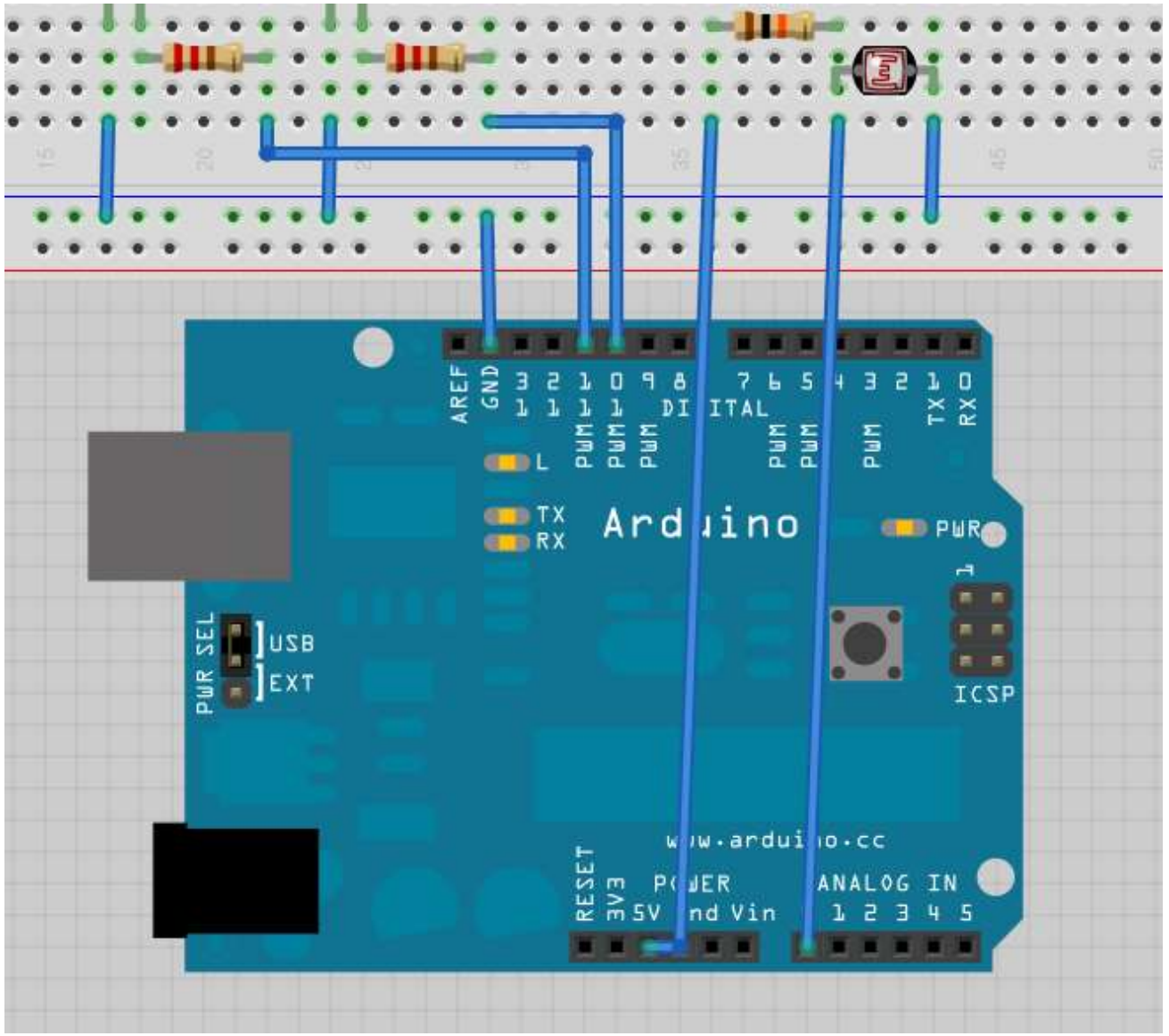


(b) 풀다운저항 사용

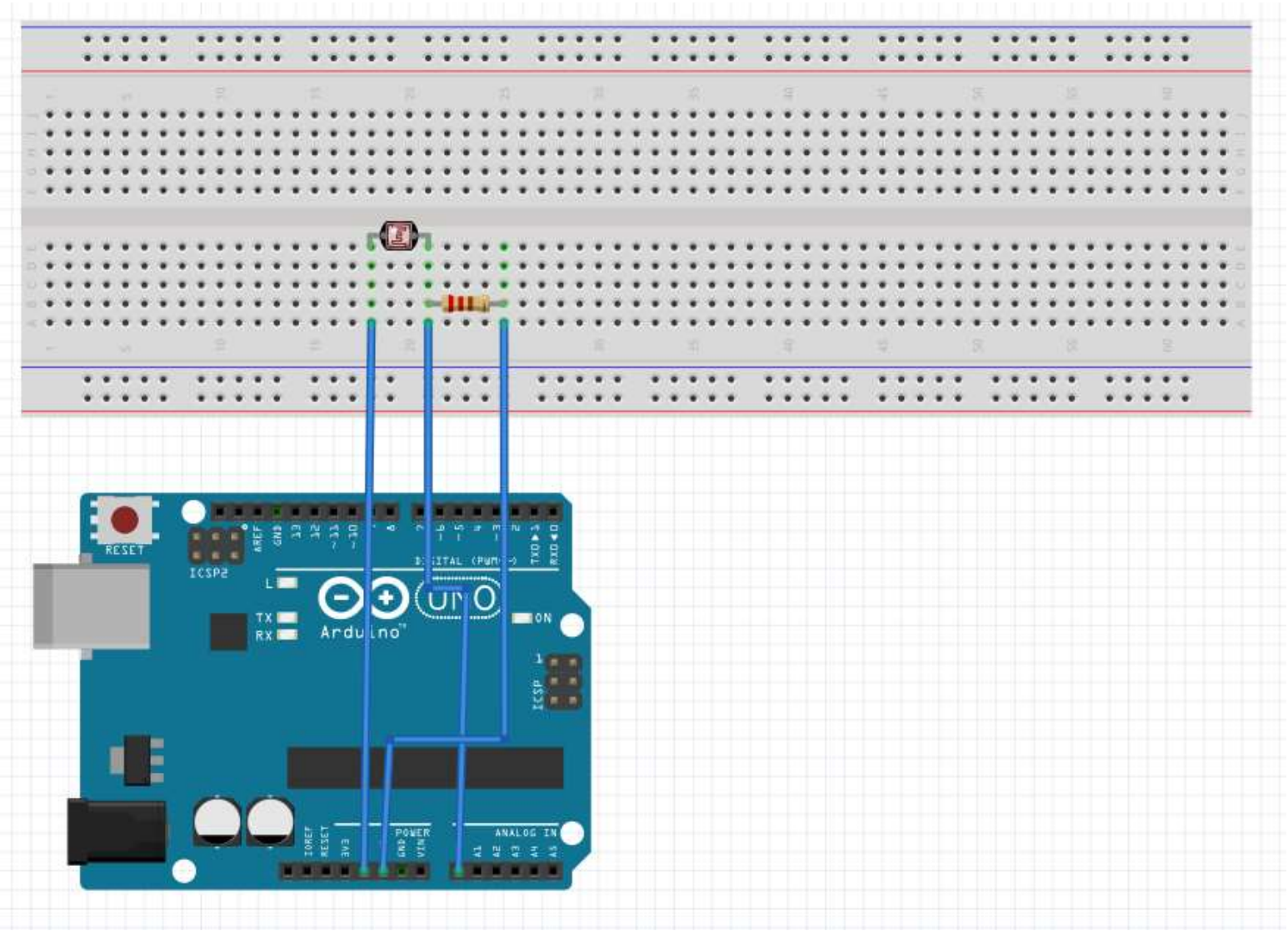
조도센서



Cds 셀의 구조도



조도센서



조도센서

```
const int LIGHT = 0;

void setup() {
  Serial.begin(9600);
}

void loop() {
  int temp = analogRead(LIGHT);

  Serial.println(temp);
  delay(50);
}
```

조도센서

```
const int LIGHT = 0;
const int RED = 13;

void setup() {
  Serial.begin(9600);

  pinMode(RED, OUTPUT);
}

void loop() {
  int temp = analogRead(LIGHT);

  if(temp < 200)
    digitalWrite(RED, HIGH);
  else
    digitalWrite(RED, LOW);

  Serial.println(temp);
  delay(50);
}
```