

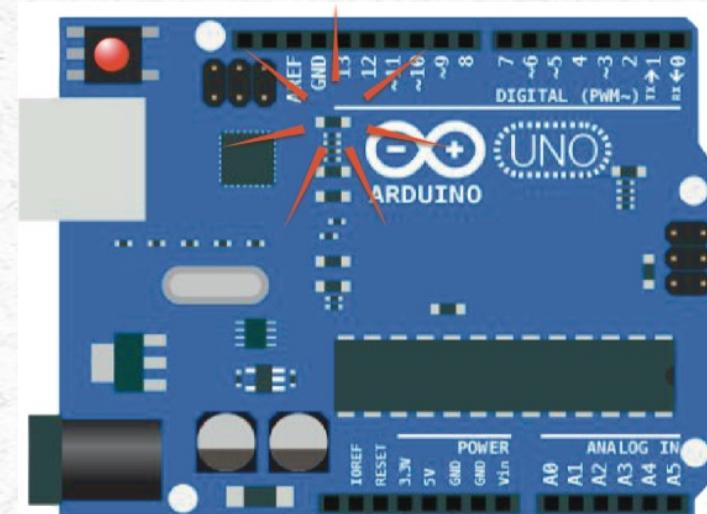
아두이노 보드에 있는 LED 켜기 및 끄기

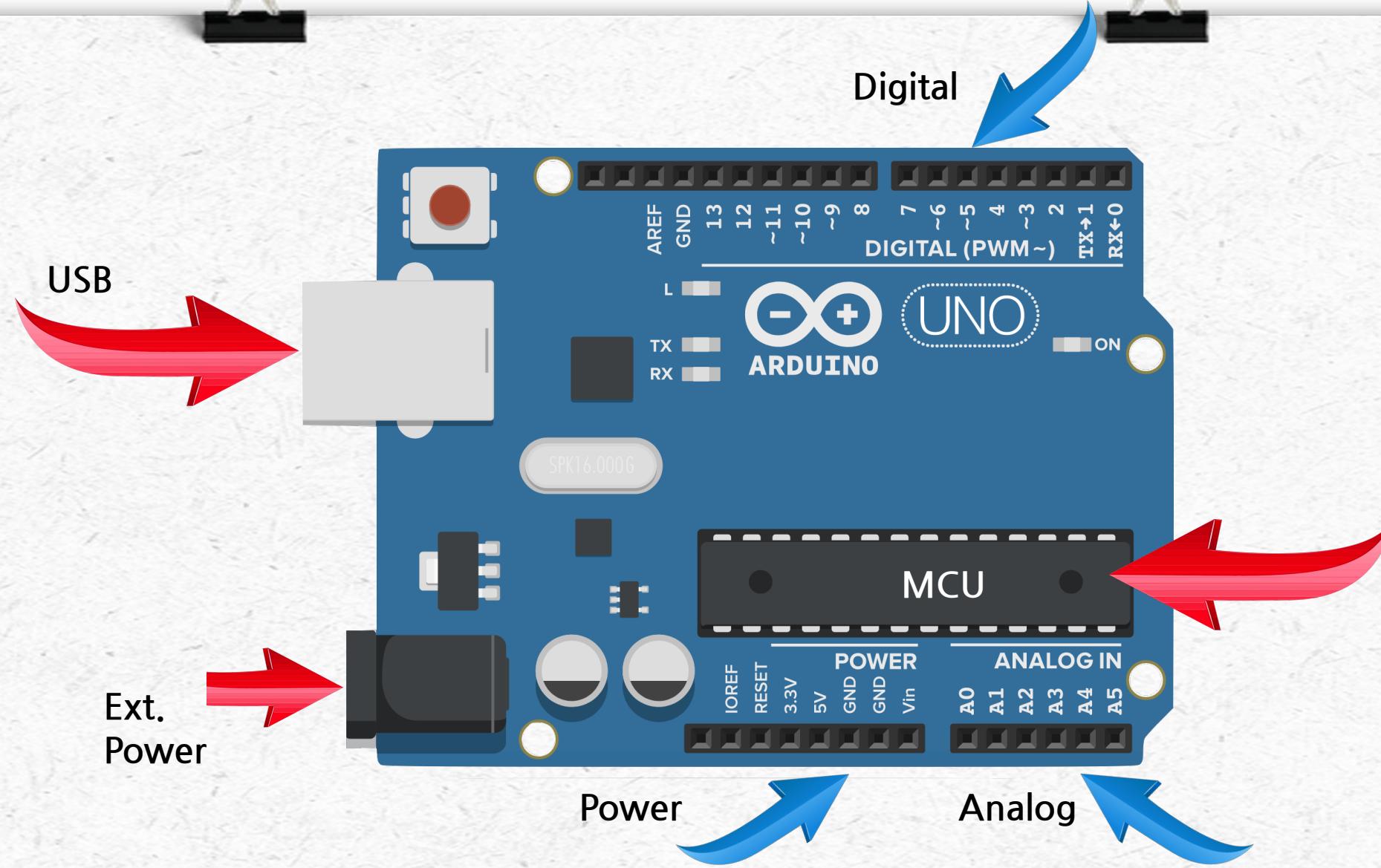
Turn OFF LED at digital pin 13

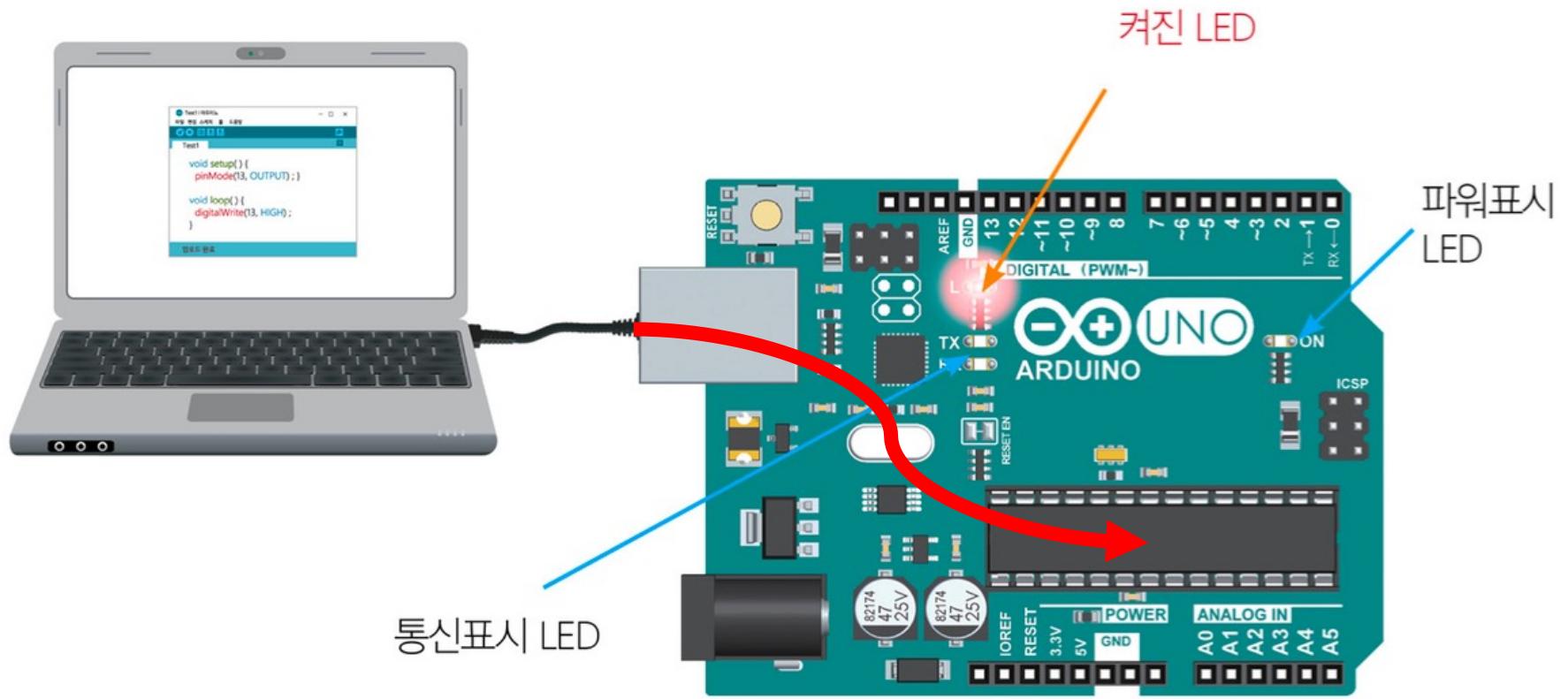
준비물 :

아두이노 보드 1개

USB 케이블 1개







핀 번호 출력 또는 입력 쎄미 콜론

pinMode(#, OUTPUT/INPUT);

셋업 안에서

핀 번호 높게 또는 낮게 쎄미 콜론

digitalWrite(#, HIGH/LOW);

루프 안에서

컴파일



Word 를
바이너리 코드로 변환

```
sketch_mar01a §
1
2 void setup() {
3   pinMode(13, OUTPUT) ;
4 }
5
6 void loop() {
7   digitalWrite(13, HIGH) ;
8 }
9
```

Save As: LED ON

Tags:

Desktop

The screenshot shows the Arduino IDE interface. At the top, there are fields for 'Save As:' containing 'LED ON' and 'Tags:'. Below that is a file browser showing 'Desktop'. The main area displays a sketch titled 'LED_ON' with the following code:

```
1
2 void setup() {
3     pinMode(13, OUTPUT) ;
4 }
5
6 void loop() {
7     digitalWrite(13, HIGH) ;
8 }
9
```

Below the code, a status bar shows the message '컴파일 완료.' (Compile completed). At the bottom, there is a summary of memory usage in Korean.

컴파일 완료.

스케치는 프로그램 저장 공간 207547 바이트(15%)를 사용.
전역 변수는 동적 메모리 15220바이트(4%)를 사용, 31246

Board 선택

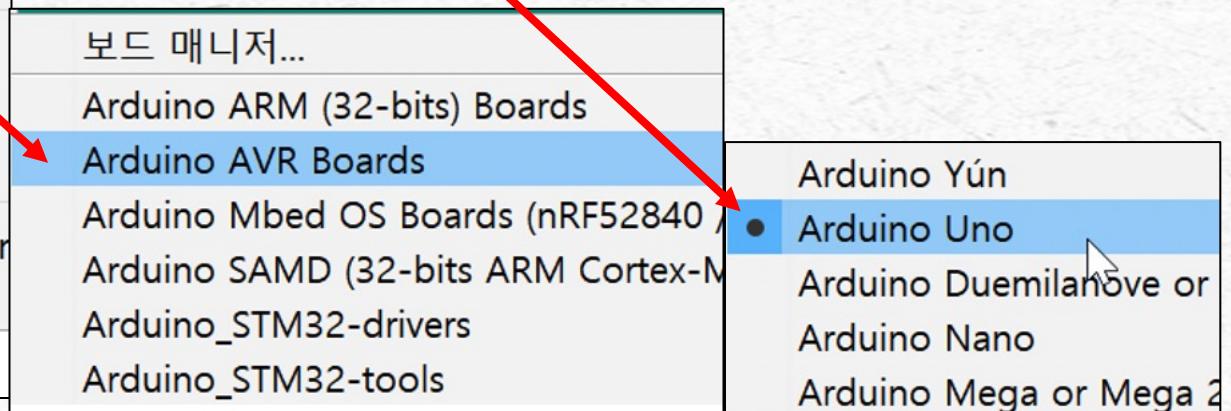
파일 편집 스케치 툴 도움말

```
1 LED_ON
2 void setup()
3 pinMode(
4 }
5
6 void loop()
7 digitalWr
8 }
9
10
```

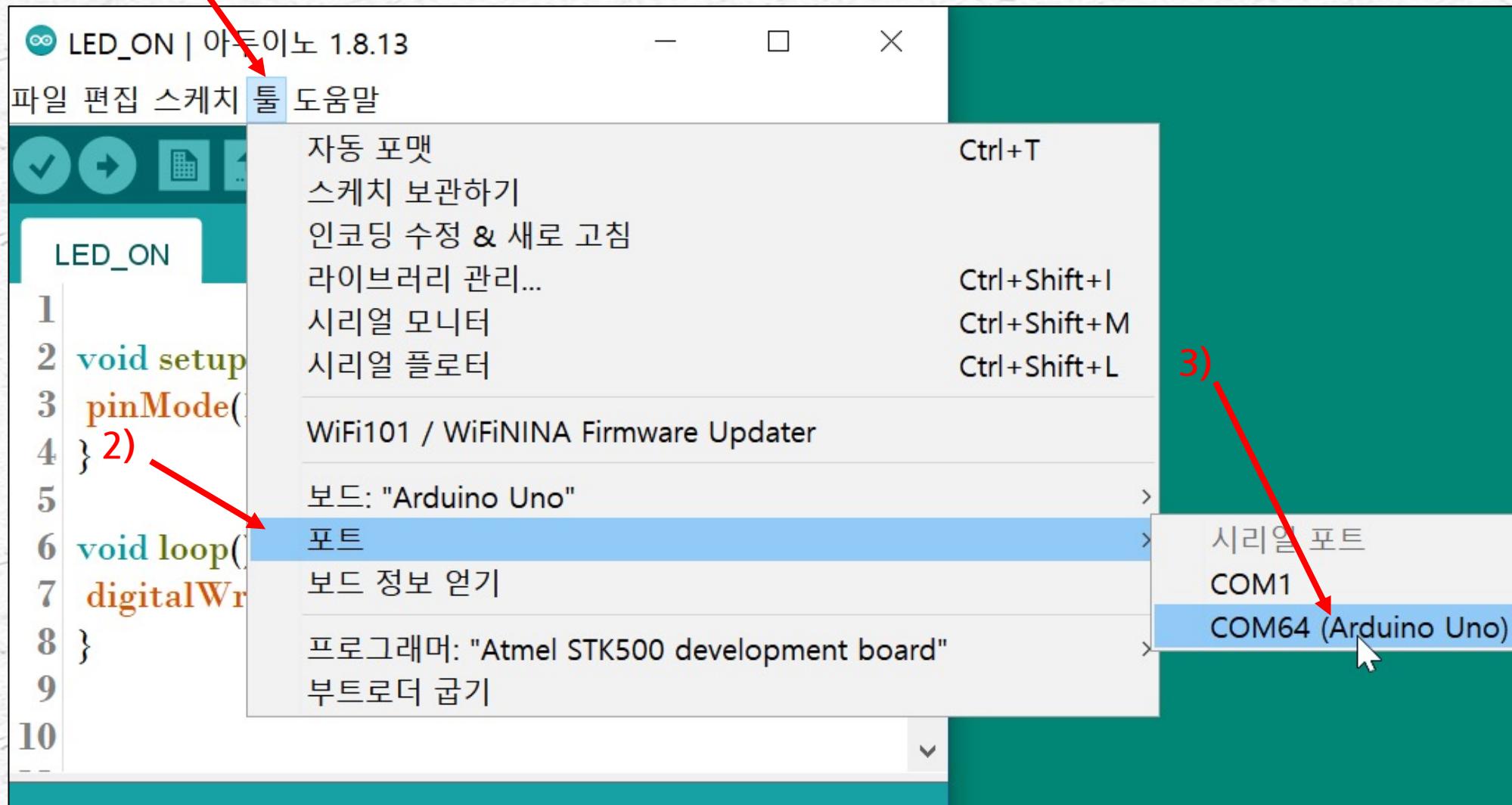
자동 포맷
스케치 보관하기
인코딩 설정 & 새로 고침
라이브러리 관리...
시리얼 모니터
시리얼 플로터
WiFi101 / WiFiNINA Firmware Updater

보드:

포트
보드 정보 얻기
프로그래머: "Atmel STK500 developer"
부트로더 굽기



포트 선택



보드, 포트 확인

LED_ON | 아두이노 1.8.13

파일 편집 스케치 도움말

```
1
2 void setup()
3 pinMode(
4 }
5
6 void loop()
7 digitalWr
8 }
9
10
```

자동 포맷
스케치 보관하기
인코딩 수정 & 새로 고침
라이브러리 관리...
시리얼 모니터
시리얼 플로터

WiFi101 / WiFiNINA Firmware Updater

보드: "Arduino Uno"
포트: "COM64 (Arduino Uno)"
보드 정보 얻기

프로그래머: "Atmel STK500 development board"
부트로더 굽기

업로드

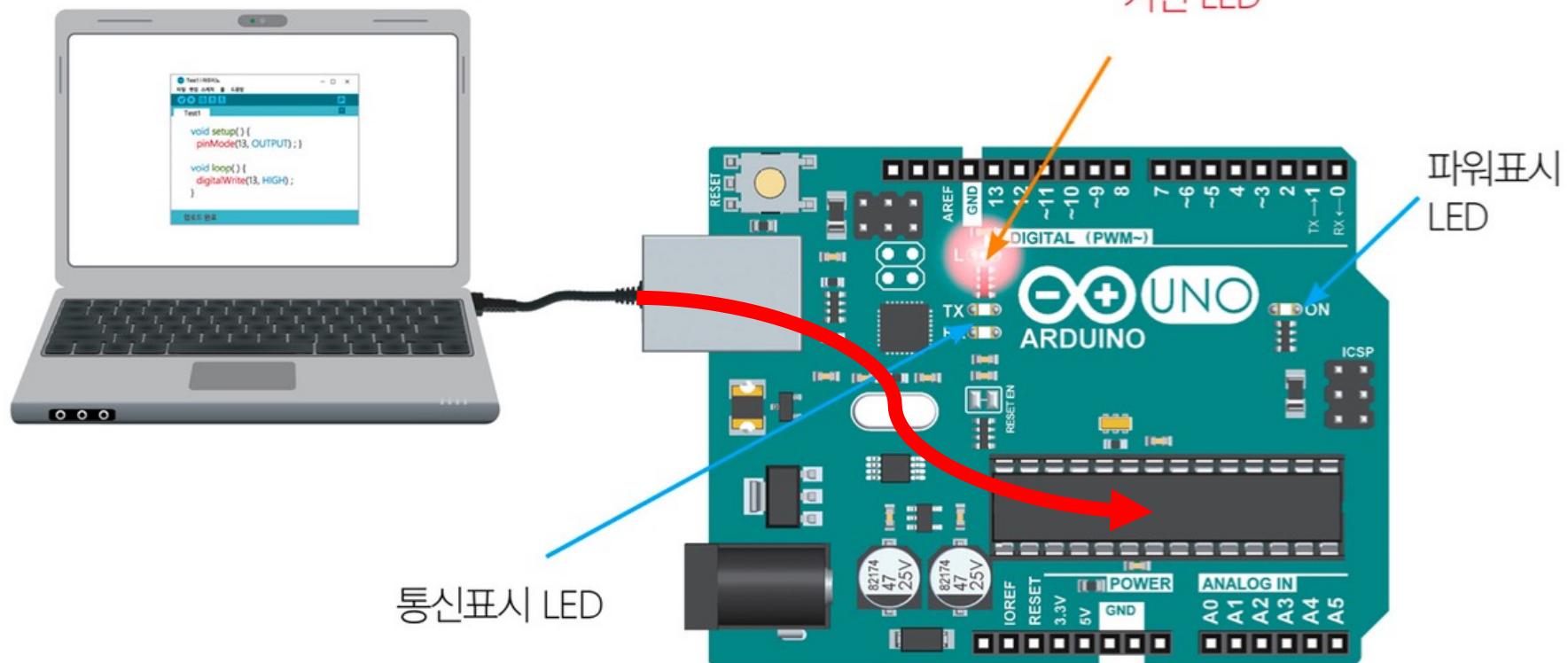
The screenshot shows the Arduino IDE interface with the following details:

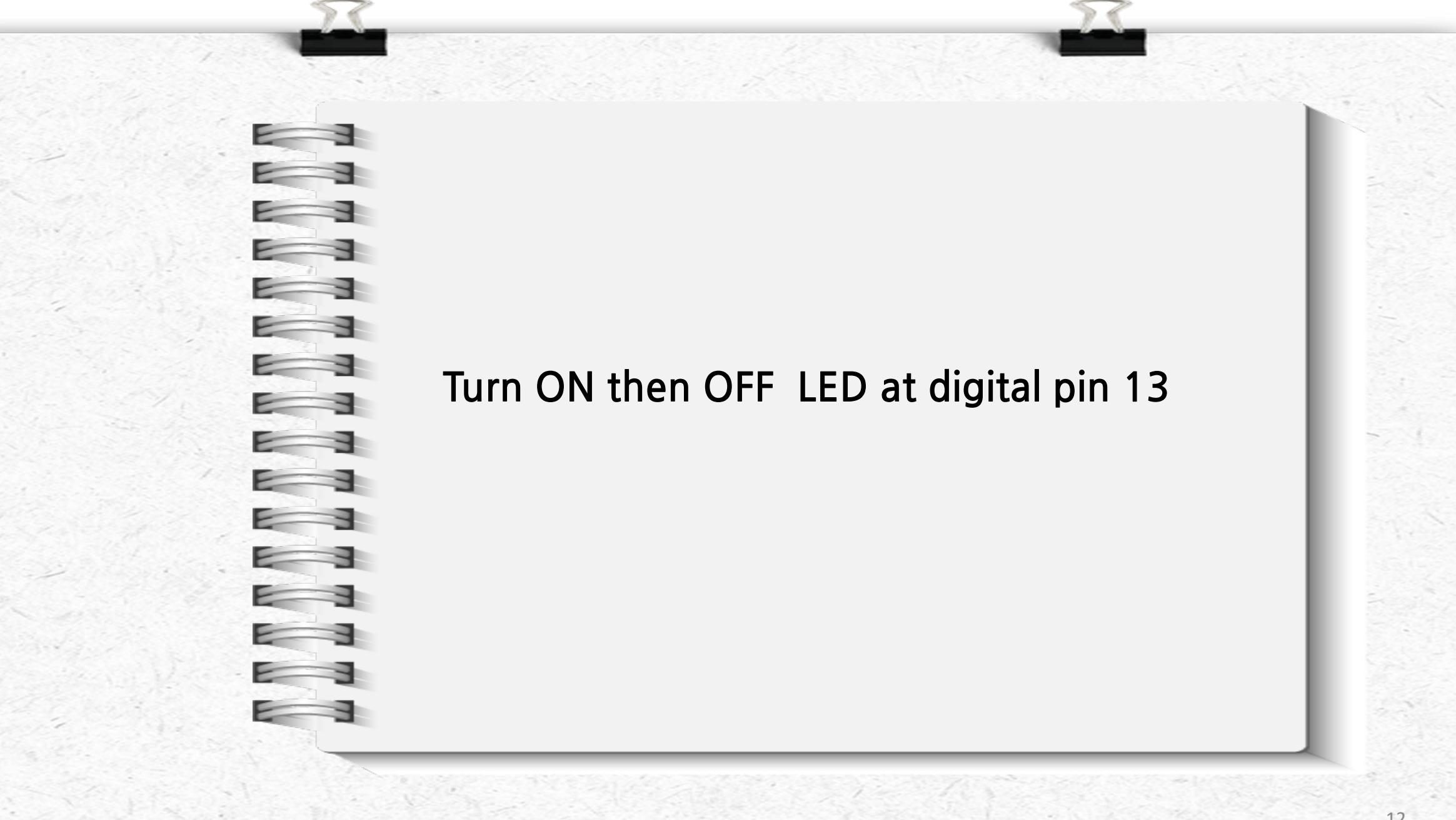
- Title Bar:** LED_ON | 아두이노 1.8.13
- Toolbar:** Includes icons for file, copy, paste, select all, and search.
- Code Area:** The sketch is named "LED_ON".

```
1
2 void setup() {
3   pinMode(13, OUTPUT);
4 }
5
6 void loop() {
7   digitalWrite(13, HIGH);
8 }
9
10
```
- Status Bar:** Displays "업로드 완료." (Upload completed.) and "avrdude done. Thank you."

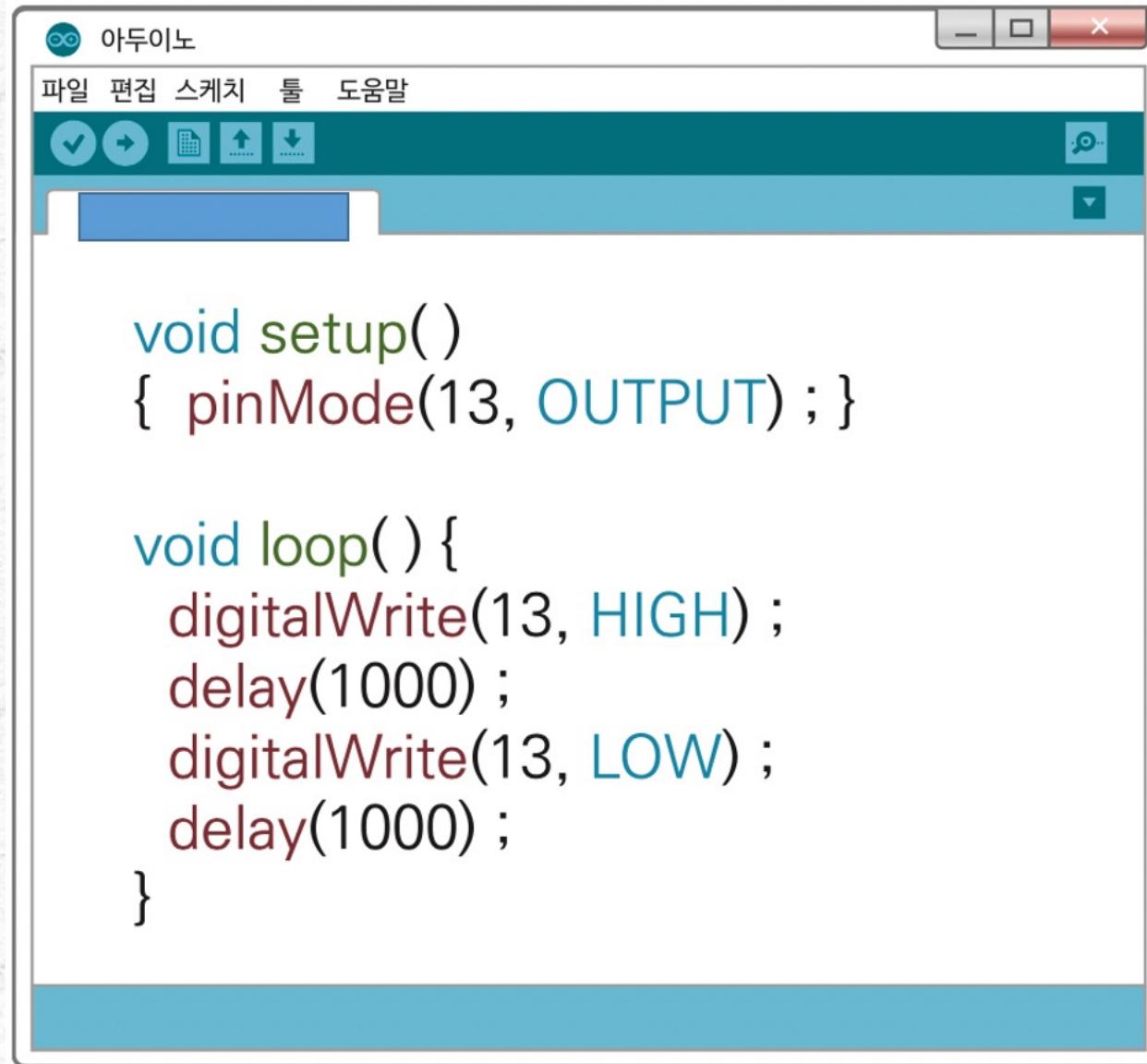
A red arrow points to the green "Upload" button in the toolbar. A black arrow points to the status message "업로드 완료." at the bottom of the code area.

확인





Turn ON then OFF LED at digital pin 13



The image shows a screenshot of the Arduino IDE. The title bar says "아두이노". The menu bar includes "파일", "편집", "스케치", "툴", and "도움말". Below the menu is a toolbar with icons for save, upload, and search. The main code area contains the following sketch:

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

void loop()
{
    digitalWrite(13, HIGH);
    delay(1000);
    digitalWrite(13, LOW);
    delay(1000);
}
```

delay(1000) 는
1000 밀리초 동안
현재 상태로 지연



samstack54 github

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Arduino-stepper-motor-L293D-driver-18 Public

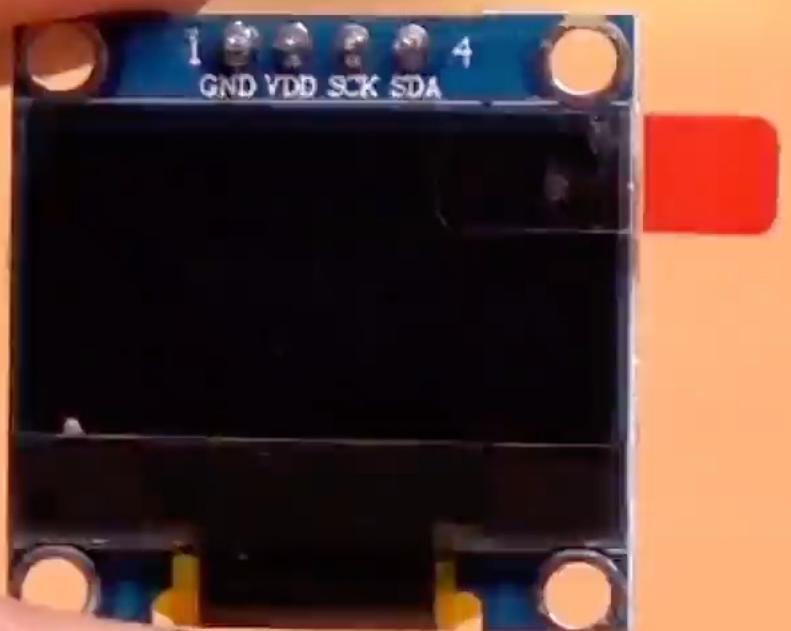
C++ Updated 14 days ago

Arduino-stepper-motor-driver-A4988-19 Public

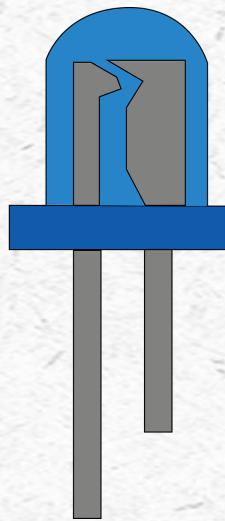
C++ Updated 14 days ago

Arduino-Promini-UNO-upload-20 Public

C++ Updated 14 days ago



Different shape and size of LED



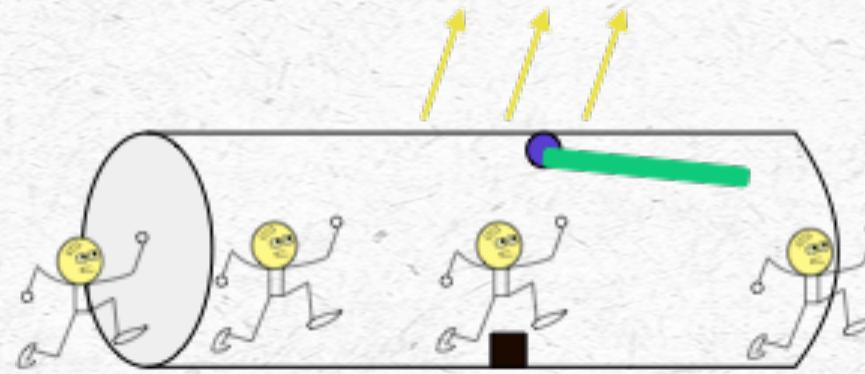
LED 극성

LED

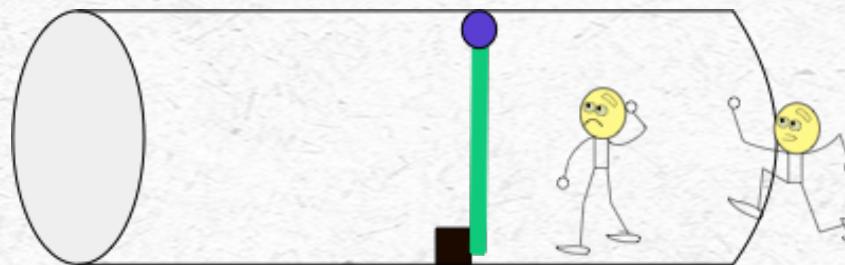
L : Light

E : Emitting

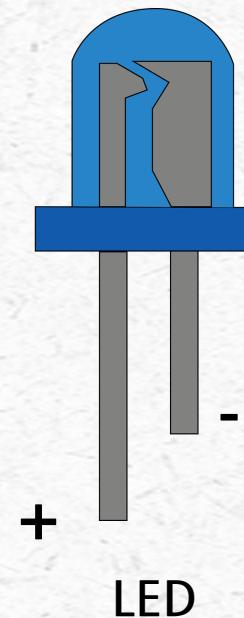
D : Dioe



LED 극성이 맞게 연결 되었을때



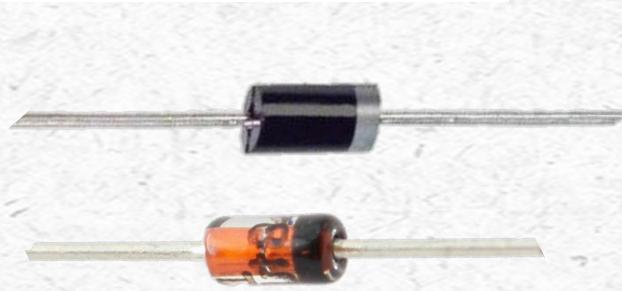
LED 극성이 반대로 연결 되었을때



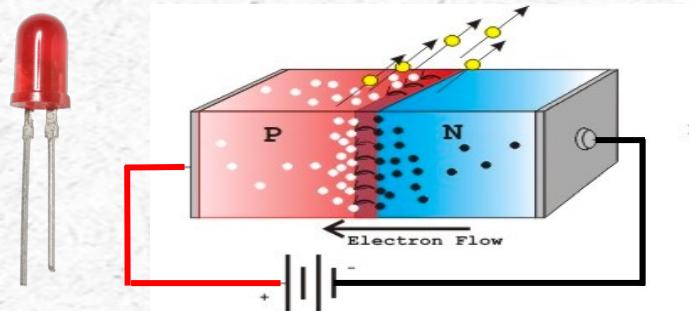
LED

Diode, LED symbols

Diode : PN junction

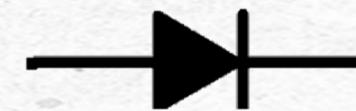


LED : PN junction



Diode : Symbol

Anode (+) Cathode (-)



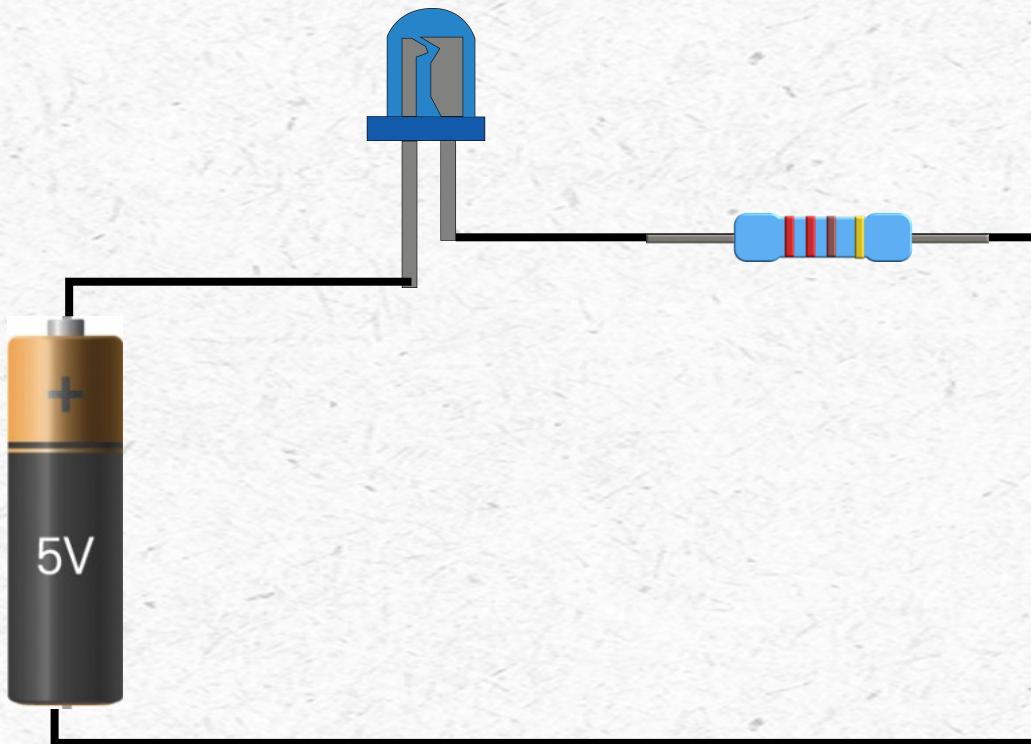
LED : Symbol

Anode (+) Cathode (-)



LED 켜기

?



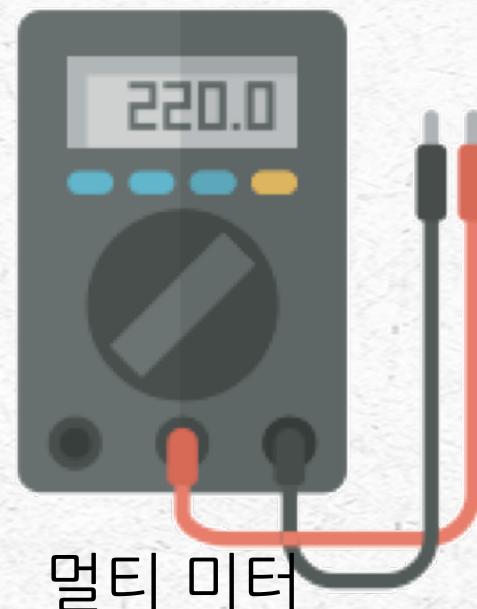
Ohm's Law
 $V=IR$

$$R = 3V / 20mA = 150 \Omega$$

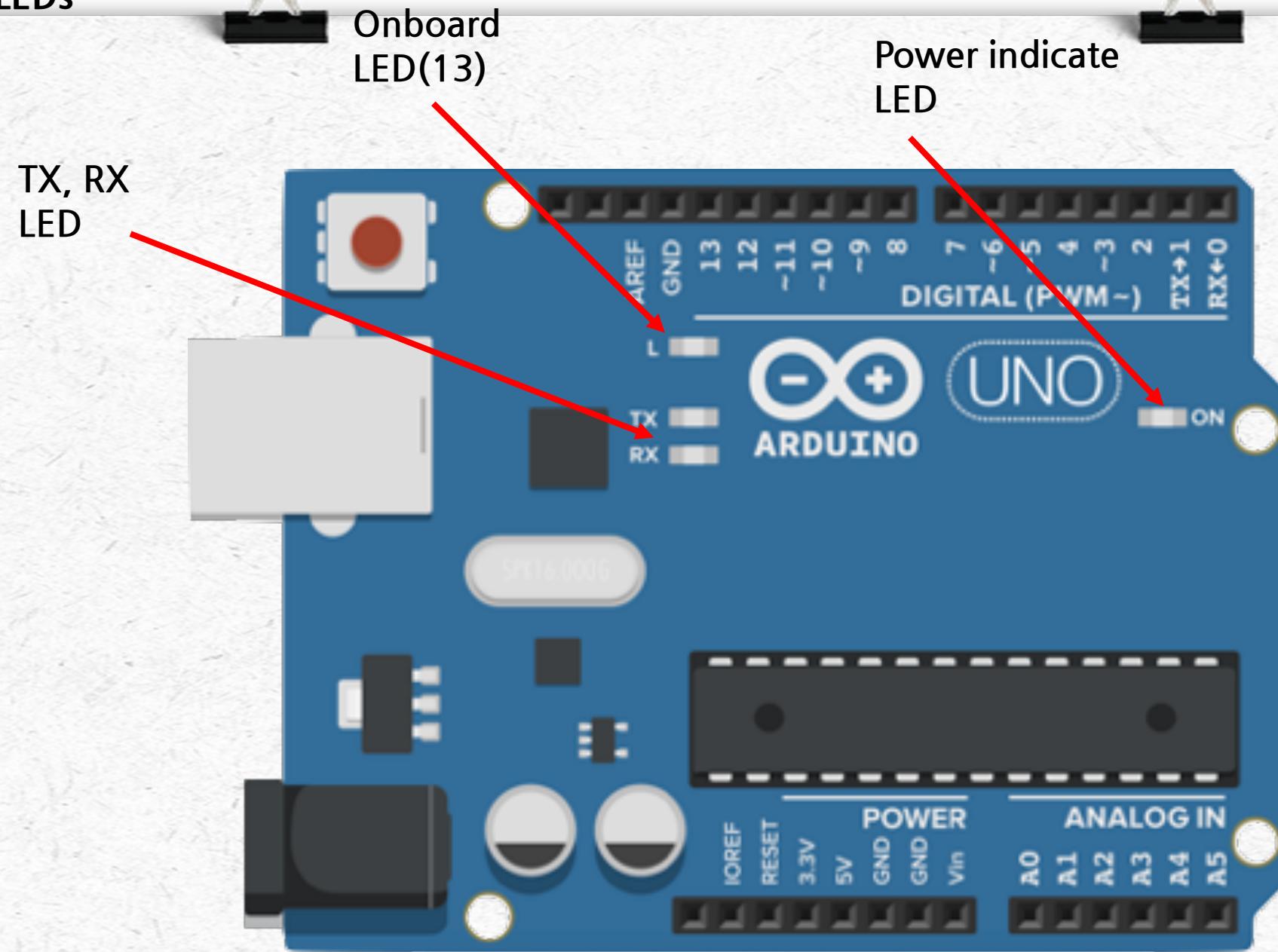
$$P=VI = 3V \times 20mA = 60mW$$

Normal resistors 1/8W, 1/4W, 1W, ...

저항 색상 코드



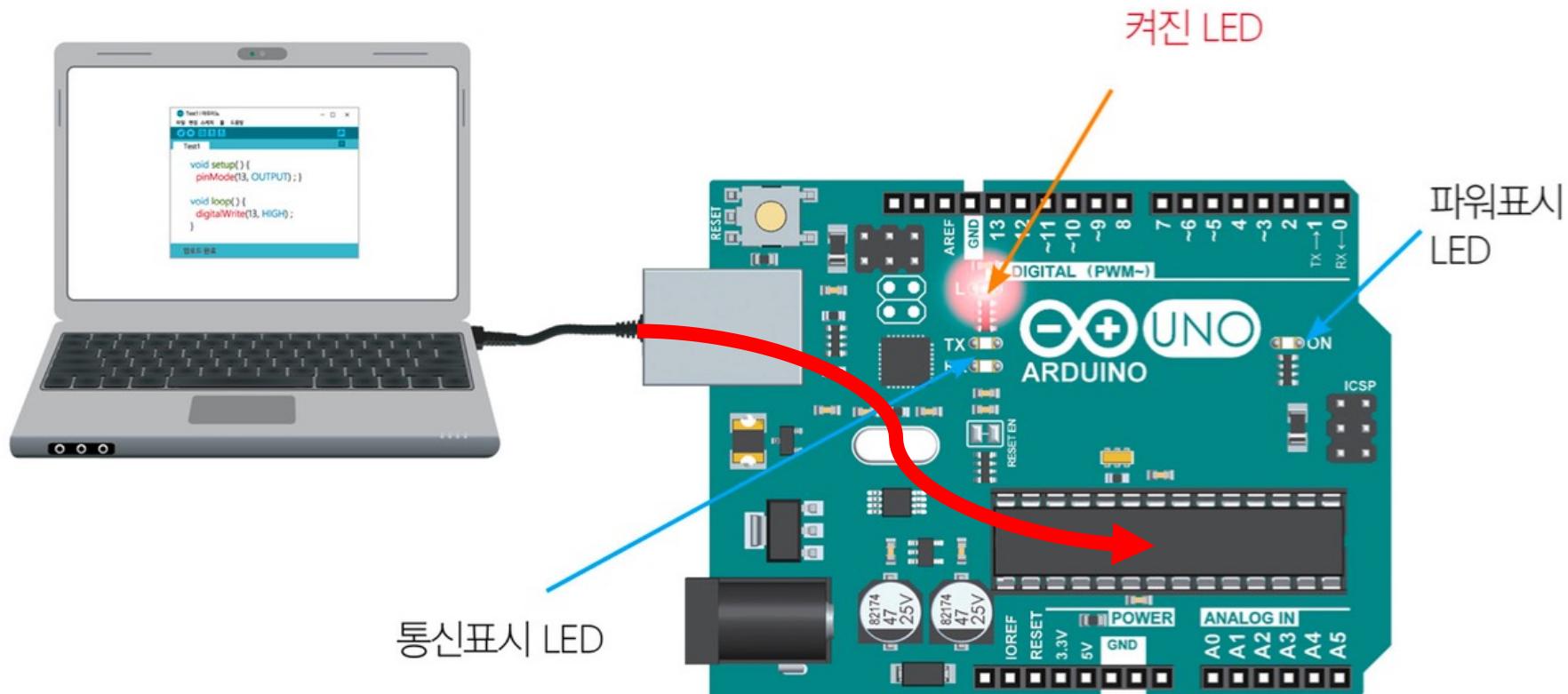
Onboard LEDs



Onboard LED control

Turn OFF LED at digital pin 13

보드의 13번 디지털 판넬에 테스트 목적용 LED 가 있다.



핀 번호

출력 또는 입력

세미 콜론

`pinMode(#, OUTPUT/INPUT) ;`

셋업 안에서

핀 번호

높게 또는 낮게

세미 콜론

`digitalWrite(#, HIGH/LOW) ;`

루프 안에서

컴파일



Word 를
바이너리 코드로 변환

```
sketch_mar01a §
1
2 void setup() {
3   pinMode(13, OUTPUT) ;
4 }
5
6 void loop() {
7   digitalWrite(13, HIGH) ;
8 }
9
```

Save As: **LED ON**

Tags:

Desktop

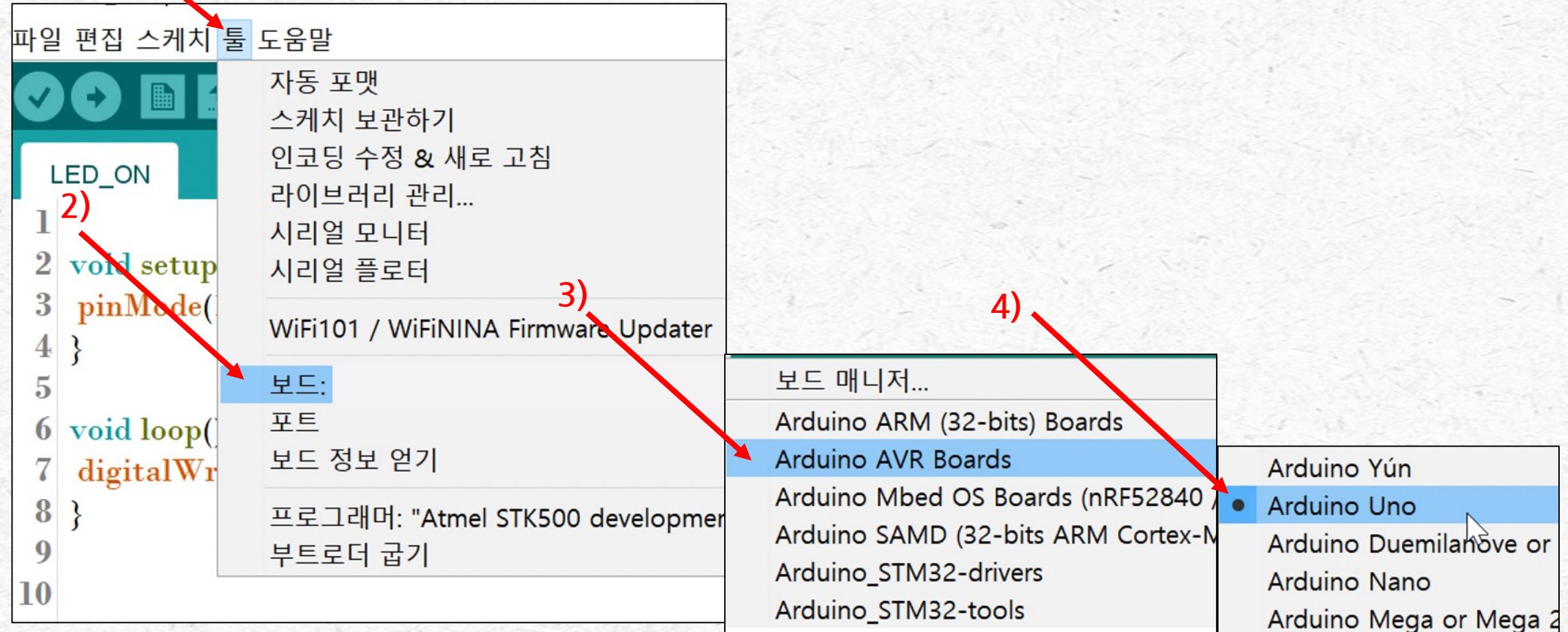
The screenshot shows the Arduino IDE interface. At the top, there's a save dialog box with 'Save As:' set to 'LED ON'. Below it is a file browser showing 'Desktop'. The main workspace contains a sketch titled 'LED_ON' with the following code:

```
1
2 void setup() {
3   pinMode(13, OUTPUT) ;
4 }
5
6 void loop() {
7   digitalWrite(13, HIGH) ;
8 }
9
```

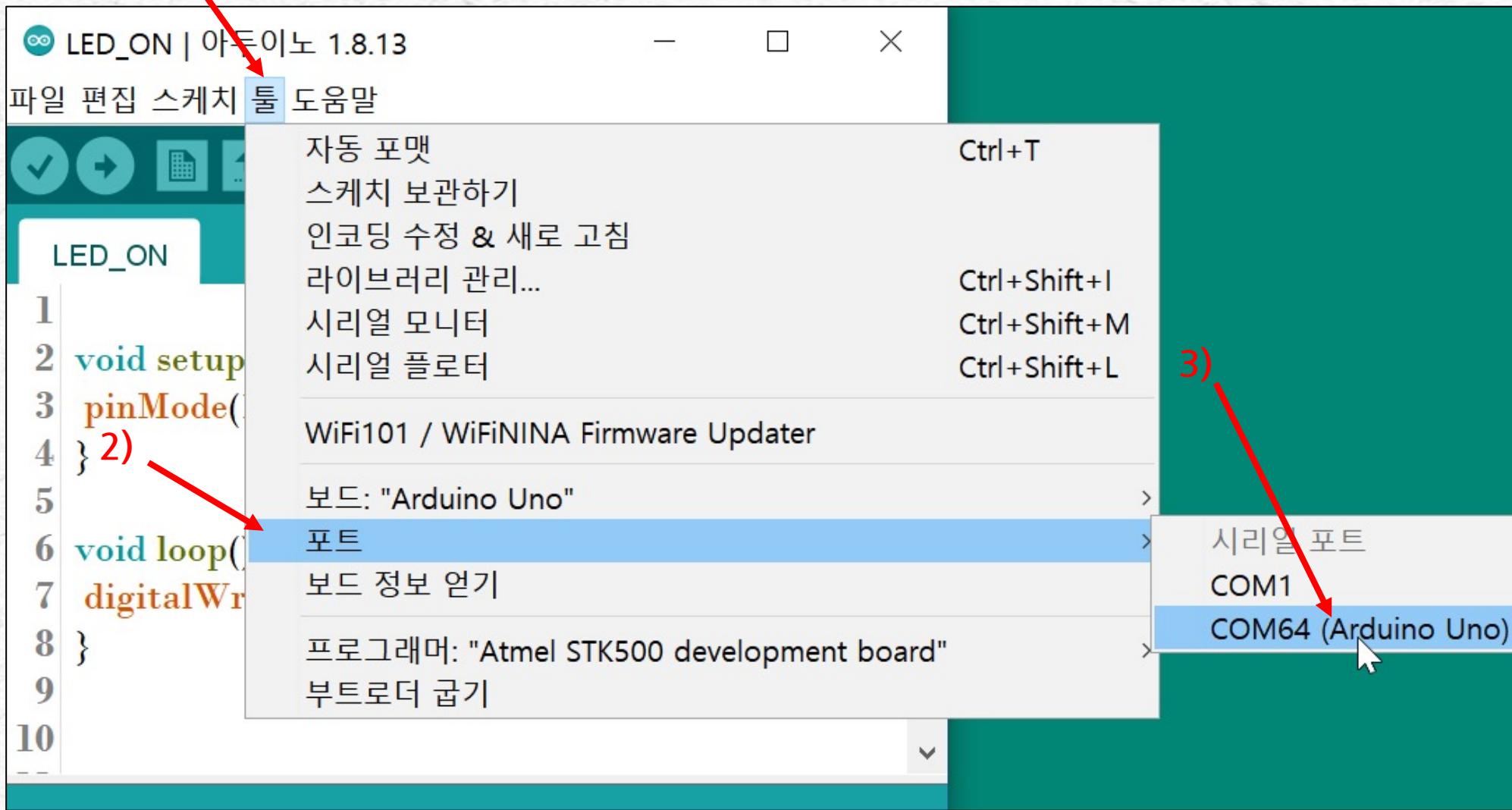
Two red arrows point to status messages at the bottom of the screen. The first arrow points to the message '컴파일 완료.' (Compile completed). The second arrow points to performance statistics: '스케치는 프로그램 저장 공간 207547 바이트(15%)를 사용. 전역 변수는 동적 메모리 15220바이트(4%)를 사용, 31246'.

스케치는 프로그램 저장 공간 207547 바이트(15%)를 사용.
전역 변수는 동적 메모리 15220바이트(4%)를 사용, 31246

Board 선택



포트 선택



보드, 포트 확인

LED_ON | 아두이노 1.8.13

파일 편집 스케치 도움말

```
1
2 void setup()
3 pinMode(
4 }
5
6 void loop()
7 digitalWr
8 }
9
10
```

자동 포맷
스케치 보관하기
인코딩 수정 & 새로 고침
라이브러리 관리...
시리얼 모니터
시리얼 플로터

WiFi101 / WiFiNINA Firmware Updater

보드: "Arduino Uno"
포트: "COM64 (Arduino Uno)"
보드 정보 얻기

프로그래머: "Atmel STK500 development board"
부트로더 굽기

업로드

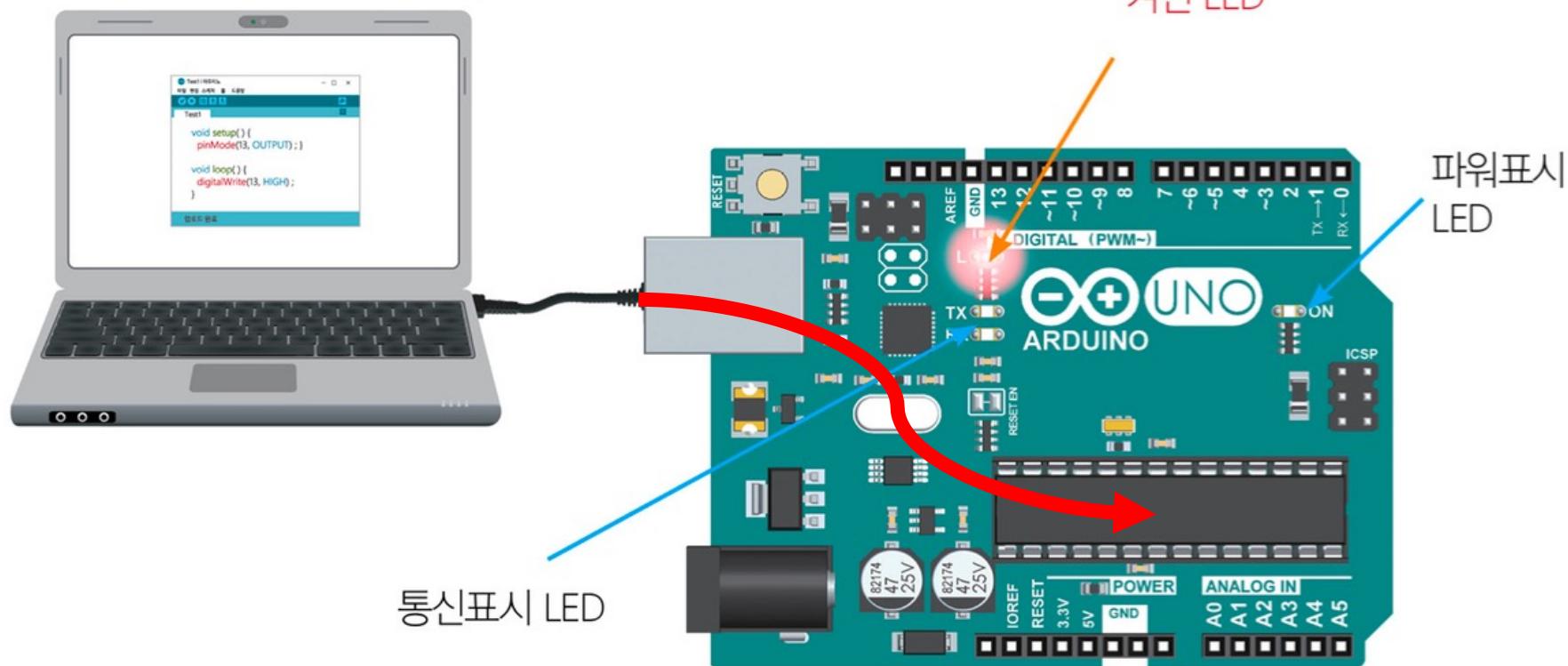
The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** LED_ON | 아두이노 1.8.13
- Toolbar:** Includes icons for file, copy, paste, select all, and search.
- Code Area:** The sketch is named "LED_ON".

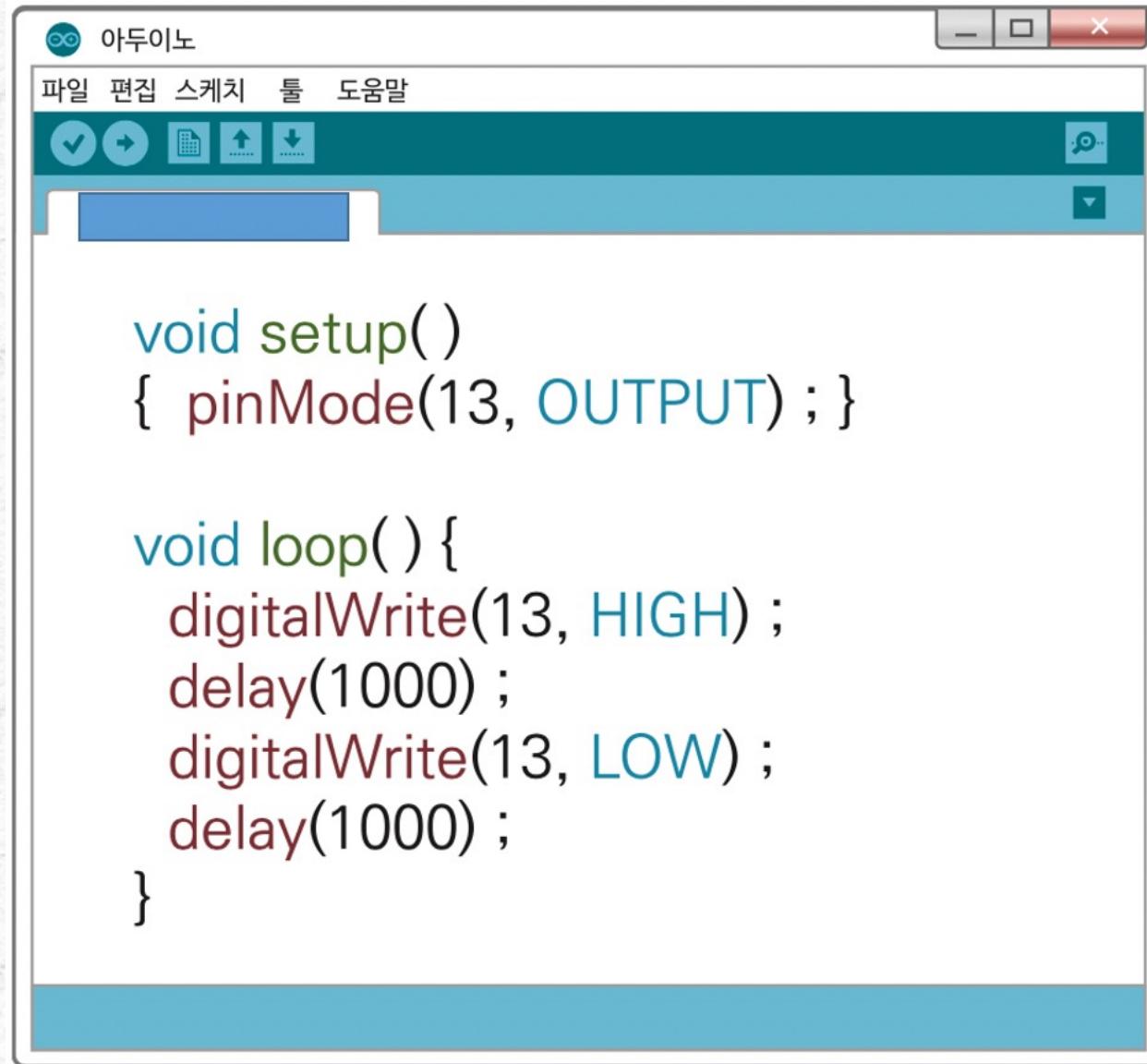
```
1
2 void setup() {
3   pinMode(13, OUTPUT);
4 }
5
6 void loop() {
7   digitalWrite(13, HIGH);
8 }
9
10
```
- Status Bar:** Displays the message "업로드 완료." (Upload completed.) and "avrdude done. Thank you."

A red arrow points to the green "Upload" button in the toolbar. A black arrow points to the status bar message "업로드 완료.".

확인



Turn ON then OFF LED at digital pin 13



The image shows a screenshot of the Arduino IDE. The window title is "아두이노". The menu bar includes "파일", "편집", "스케치", "툴", and "도움말". Below the menu is a toolbar with icons for file operations like save, open, and upload. The main code area contains the following sketch:

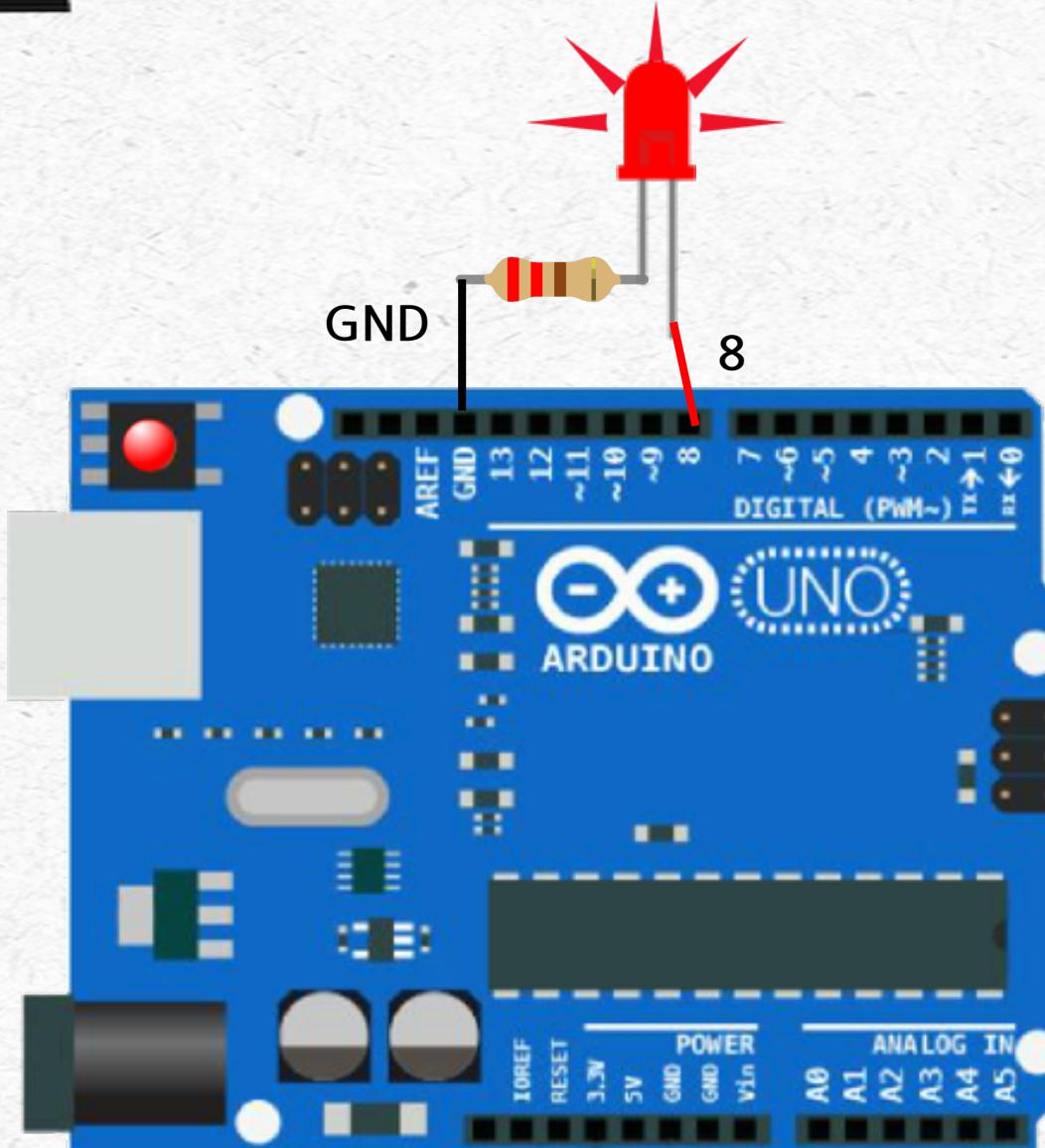
```
void setup()
{
    pinMode(13, OUTPUT);
}

void loop()
{
    digitalWrite(13, HIGH);
    delay(1000);
    digitalWrite(13, LOW);
    delay(1000);
}
```

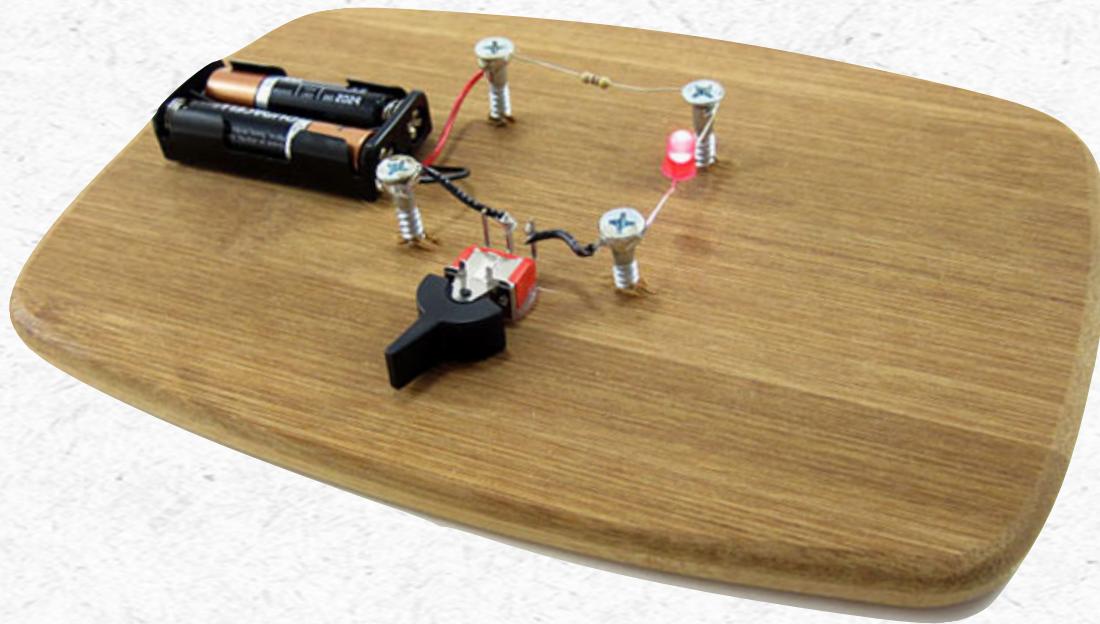
delay(1000) 는
1000 밀리초 동안
현재 상태로 지연

외부에 연결한 LED 켜기

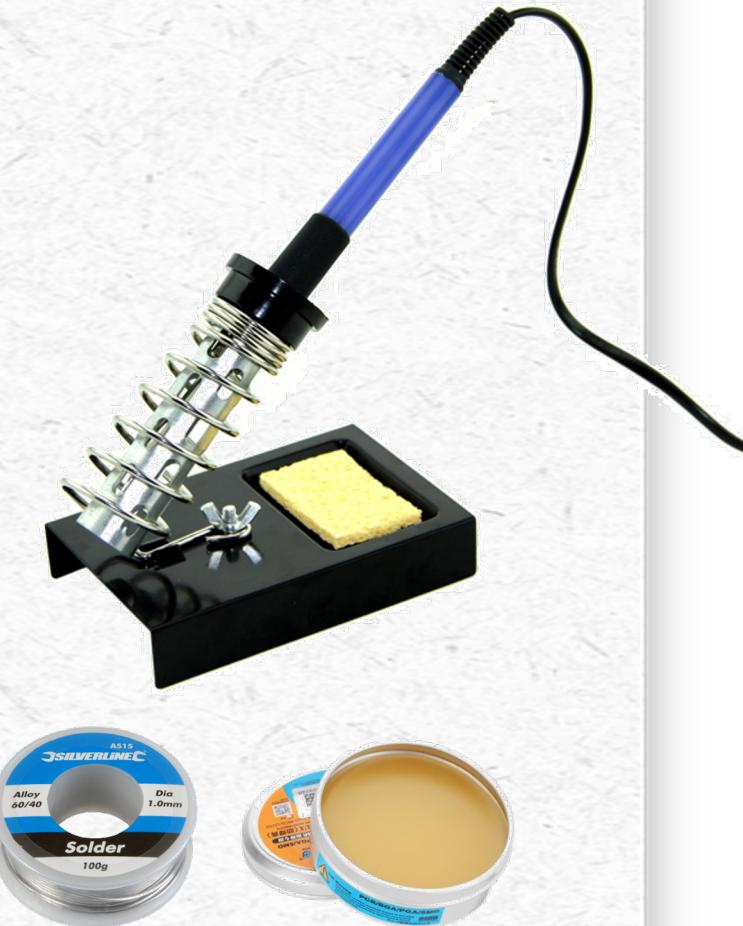
외부 LED 컨트롤



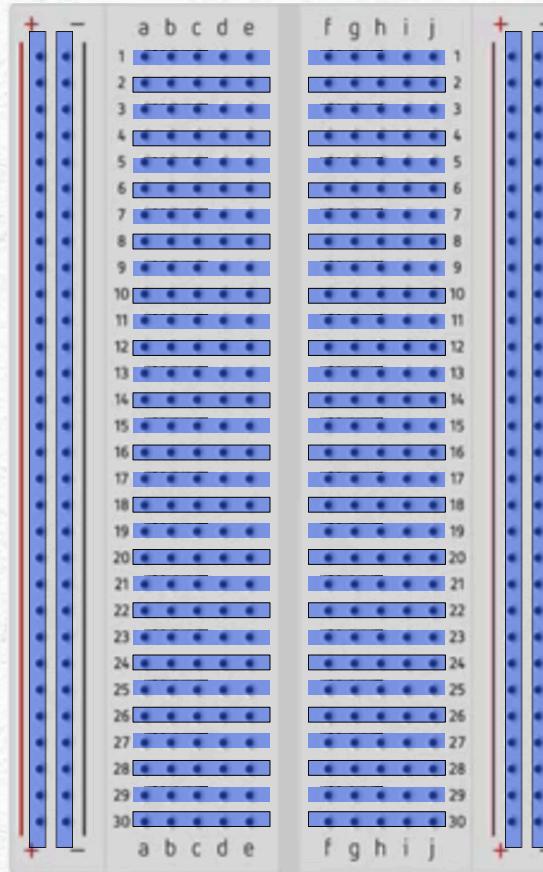
브래드 보드



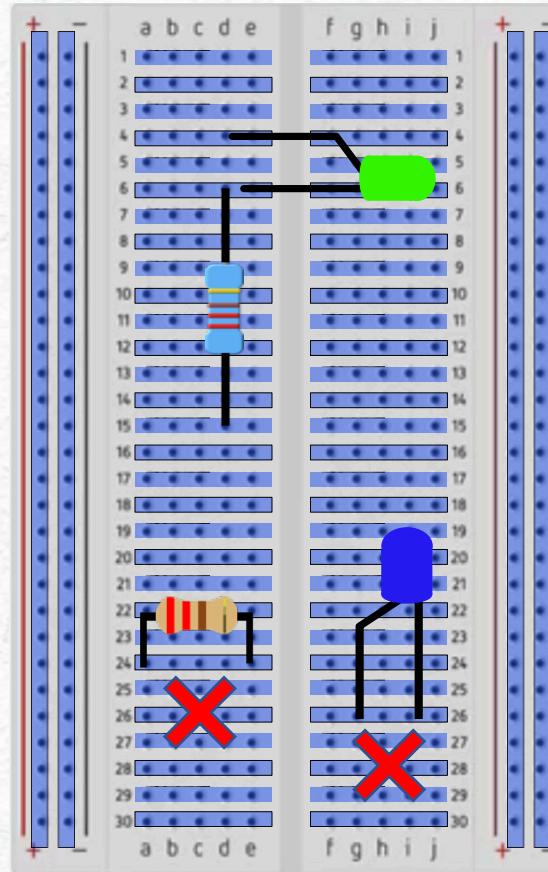
SCIENCE BUDDIES



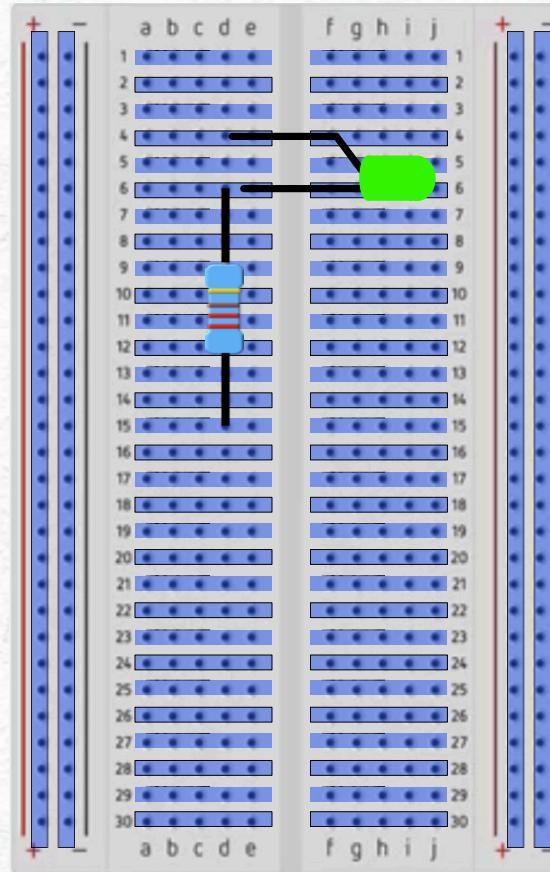
브래드 보드



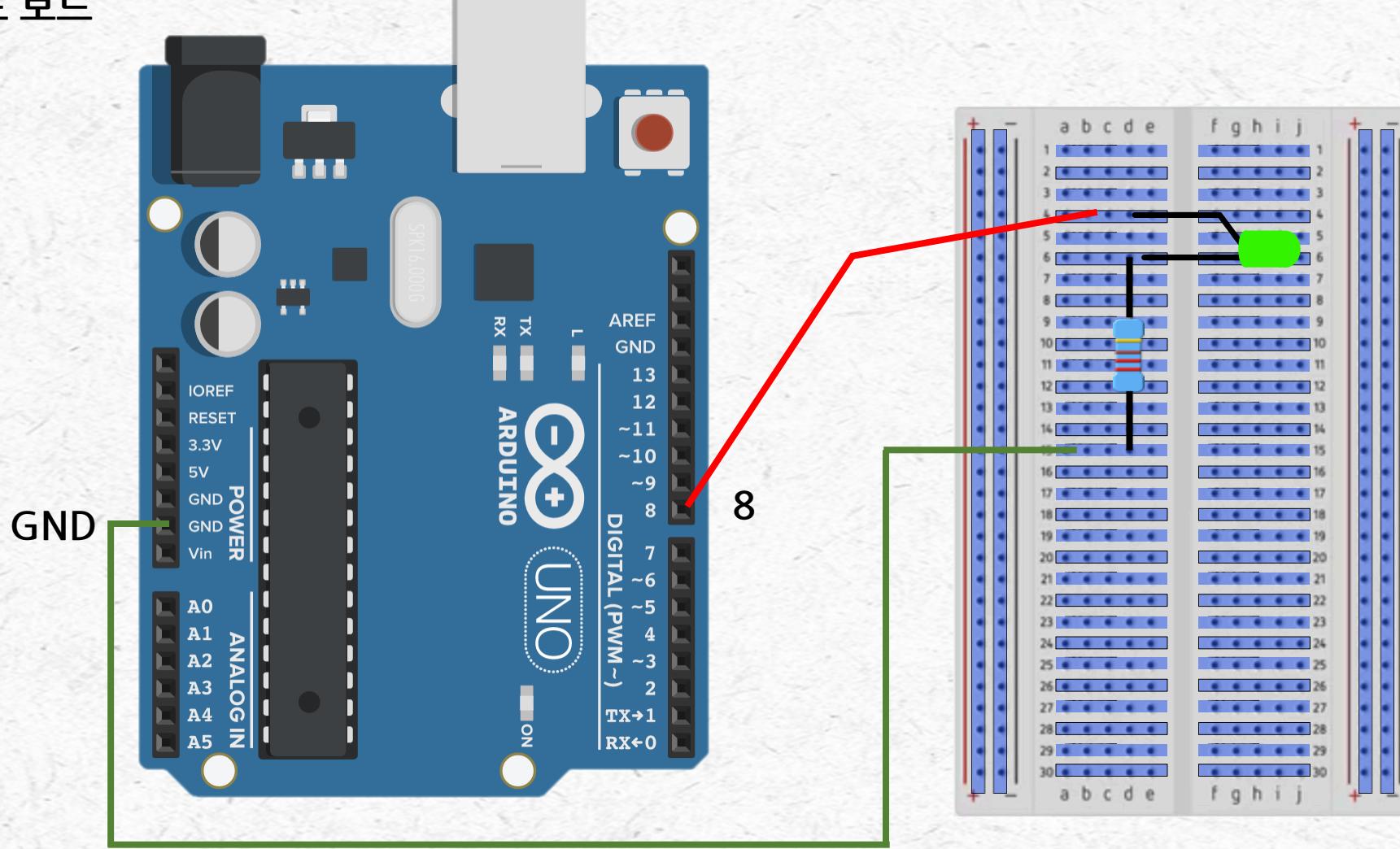
브래드 보드



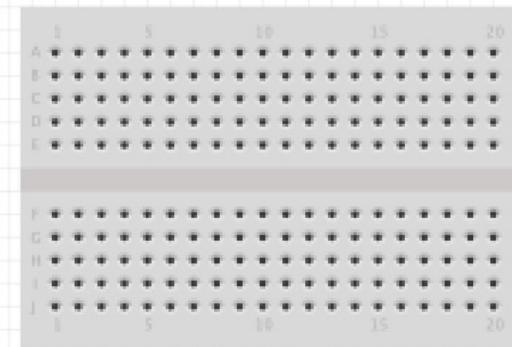
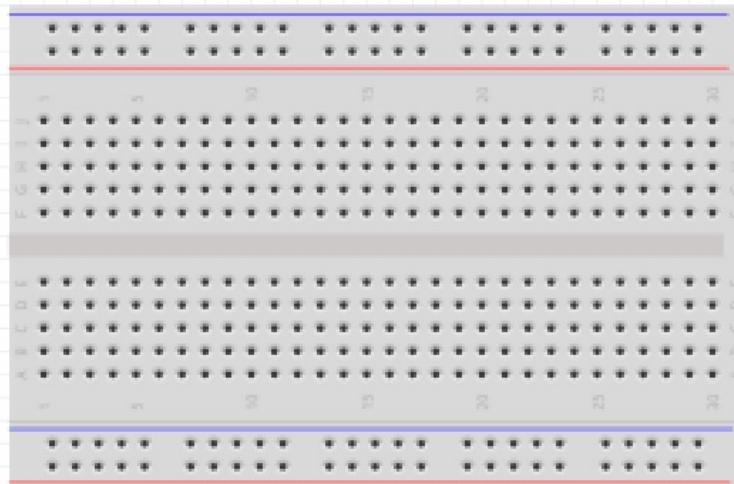
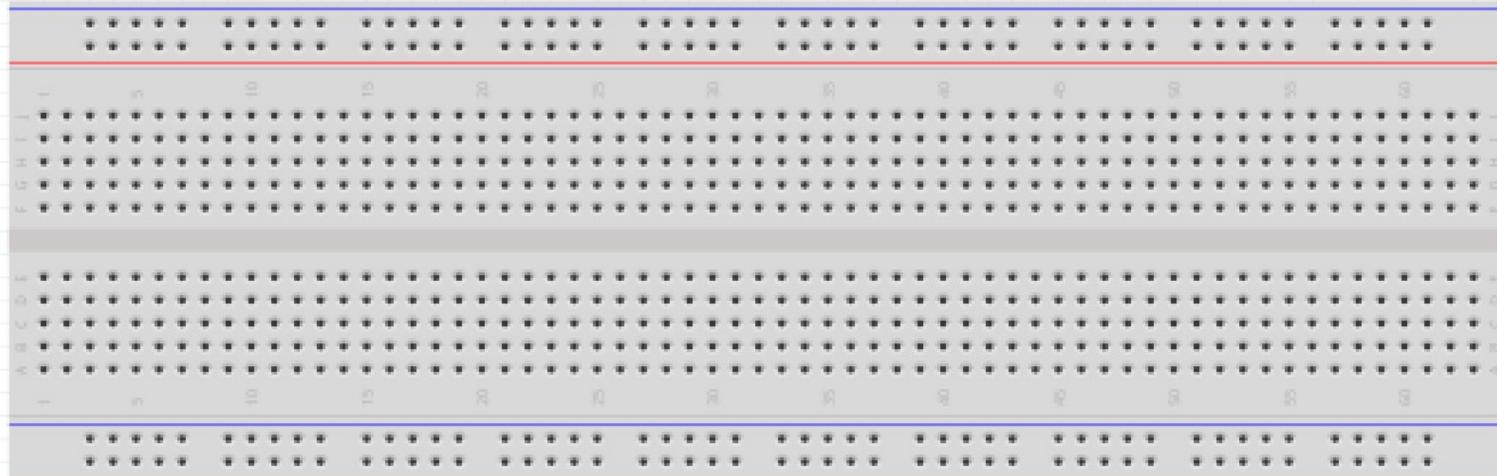
브래드 보드



브래드 보드



브래드보드 종류 예



외부 LED Blink

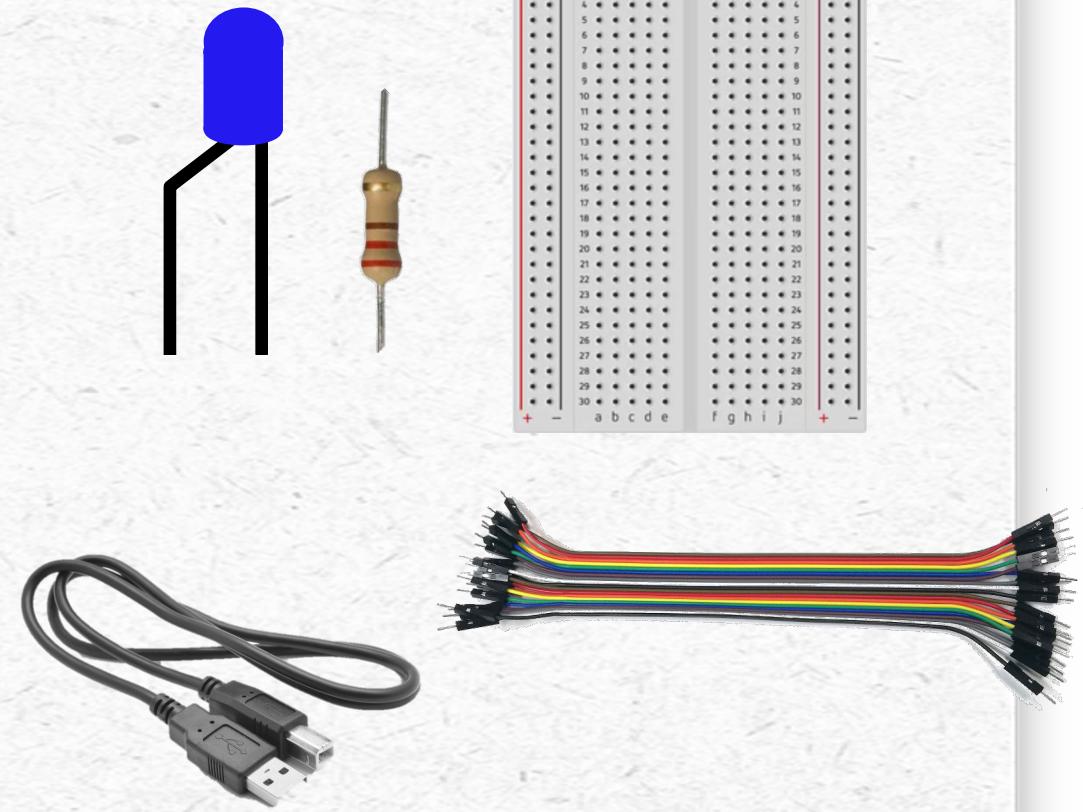
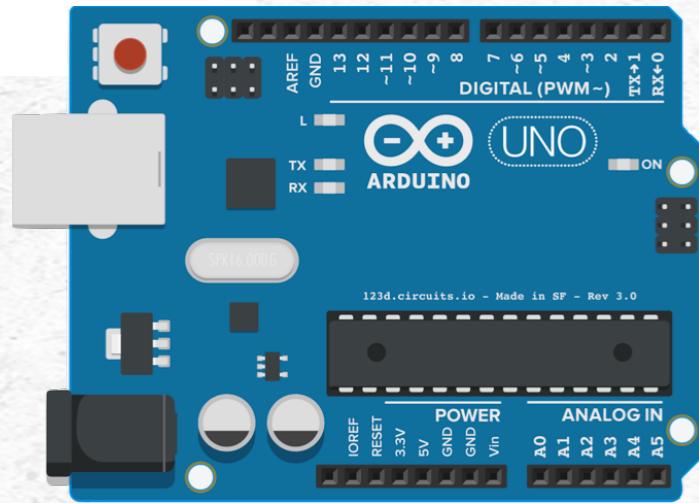
준비물 :

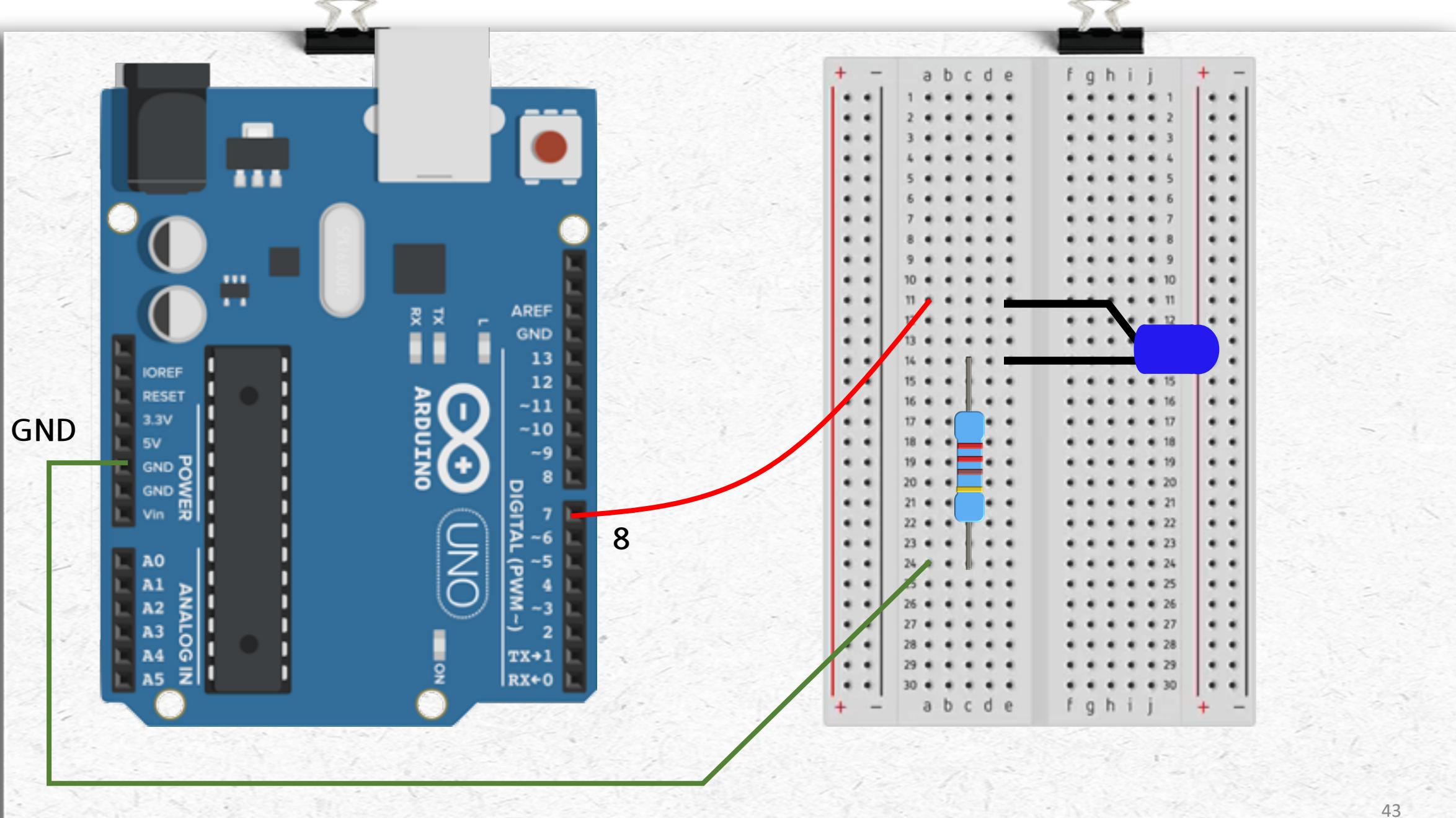
아두이노 보드 1개, USB 케이블 1개

LED 1개, 220 Ω 저항 1개

브래드 보드 1개

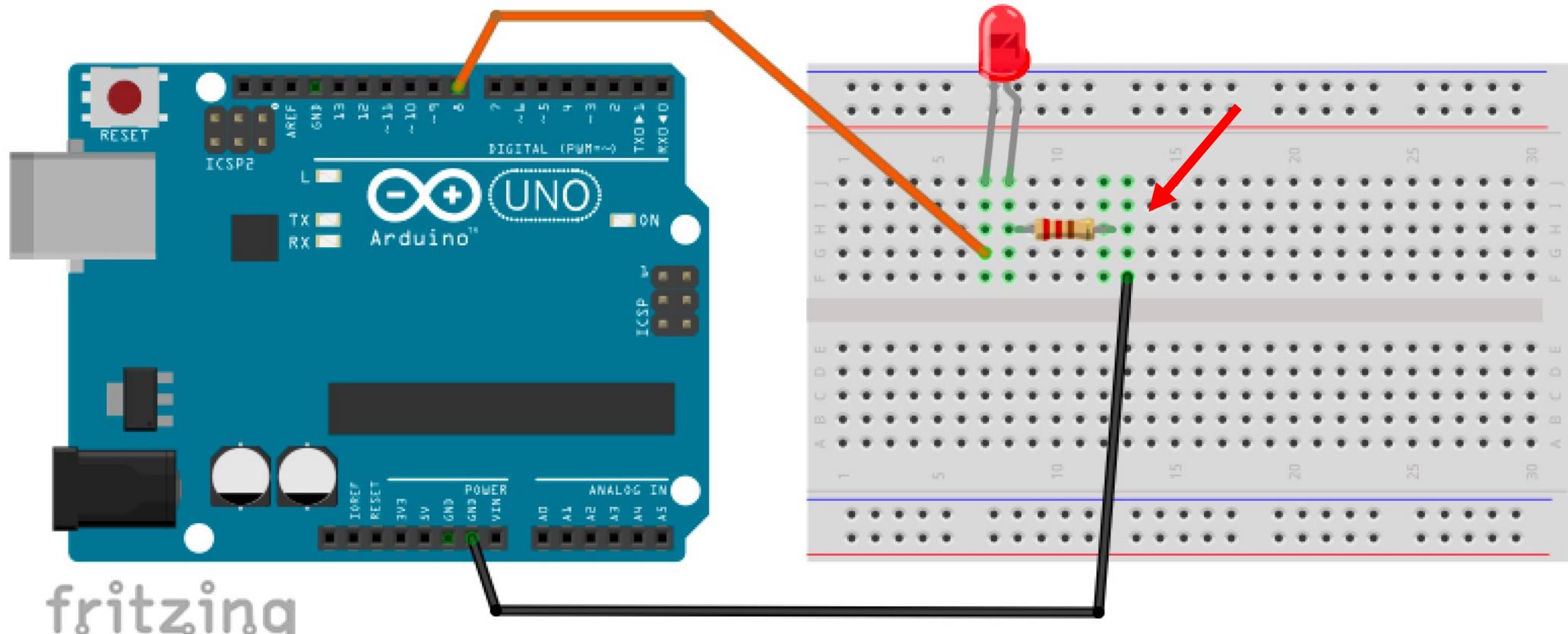
점퍼 케이블





```
1
2 void setup() {
3     pinMode(8, OUTPUT) ;
4 }
5
6 void loop() {
7     digitalWrite(8, HIGH) ;
8     delay(200) ;
9     digitalWrite(8, LOW) ;
10    delay(200) ;
11 }
12
```

틀린곳 찾기(2)



틀린곳 찾기(4)

```
1 void setup() {  
2     pinMode(13, OUTPUT) ;  
3 }  
4  
5 void loop() {  
6  
7     digitalWrite(13, HIGH)  
8     delay(1000) :  
9 }  
10 }  
11 }
```

The image shows a screenshot of the Arduino IDE. The title bar says "sketch_aug07b §". The code editor contains the following code:

```
1 void setup() {  
2     pinMode(13, OUTPUT) ;  
3 }  
4  
5 void loop() {  
6  
7     digitalWrite(13, HIGH)  
8     delay(1000) :  
9 }  
10 }  
11 }
```

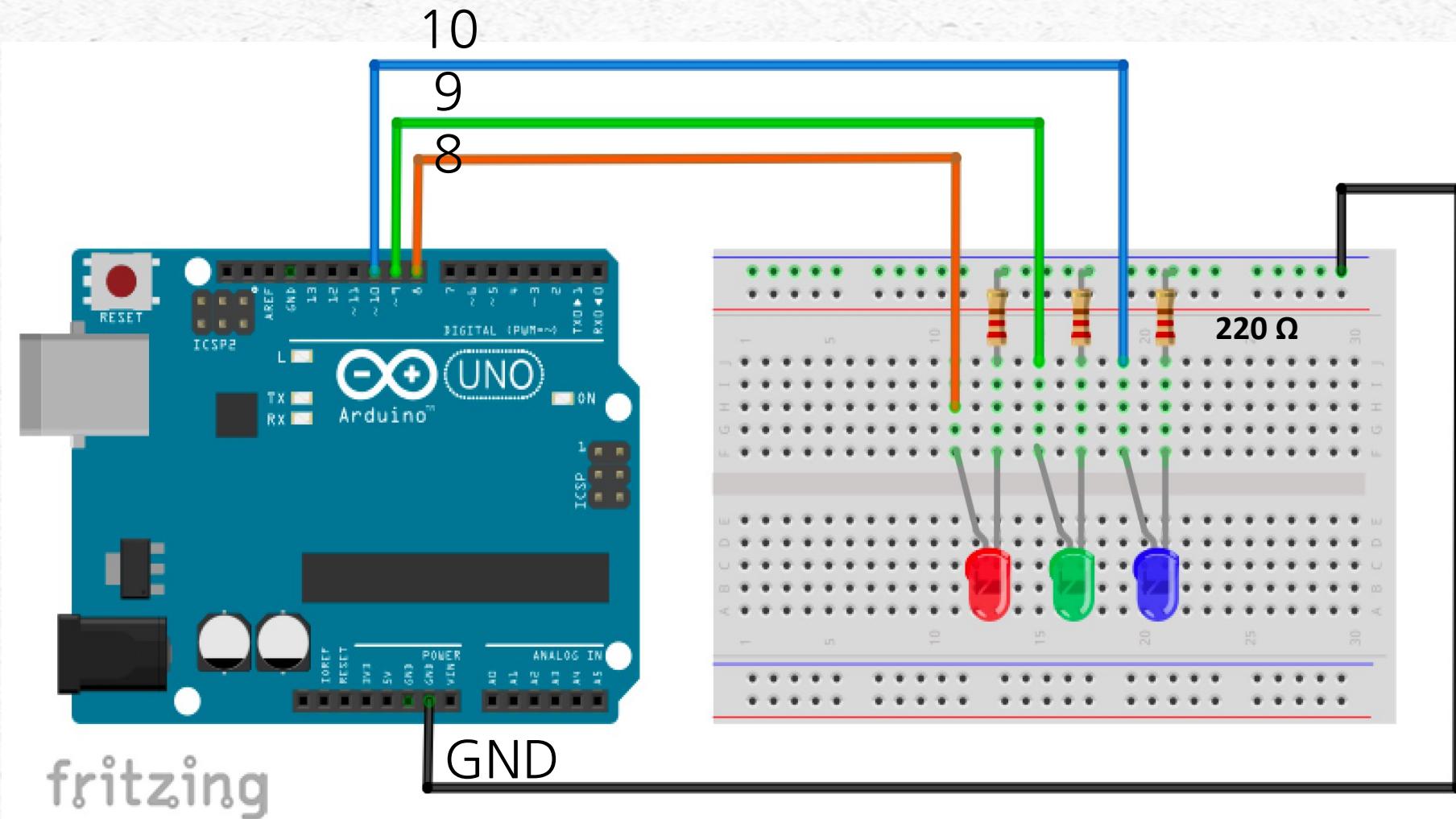
Several syntax errors are highlighted with red arrows:

- A red arrow points to the opening brace of the `setup()` function at line 3.
- A red arrow points to the colon after the `delay` call at line 8.
- A red arrow points to the closing brace of the `loop()` function at line 11.



Project 1 : 외부 LED 3 개를 순차적으로 ON/OFF 시키기

회로



외부 LED Blink

for loop 사용 3 개의 LED 컨트롤 하기

준비물 :

아두이노 보드 1개

USB 케이블 1개

LED 3개

220 요 저항 3개

브래드 보드 1개

점퍼 케이블

```
for (시작점 ; 종료점 ; 증가폭) {  
    수행 작업  
}
```

예 :

```
for ( k=0 ; k<=2 ; k=k+1 ) {  
    digitalWrite( k, HIGH );  
}
```

외부 LED Blink



The image shows a Scratch script titled "LED_3". The script consists of two main sections: "setup" and "loop". In the setup section, pins 8 through 10 are set as outputs. In the loop section, pins 8 through 10 are alternately turned on and off with a 50ms delay between each pin.

```
1 // LED 3 개 컨트롤
2
3 int k=0 ; // k 는 정수로 사용한다 글로벌 변수
4 int del=50 ; // delay 시간 사용 목적
5
6 void setup() {
7
8 for(k=8; k<=10 ; k=k+1) {
9 pinMode(k, OUTPUT) ;
10 }
11 }
12
13 void loop() {
14
15 for(k=8; k<=10 ; k=k+1) {
16 digitalWrite(k, HIGH) ;
17 delay(del) ;
18 digitalWrite(k, LOW) ;
19 delay(del) ;
20 }
21 }
```

// 는 콤멘트
코딩 구동과 무관

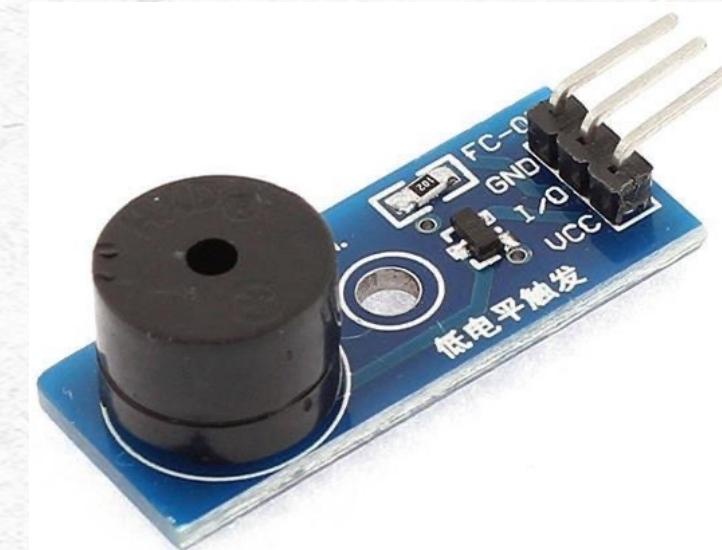
```
// LED 3 Array
int LEDs[3] = {8, 9, 10};

void setup() {
  for (int i=0 ; i<3 ; i++) {
    pinMode(LEDs[i], OUTPUT);
  }
}

void loop() {
  for(int i=0 ; i<3 ; i++) {
    digitalWrite(LEDs[i], HIGH);
    delay(1000);
    digitalWrite(LEDs[i], LOW);
    delay(1000);
  }
}
```

Digital output Piezo buzzer(tone)

Active vs Passive Piezo buzzer



Digital output Piezo buzzer(tone)

전기를 인가 하면 체적이 변하는 재료의 특성(피에조 효과)을
이용하여 만든 부저. 경고음, 음악 스피커 대용으로 사용

준비물 :

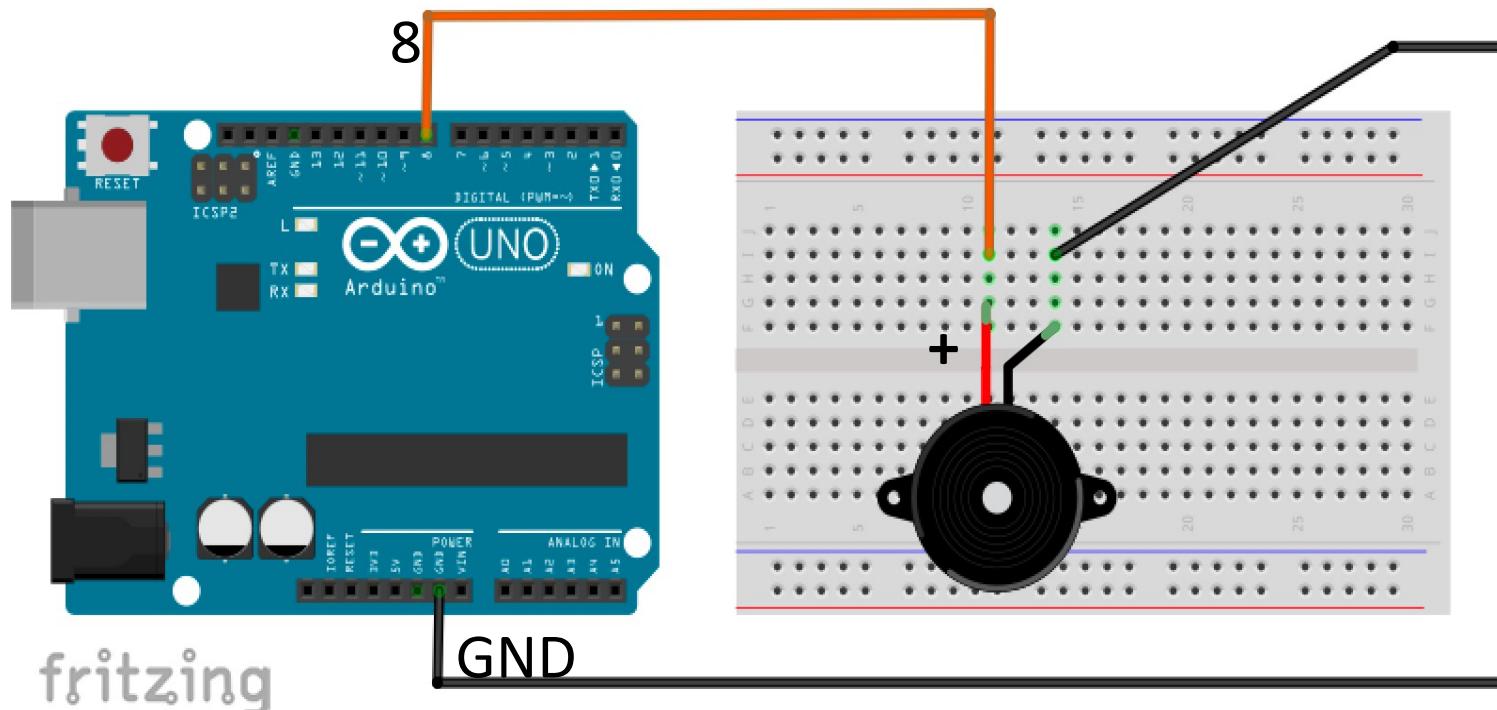
아두이노 보드 1개
USB 케이블 1개
피에조 부저 1개
브래드 보드 1개
점퍼 케이블



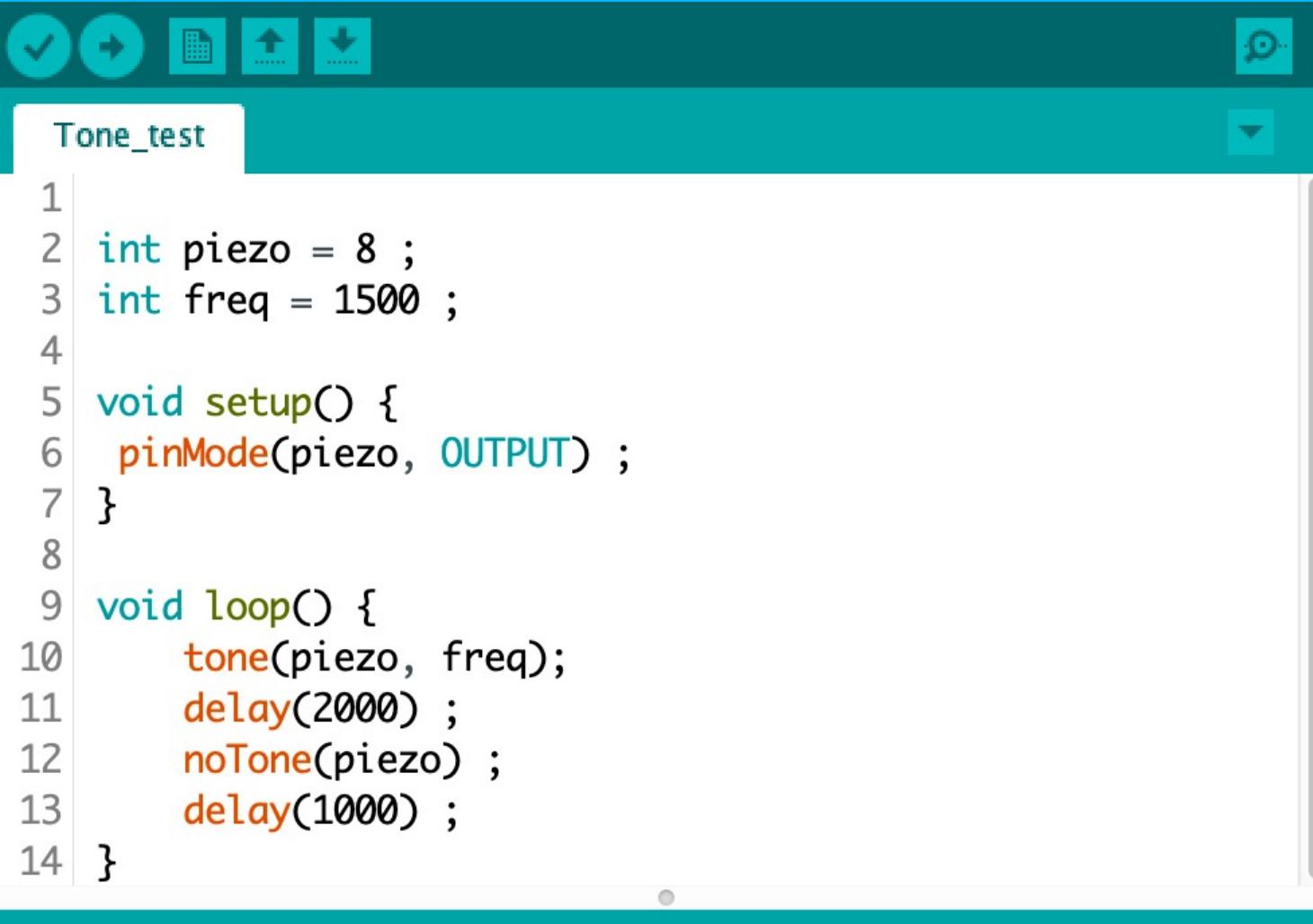
```
tone (핀번호, 주파수, 시간) {  
    수행 작업  
}
```

예 :
tone(8, 1000, 500);
or
tone(8, 1000);

3) Digital Output Piezo by 4-LED(tone)



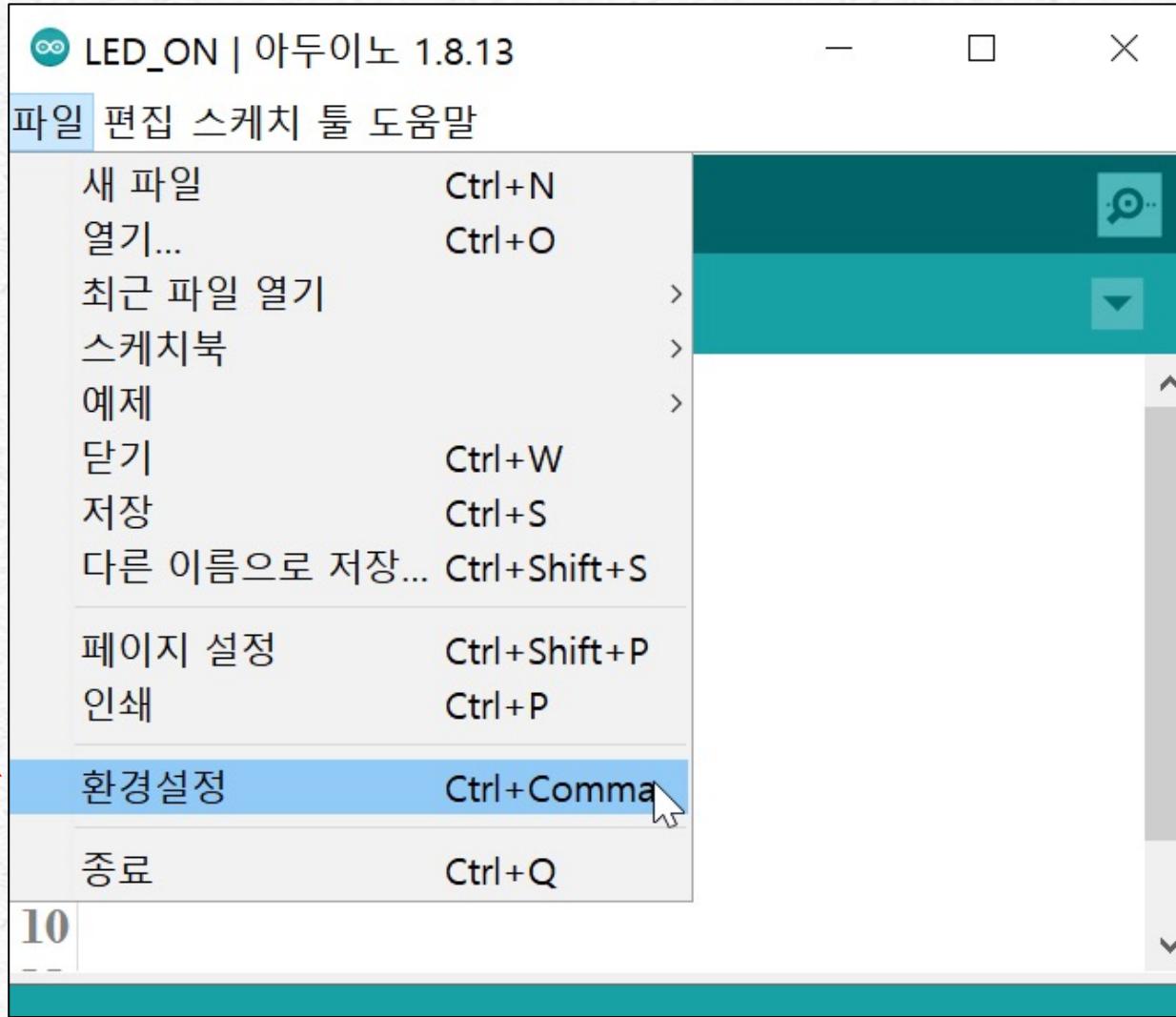
3) Digital Output Piezo by 4-LED(tone)

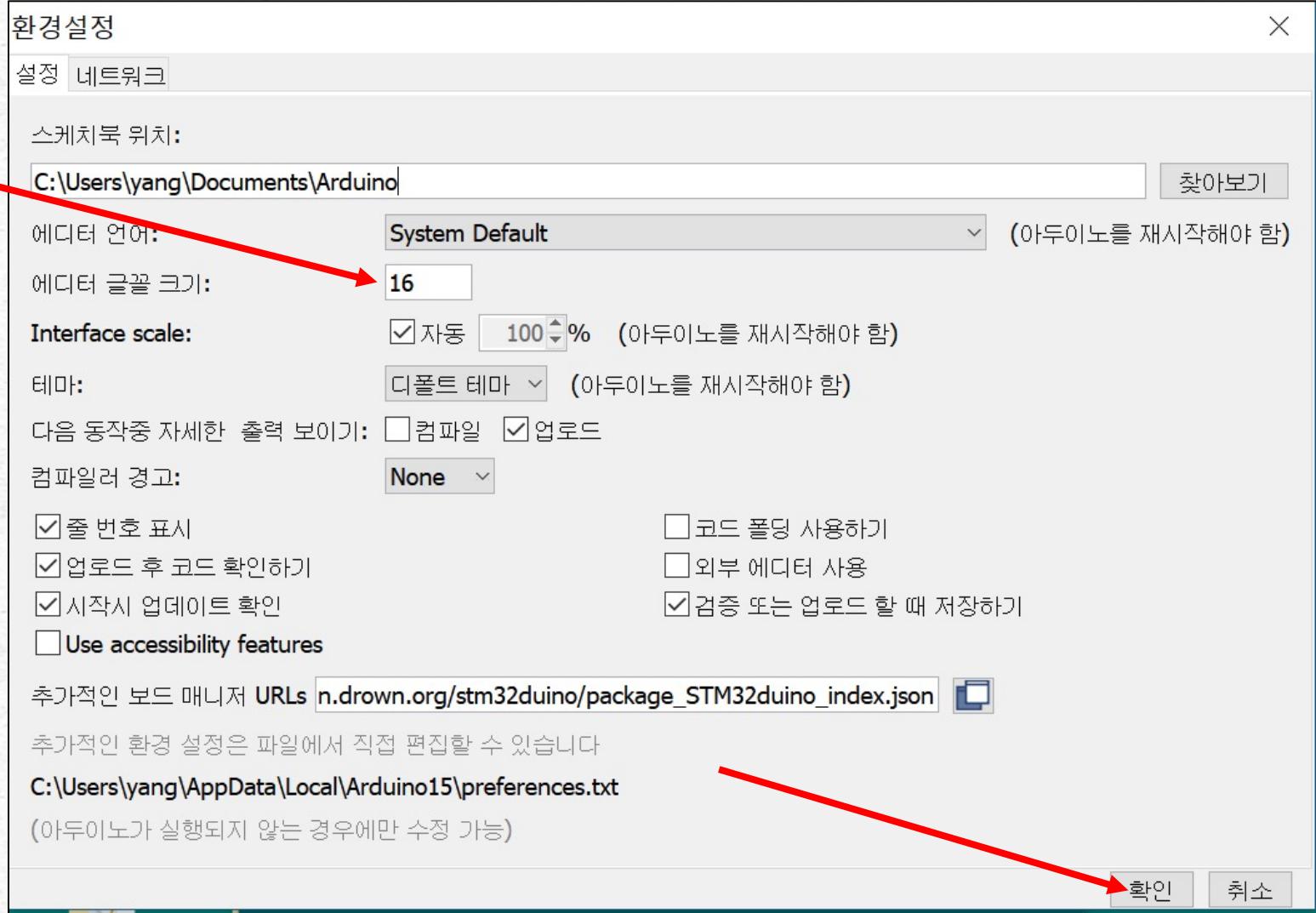


The screenshot shows the Arduino IDE interface with a sketch titled "Tone_test". The code is as follows:

```
1
2 int piezo = 8 ;
3 int freq = 1500 ;
4
5 void setup() {
6     pinMode(piezo, OUTPUT) ;
7 }
8
9 void loop() {
10    tone(piezo, freq);
11    delay(2000) ;
12    noTone(piezo) ;
13    delay(1000) ;
14 }
```

아두이노 IDE 환경설정





Ch3. Digital INPUT/Analog INPUT

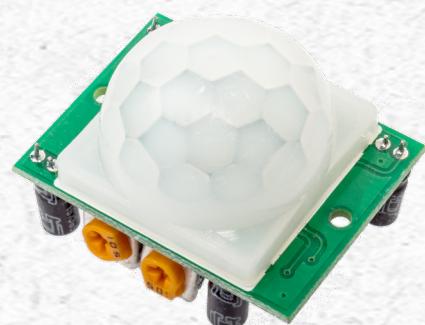
Ch3. Digital INPUT/Analog INPUT

- 1) Digital INPUT
- 2) Analog INPUT

1) Digital INPUT

1 or 0

격자선변화 감지 센서



적외선 감지 센서+



1) Digital Input 1: 인체감지 센서

인체감지 센서 : 자금에서 발생하는 IR detect

PIR sensor

주변물

아두이노 우드 보드 1개, USB 케이블 1개

인체감지 센서 1개, 브래드 보드 1개

LED 1개, 220Ω 저항 1개

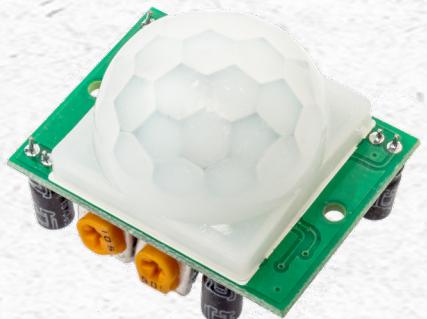
Piezo buzz 1개

점퍼線 M-F 3개, M-M 4개

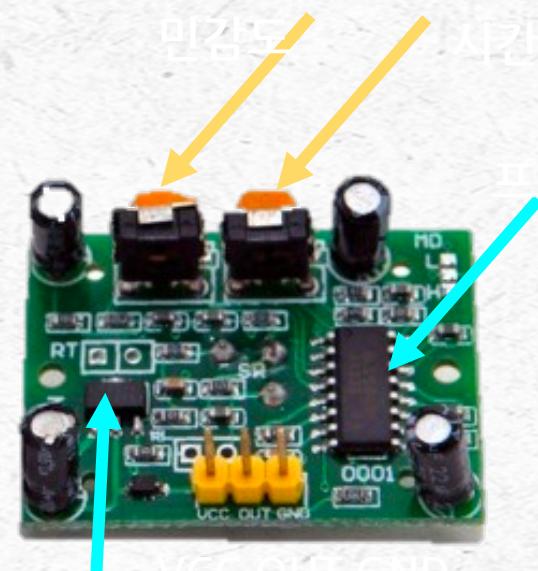


I) Digital Input I · 디지털 입력 I

PIR sensor module



Pyro
sensor



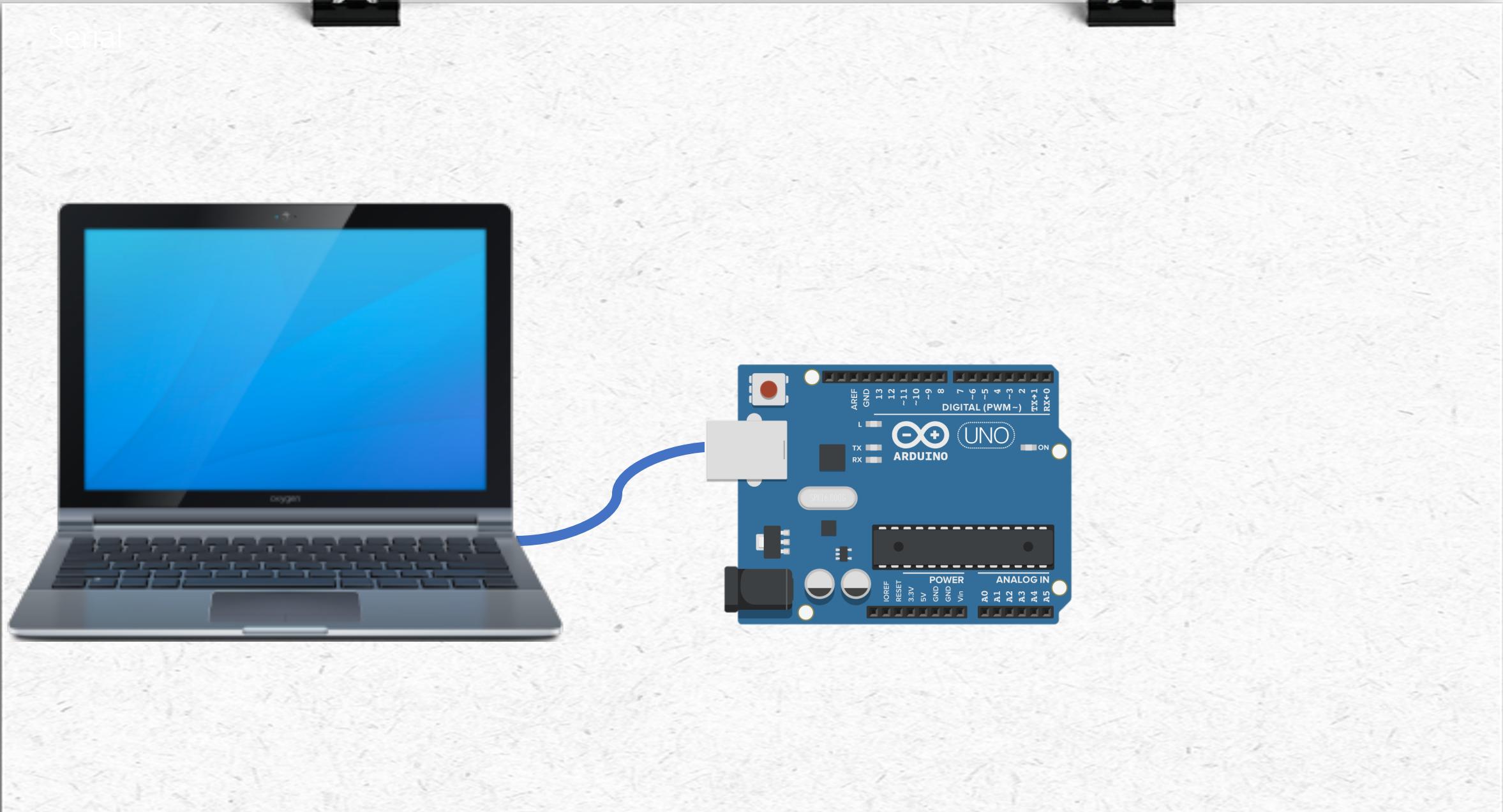
디지털
입력 I

Serial.begin

The image shows a screenshot of the Arduino IDE. At the top, there's a toolbar with icons for file operations like Open, Save, and Print. Below the toolbar, the title bar displays "Serial_Test1". The main area contains the following C++ code:

```
1
2 void setup() {
3
4 Serial.begin(9600) ;
5
6 }
7
8 void loop() {
9
10 Serial.print(" Hello World ") ;
11
12 }
```

The code consists of two functions: setup and loop. The setup function initializes the serial communication at 9600 baud. The loop function prints the string "Hello World" to the serial port.



```
Serial_Test1
1 void setup() {
2
3 Serial.begin(9600) ;
4
5 }
6
7 void loop() {
8
9 Serial.print(" Hello World ") ;
10
11 }
12
```

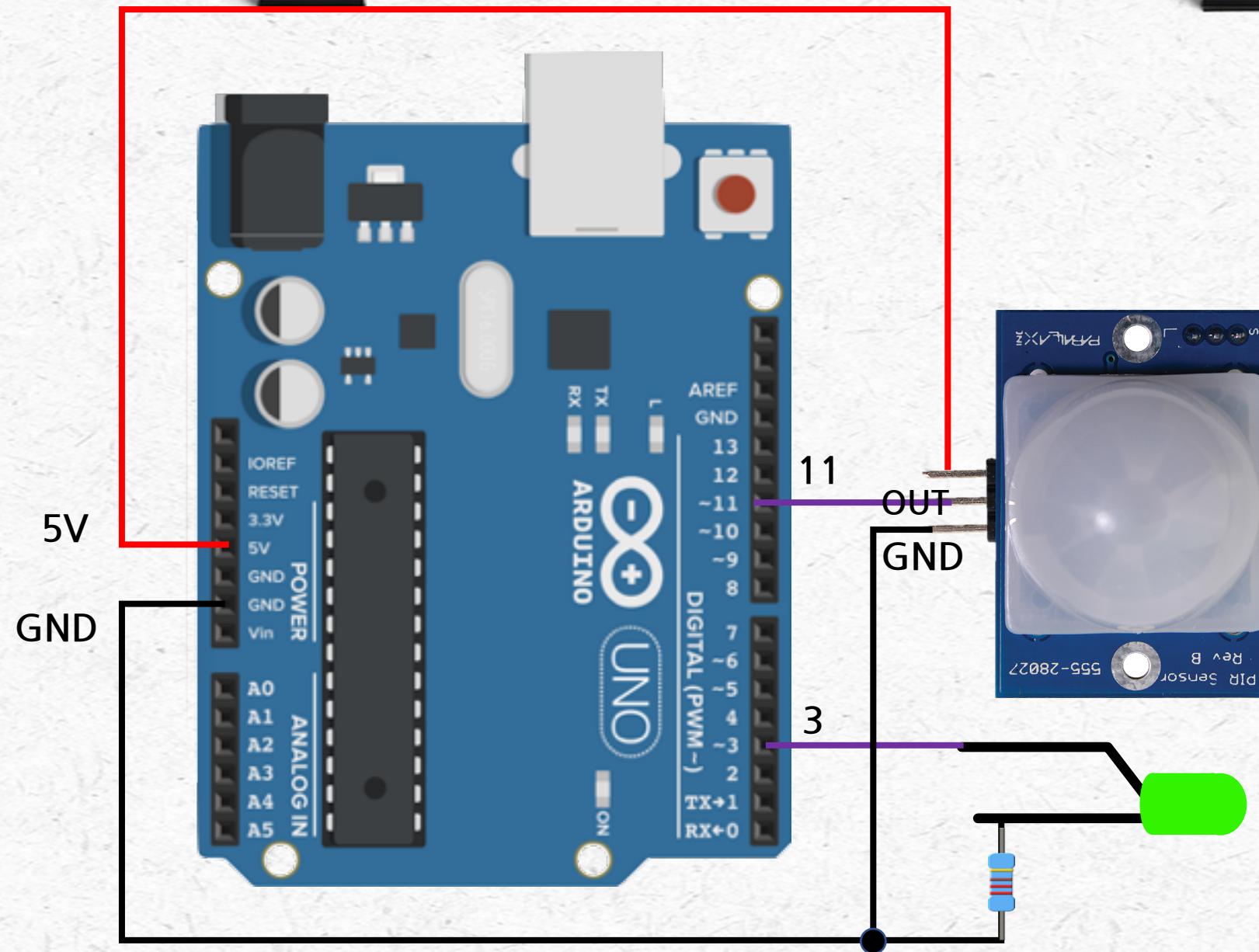
World Hello World Hello World Hello World Hello World Hello World Hello

자동 스크롤 타임스탬프 표시 Both NL & CR 9600 보드레이트 ✓ 9600 보드레이트 19200 보드레이트 38400 보드레이트 57600 보드레이트 74880 보드레이트 115200 보드레이트 230400 보드레이트 250000 보드레이트

```
Serial_Test2
1
2 int x= 21 ;
3
4 void setup() {
5
6 Serial.begin(9600) ;
7
8 }
9
10 void loop() {
11
12 Serial.print(x) ;
13
14 Serial.println(" Hello World ") ;
15
16 }
```

```
21 Hello World
21 Hello
```

자동 스크롤 타임스탬프 표시 Both NL & CR 9600 보드레이트



PID Motion Detection Sensor

The image shows the Arduino IDE interface with a sketch titled "Pir_LED". The code is written in C++ and performs the following tasks:

- Defines pins PIR (11) and LED (3).
- Configures pin PIR as INPUT and pin LED as OUTPUT.
- In the loop function, it reads the value from PIR. If the value is HIGH, it turns the LED ON (HIGH) for 100ms and then turns it OFF (LOW). If the value is LOW, it turns the LED OFF (LOW).

```
1 // Pir Sensor
2
3 int PIR = 11 ;
4 int LED = 3 ;
5
6 void setup(){
7   pinMode(PIR, INPUT);
8   pinMode(LED, OUTPUT);
9 }
10
11 void loop(){
12   int val = digitalRead(PIR) ;
13
14   if (val == HIGH) {
15     digitalWrite(LED, HIGH) ;
16     delay(100) ;
17   }
18   else {
19     digitalWrite(LED, LOW) ;
20   }
21 }
```

At the bottom of the code editor, there is a message in Korean: "컴파일 완료." (Compilation completed).

