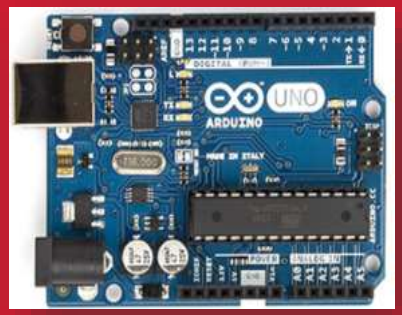
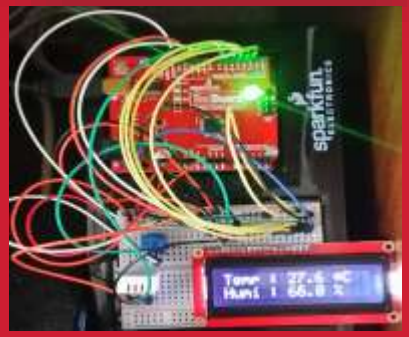




# Arduino-basic

## [wk01]

# Introduction

Learn how to code Arduino from scratch

Comsi, INJE University

1st semester, 2023

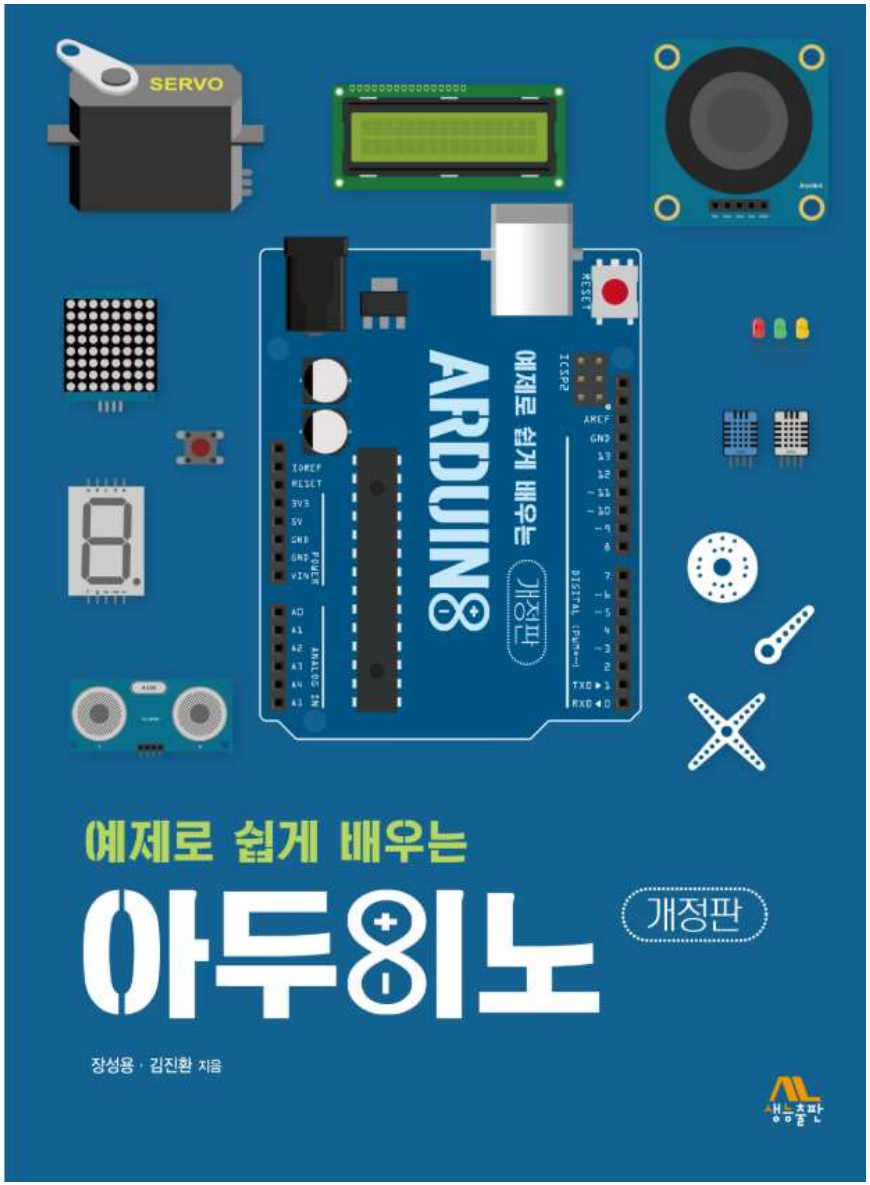
Email : chaos21c@gmail.com

# My ID (ARnn, github repo)

- AR01 강동하
- AR02 정재윤
- AR03 유석진
- AR04 정창민
- AR05 정희서
- AR06 유동기
- AR07 ***
- AR08 ***
- AR09 ***
- AR10 ***

# 주교재

# Uno team




# Syllabus of AR

## 2023학년도 1학기 수업계획서

### 수업정보

| | | | | | |
|---|---|---|---|---|---|
| 교과목명 (영문명) | 아두이노 기초(IDEDI인증과목)(Basic Arduino(IDEDI Certified Subject)) | | | 수업방식 | 대면(15주) |
| 교과목번호 | ASB128 | 분반 | 1 | 과정 | 학사과정 |
| 이수구분 | 전공선택 | 이수학점 | 3.0 | 사용언어 | 한국어(100%) |
| 시간/강의실 | 목6,7,8,9 E동323 | | | 선수과목 | |
| 수강대상 (권장학년) | 드론IoT시뮬레이션학부(3) | | | | |
| 수강제한 | | | | | |

**Email: chaos21c@gmail.com**

# Syllabus of AR

## 교재

| 교재구분 | 도서명 | 저자명 | 출판사 | 출판년도 |
|---|---|---|---|---|
| 주교재 | 예제로 쉽게 배우는 아두이노 | 장성용,김진환 | 생능출판 | 2018 |

## 평가방법

| 평가방법 | 평가비율(%) |
|---|---|
| 중간고사 | 30% |
| 기말고사 | 30% |
| 발표 | 20% |
| 실기과제 | 20% |

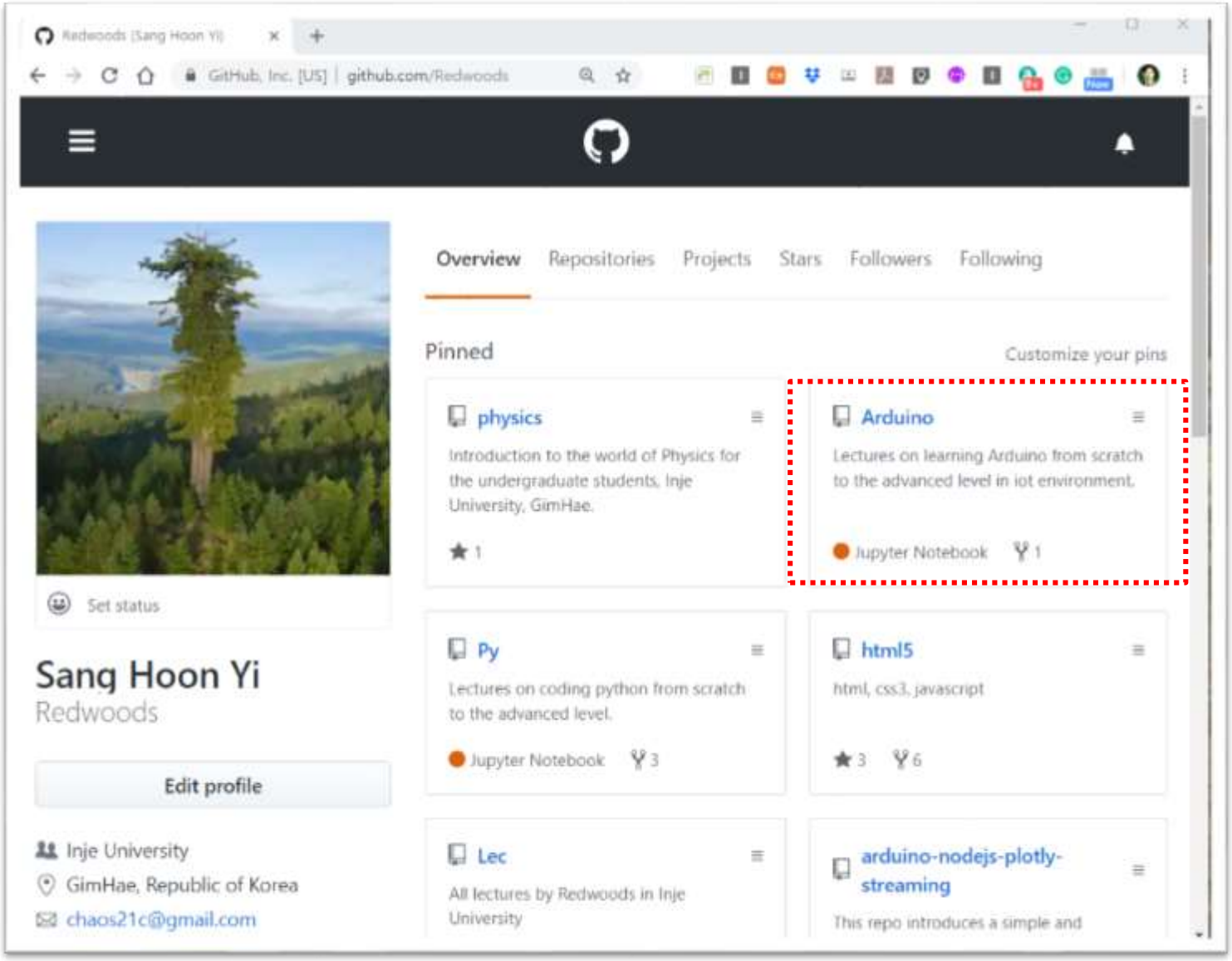
**[2022년 실습]**

- 1인1조로 아두이노 세트를 배정한다.
- 배정된 아두이노 키트를 분실 또는 고의 파손 시에는 변상한다.
- 필요 시 대여 장부에 시간/이름을 기록하고 빌려서 사용할 수 있다.

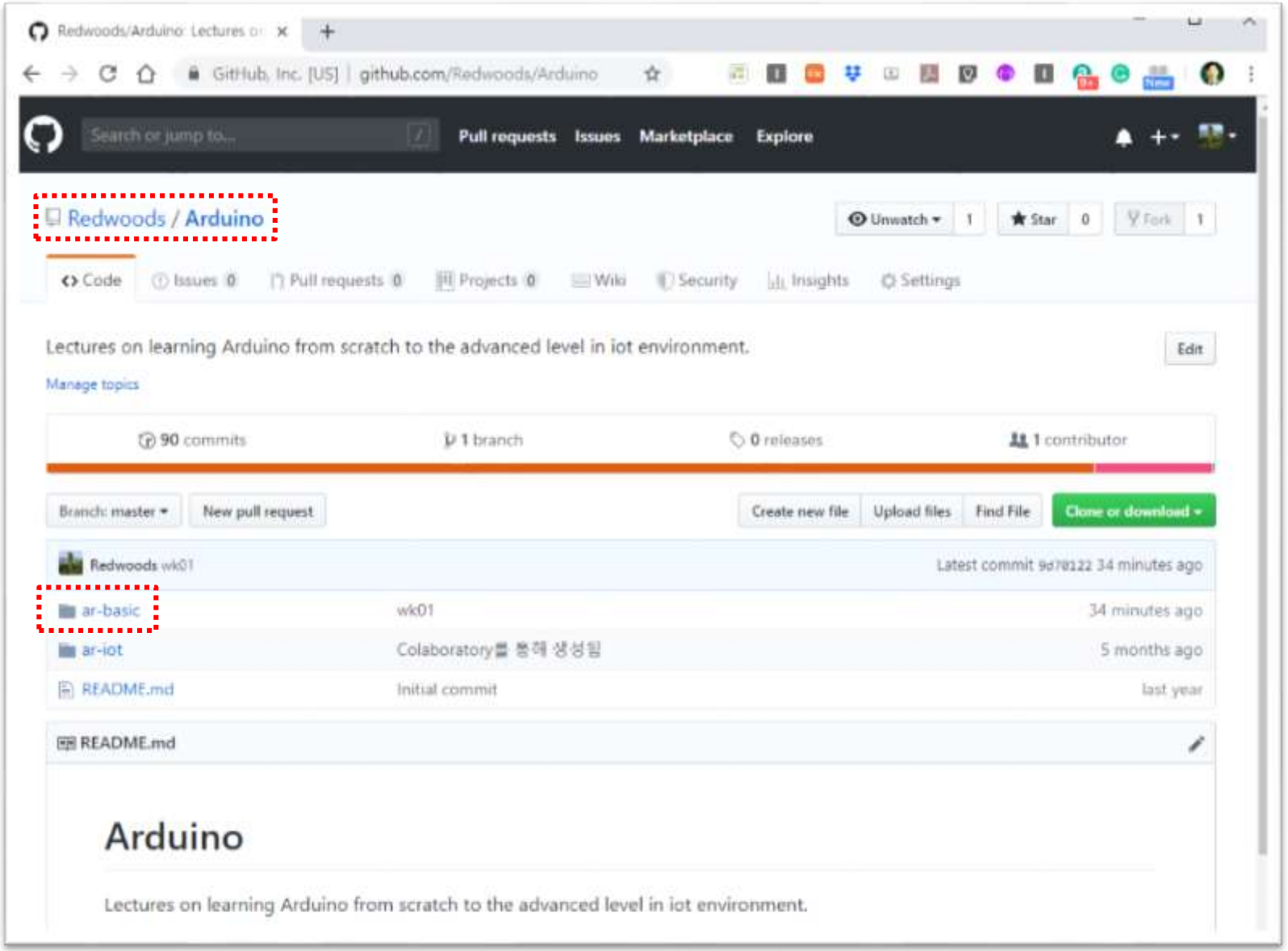
# 주간계획서

| 주간계획서 | | | |
|---|---|---|---|
| 주차 | 수업방법 | 수업내용 | 과제물 |
| 1 | 이론 및 실습 | 강의안내, Arduino 소개 및 사용법 | |
| 2 | 이론 및 실습 | 시리얼 통신 | 실습 |
| 3 | 이론 및 실습 | LCD 출력 | 실습 |
| 4 | 이론 및 실습 | LED 출력 1 | 실습 |
| 5 | 이론 및 실습 | LED 출력 2 | 실습 |
| 6 | 이론 및 실습 | LED 출력 3 | 실습 |
| 7 | 이론 및 실습 | 디지털신호 입력 | 실습 |
| 8 | 이론 및 실습 | 중간고사 필기 시험 | |
| 9 | 이론 및 실습 | 아날로그신호 입력 1 | 실습 |
| 10 | 이론 및 실습 | 아날로그신호 입력 2<br>- LCD 연결 | 실습 |
| 11 | 이론 및 실습 | 모터 구동 | 실습 |
| 12 | 이론 및 실습 | 적외선 리모컨 | 실습 |
| 13 | 이론 및 실습 | 여러 가지 부품들 | 실습 |
| 14 | 이론 및 실습 | 프로젝트 | 실습 |
| 15 | 이론 및 실습 | 기말필기 시험 | |
| 16 | 이론 및 실습 | 기말고사 필기및 실기 시험 | |

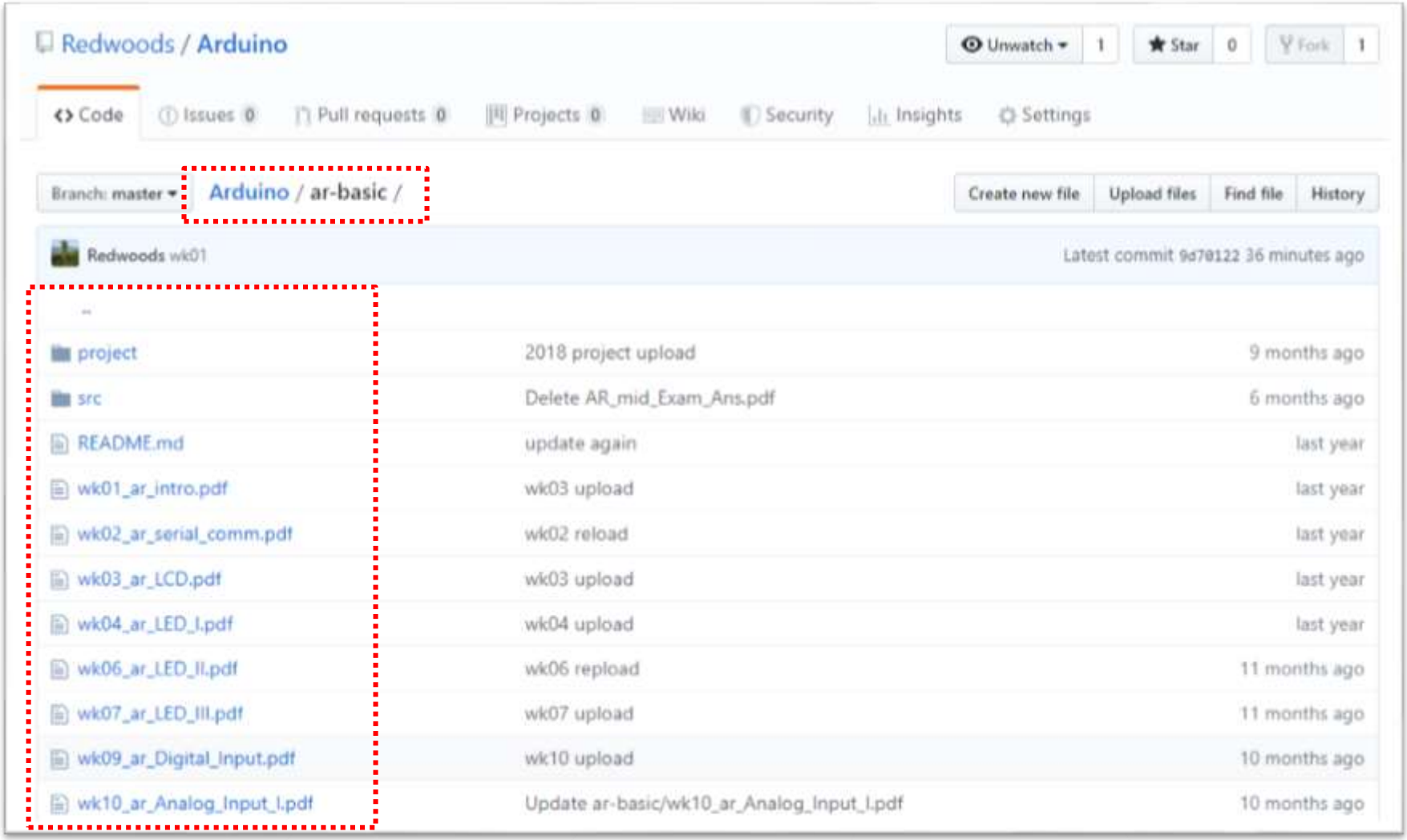
# Github.com/Redwoods/Arduino



# Github.com/Redwoods/Arduino



# Github.com/Redwoods/Arduino



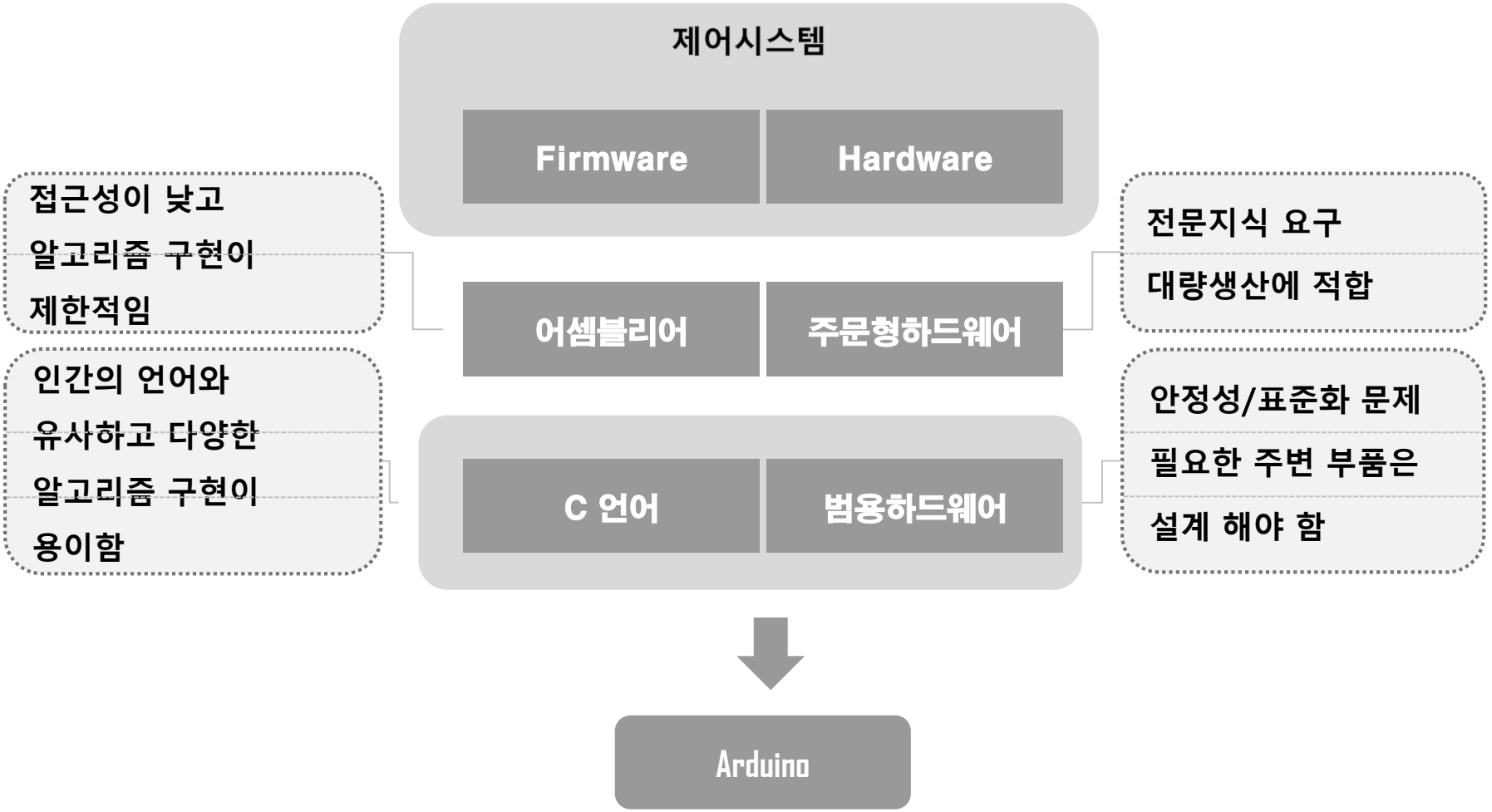
# Arduino

ARDUINO | Genuino

Home | Buy | Download | Products | Learning | Forum | Support | Blog

https://www.arduino.cc/

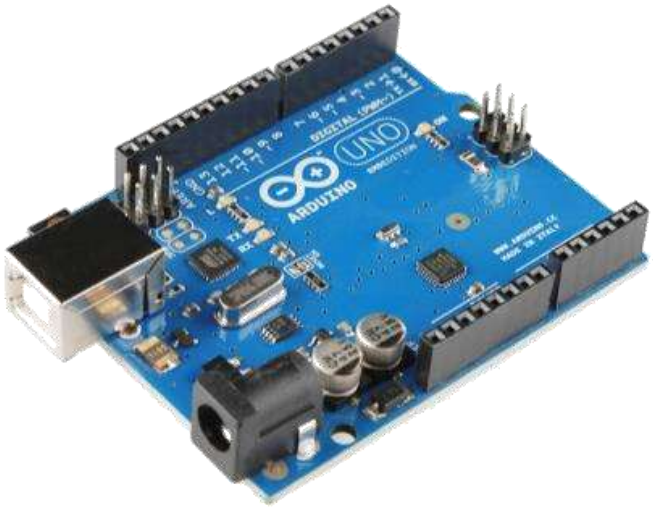
# 1.0 Arduino 란?


제어시스템
Firmware
Hardware
접근성이 낮고
알고리즘 구현이
제한적임
어셈블리어
주문형하드웨어
전문지식 요구
대량생산에 적합
인간의 언어와
유사하고 다양한
알고리즘 구현이
용이함
C 언어
범용하드웨어
안정성/표준화 문제
필요한 주변 부품은
설계 해야 함
Arduino

# 1.1 Arduino 란?

2005년 Italy의 Massimo Banzi & David Cuatielles에 의해 개발

- 예술가 취미생활 학생
- 전자공학 교육
- 누구나 쉽게 사용 가능한 제어장치
- 오픈소스 하드웨어
- GSM Wifi Ethernet Motor drive 등의 쉴드 제공
- 다양한 라이브러리



+

- LabView
- MATLAB
- Node.js Plot.ly
- Mongo DB

→ 범용 하드웨어 IOT 의 표본

# 1.2.1 Arduino hardware

Arduino Board

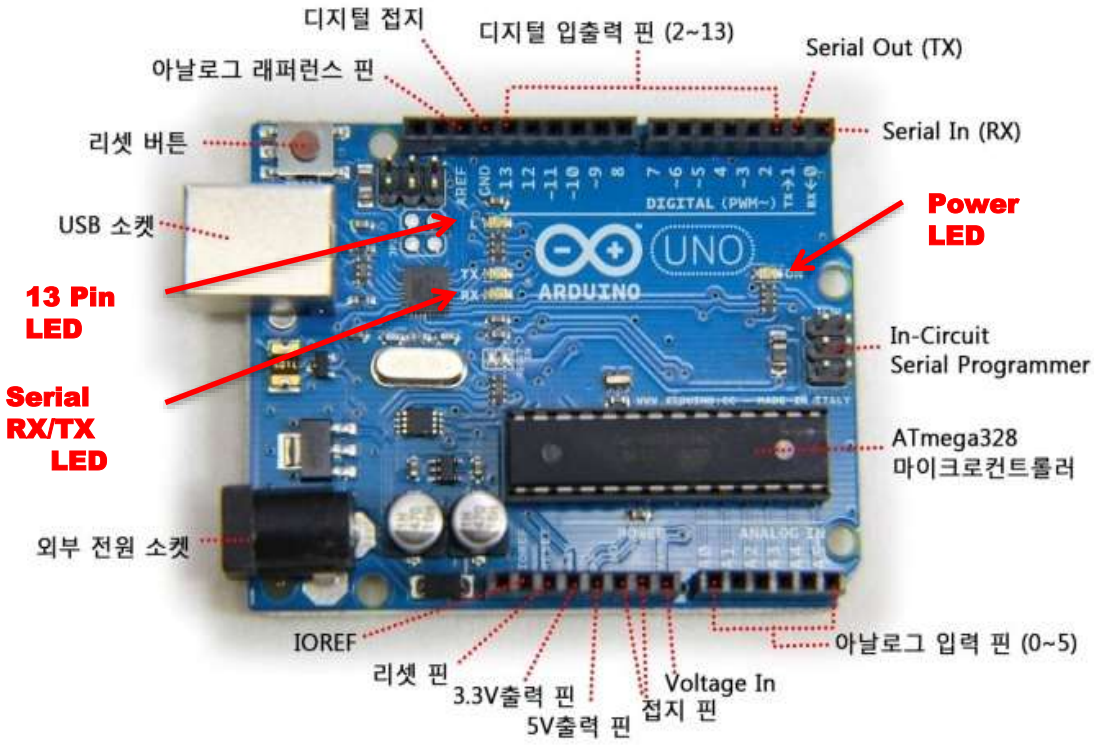

Shield (통신모듈)


**Sensor**
광,온도,
습도...

**Actuator**
LED,모터,
스피커...

**Accessory**
스크린,
USB...

# 1.2.2 Arduino hardware




## ✓ Arduino UNO R3

- ATmega328 microcontroller
- Input voltage: 7~12V
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- 32KB Flash Memory
- 16Mhz Clock Speed

# 1.2.3 Arduino hardware


✓ Arduino Uno WiFi

**ESP8266 Wi-Fi Module**

- ATmega328p microcontroller
- Input voltage: 7~12V
- 14 Digital I/O Pins (6 PWM outputs)
- 8 Analog Inputs
- ESP8266 Wi-Fi
- 16Mhz Clock Speed

# 1.2.4 Arduino hardware

✓ Arduino Pro NANO

| |
|---|
| · ATmega168/328 microcontroller |
| · Input voltage: 7~12V |
| · 14 Digital I/O Pins (6 PWM outputs) |
| · 8 Analog Inputs |
| · 16KB Flash Memory |
| · 16Mhz Clock Speed |

✓ Arduino NANO33

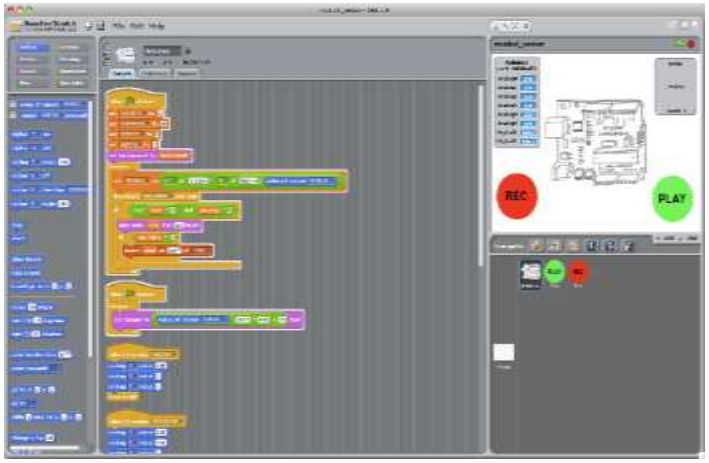
◆ BLE IOT

◆ SENSOR

# 1.3 Arduino software

스크래치

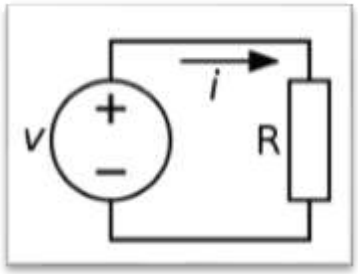
- ✓ MIT에서 만든 그래픽 언어
- ✓ 교육용, 알고리즘 구현에 제한적




C 언어

- ✓ 모든 컴퓨터 시스템에서 사용할 수 있는 프로그래밍 언어

# 1.4 전압, 전류, 저항




**전압 [V]**

- ✓ 전위가 높은 쪽과 낮은 쪽의 차이
- ✓ 1쿨롱(coulomb: 전하의 단위)의 전하가 갖고 있는 에너지
- ✓ Arduino에서는 직류 3.3[V]와 5[V]를 지원

**전류 [A]**

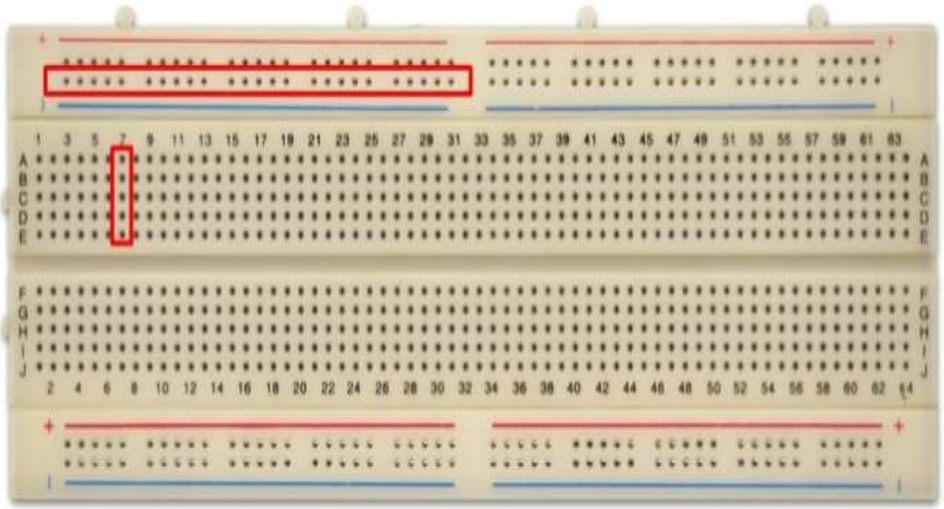
- ✓ 1초당 1쿨롱의 전하가 단위 면적을 통과했을 때를 1[A]로 정의
- ✓ Arduino에서는 1/1000[A] 단위인 [mA]를 사용

**저항 [Ω]**

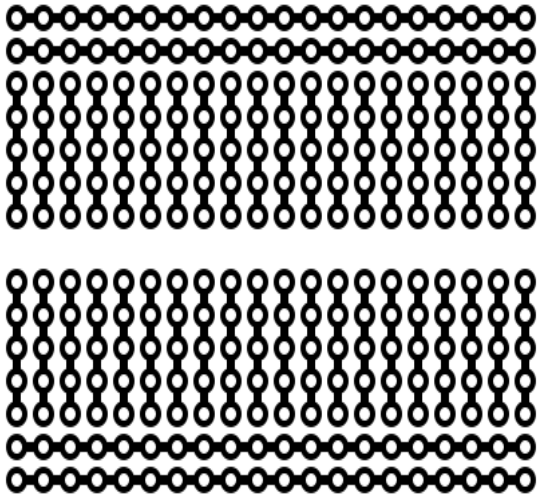
- ✓ 전류의 흐름을 방해하는 정도를 나타냄
- ✓ 색 띠나 숫자로 값을 표시
- ✓ Arduino에서는 칩 (chip) 형태의 저항이 사용

# 1.5 브레드 보드 (Bread board)

시제품 제작이나 실험용 와이어를 보드에 꽂아 사용



빨간색 묶음 홀끼리 내부회로가 연결되어 있음



내부 결선

# 1.6 아두이노 키트(Kit)


web → https://www.devicemart.co.kr/goods/view?no=12170416

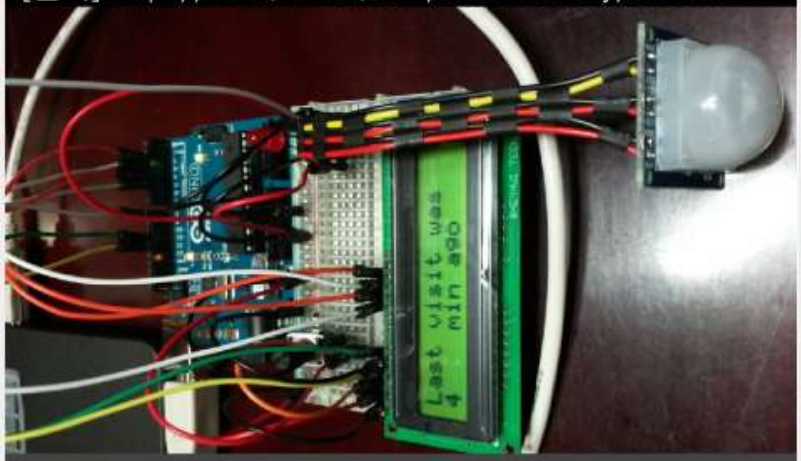
# 1.6 아두이노 키트(Kit) : Part-1

# 1.6 아두이노 키트(Kit) : Part-2


- 아두이노 UNO × 1
- 듀폰케이블 (M/F,M/M) × 80
- RGB LED 모듈 × 1
- 택트 스위치 캡 × 5
- 조이스틱 모듈 × 1
- CdS 조도센서 × 1
- 인체감지센서 모듈 × 1
- I2C 1602 LCD 모듈 × 1
- RFID 카드X1 × 1
- 74HC595X1 × 1
- USB 케이블 × 1
- 저항 × 30
- 1digit FND(CA) × 1
- 볼스위치 × 1
- 수위 센서 × 1
- 불꽃감지센서 × 1
- 사운드센서 × 1
- 서보모터 × 1
- RFID 태그 × 1
- 1X40 핀헤더 × 1
- 830핀브레드보드 × 1
- 가변저항 × 1
- 4digit FND(CA) × 1
- 리드 스위치 센서 × 1
- 온도센서 LM35 × 1
- 적외선 수신기 × 1
- 능동부저 × 1
- 스테퍼모터 × 1
- DS1302 RTC 모듈 × 1
- 9V 배터리 스냅 × 1
- 미니 브레드보드 × 1
- LED × 20
- 8×8도트 매트릭스 × 1
- 4×4 키 매트릭스 × 1
- 써미스터 × 1
- IR 리모컨 × 1
- 수동부저 × 1
- 스테퍼모터드라이버 × 1
- 1N4001 다이오드 × 1
- 아크릴 고정판 × 1
- 점퍼와이어세트 × 1
- RGB LED × 1
- 택트스위치 × 5
- 5V 릴레이 모듈 × 1
- 온습도센서 × 1
- TCRT5000 적외선 센서 × 1
- 초음파센서 × 1
- RFID 수신 모듈 × 1
- 2N2222 트랜지스터 × 1

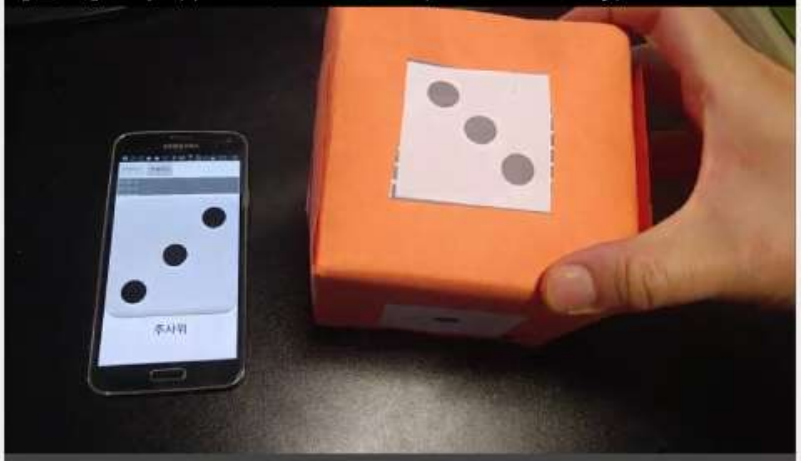
# 1.7 프로젝트 사례 (youtube)

[출처] http://cafe.naver.com/arduinostory/37790



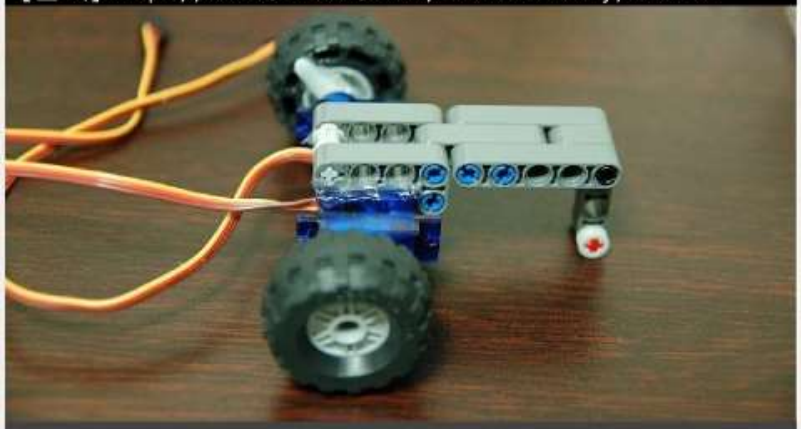

인체 감지 센서를 이용한 방문자 로그

[출처] http://cafe.naver.com/arduinostory/89525



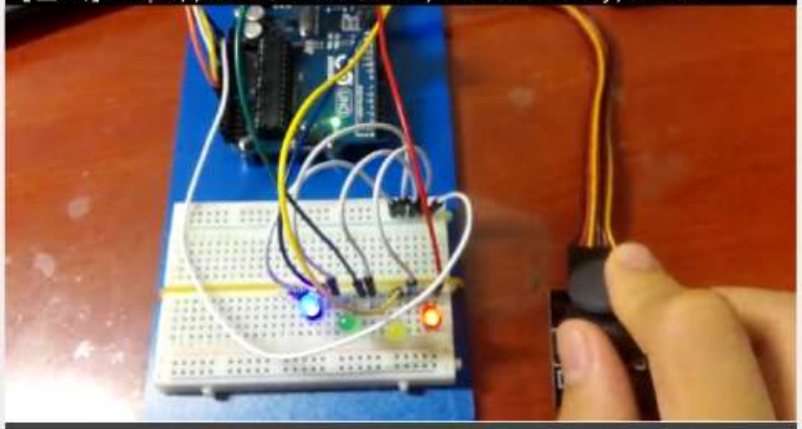

가속도/자이로센서를 이용한 스마트 주사위

[출처] http://cafe.naver.com/arduinostory/29743



아두이노와 레고의 조합

[출처] http://cafe.naver.com/arduinostory/63507



조이스틱 모듈 LED 점등

# Arduino SW

http://fritzing.org/home/

# Fritzing configuration

fritzing electronics made easy

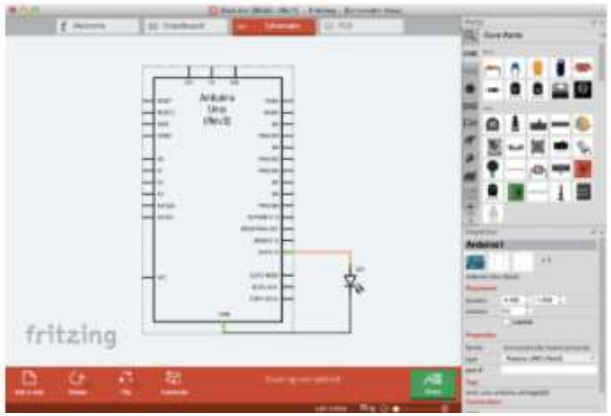
Projects Parts **Download** Learning Services Contribute FORUM FAB

Fritzing is open source, free software. Be aware that the development of it depends on the active support of the community.
Select the download for your platform below.

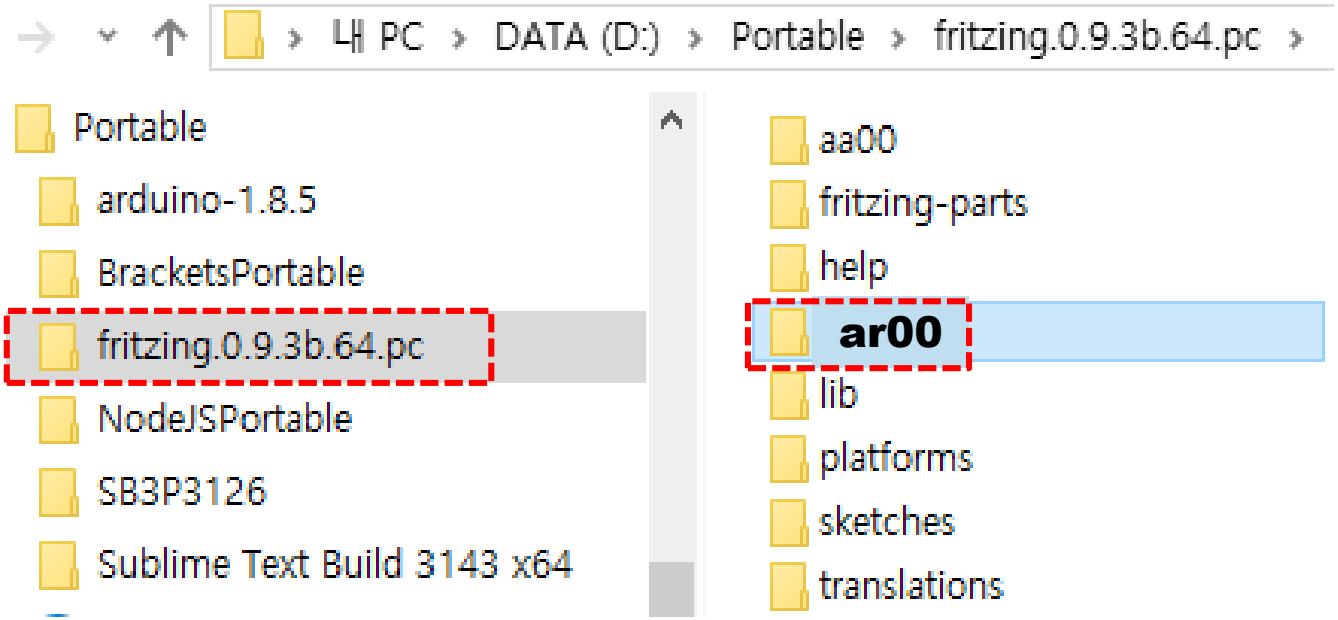
Version **0.9.3b** was released on **June 2, 2016**.

- Windows 32 bit
- Windows 64 bit
- Mac OS X 10.7 and up
- Linux 32 bit
- Linux 64 bit
- Source Github

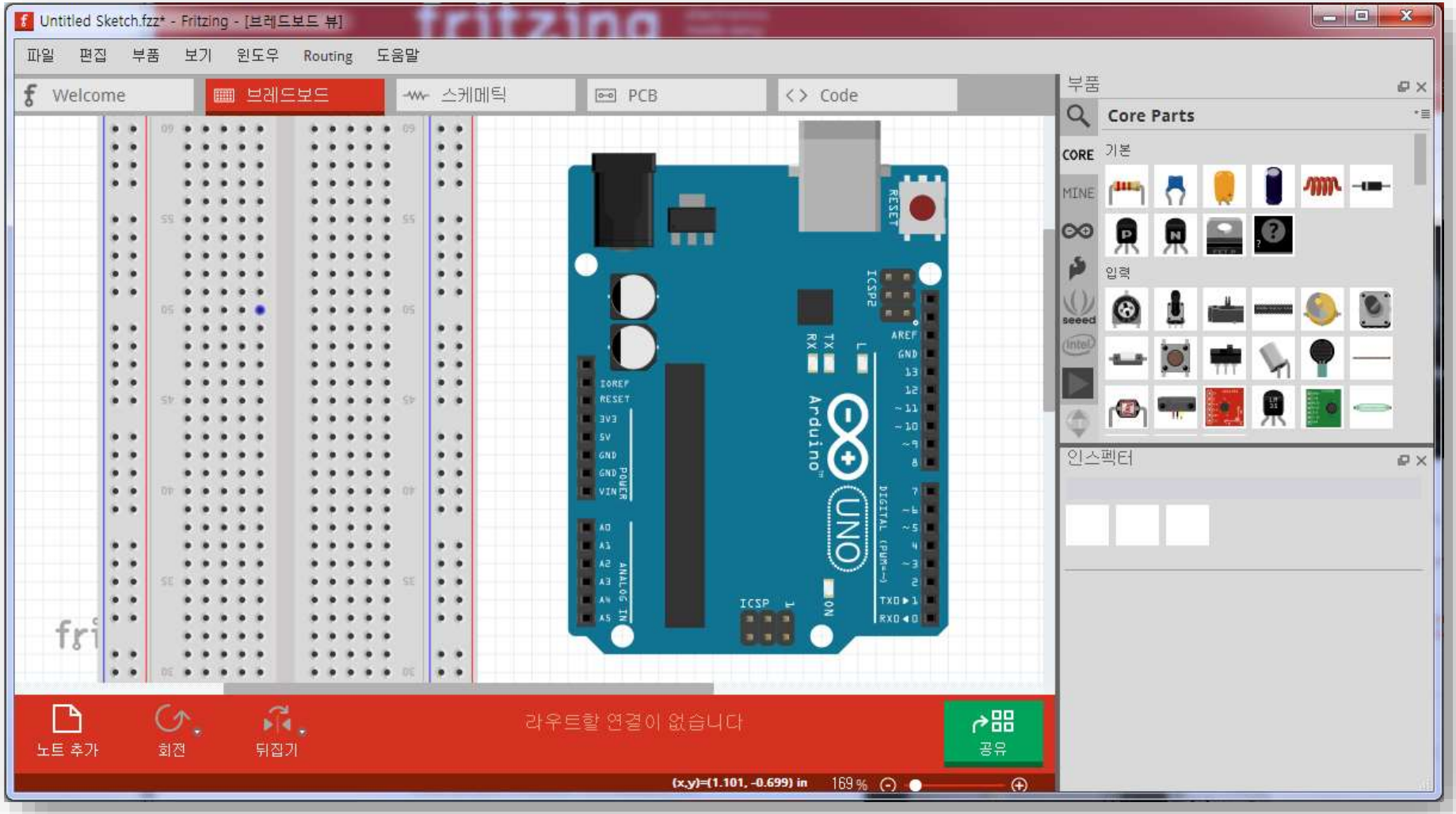
Downloaded 2578877 times.

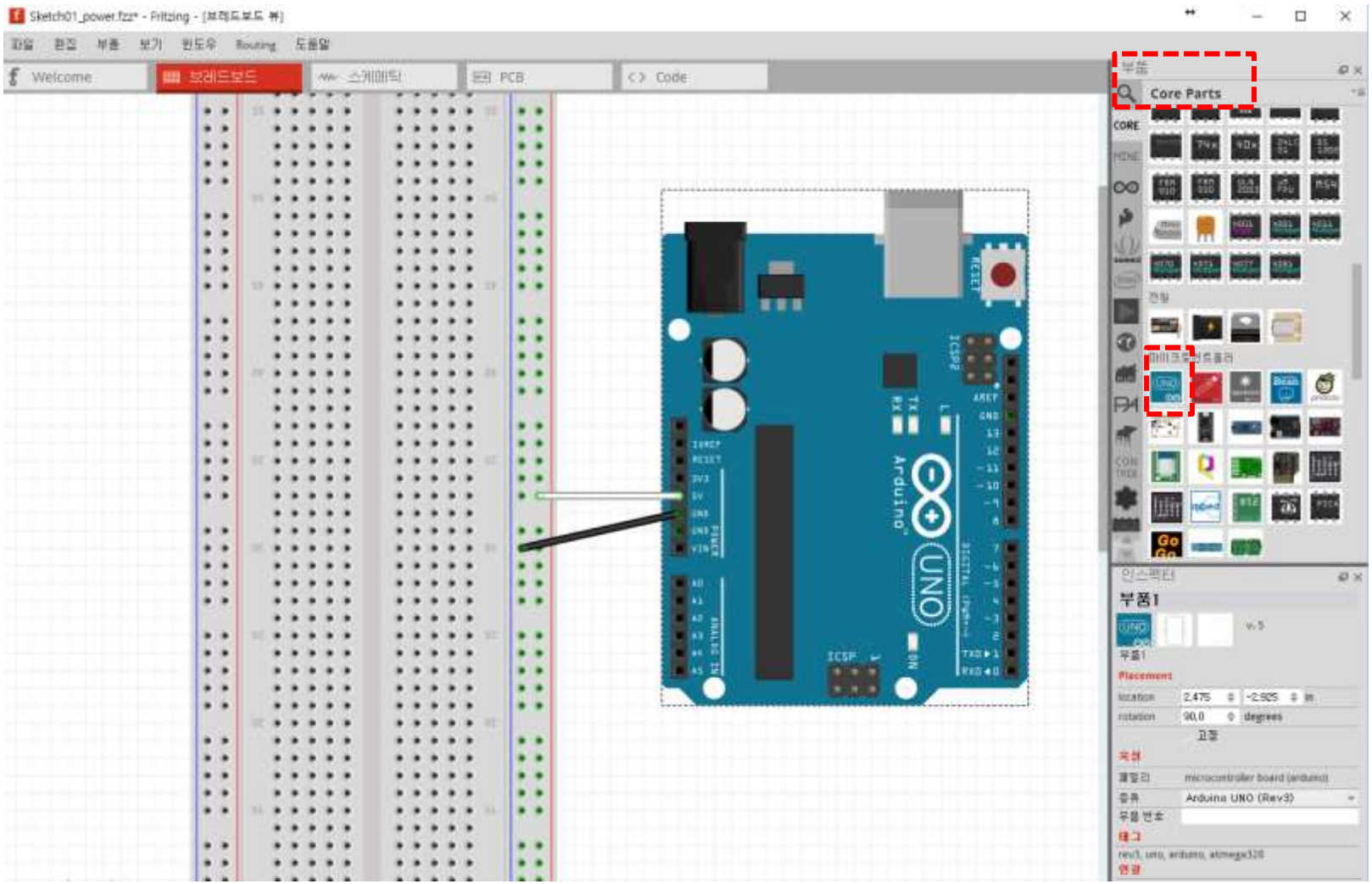
# [Fritzing] configuration



# [Fritzing] configuration

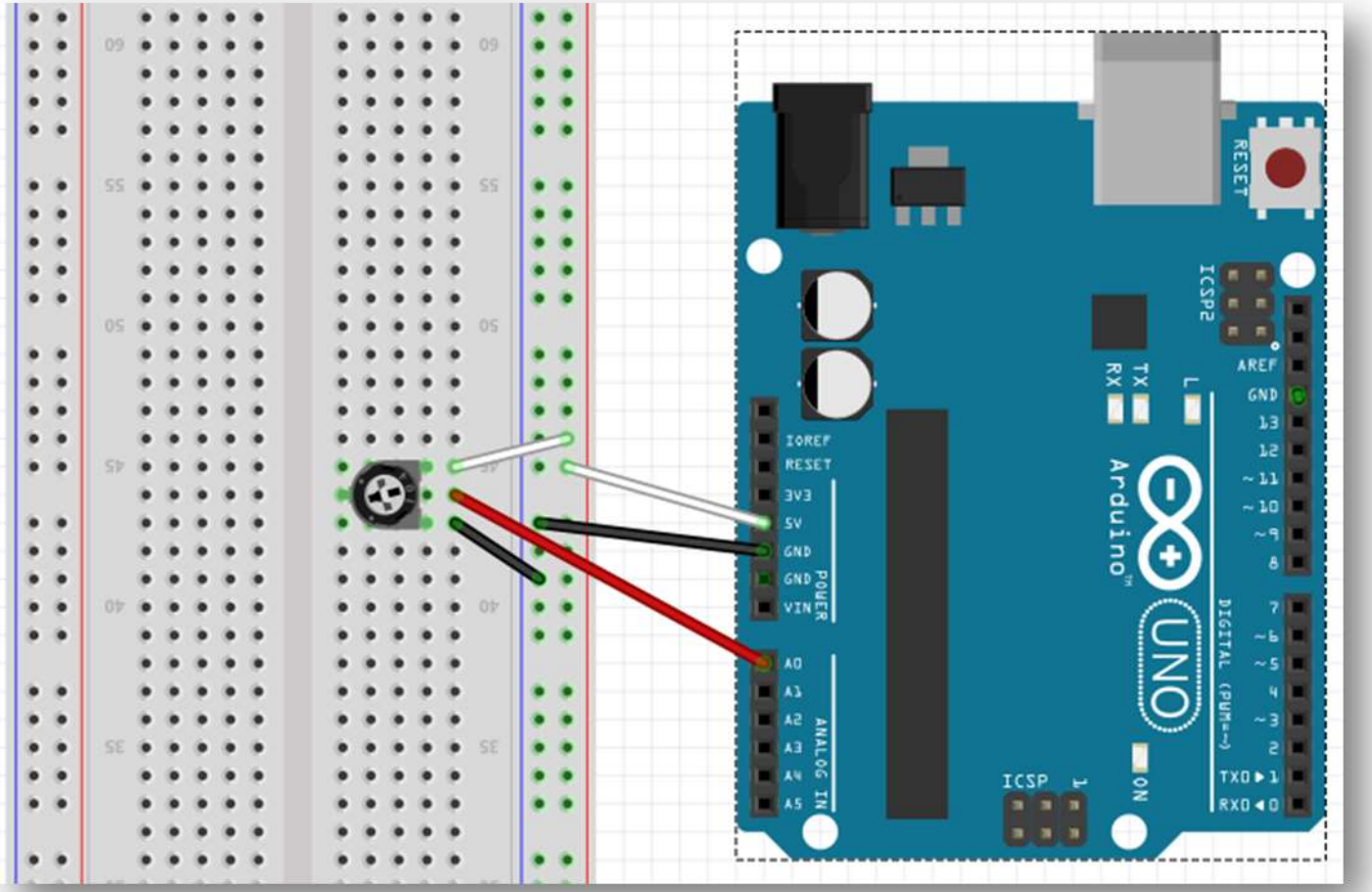


# Fritzing configuration – power



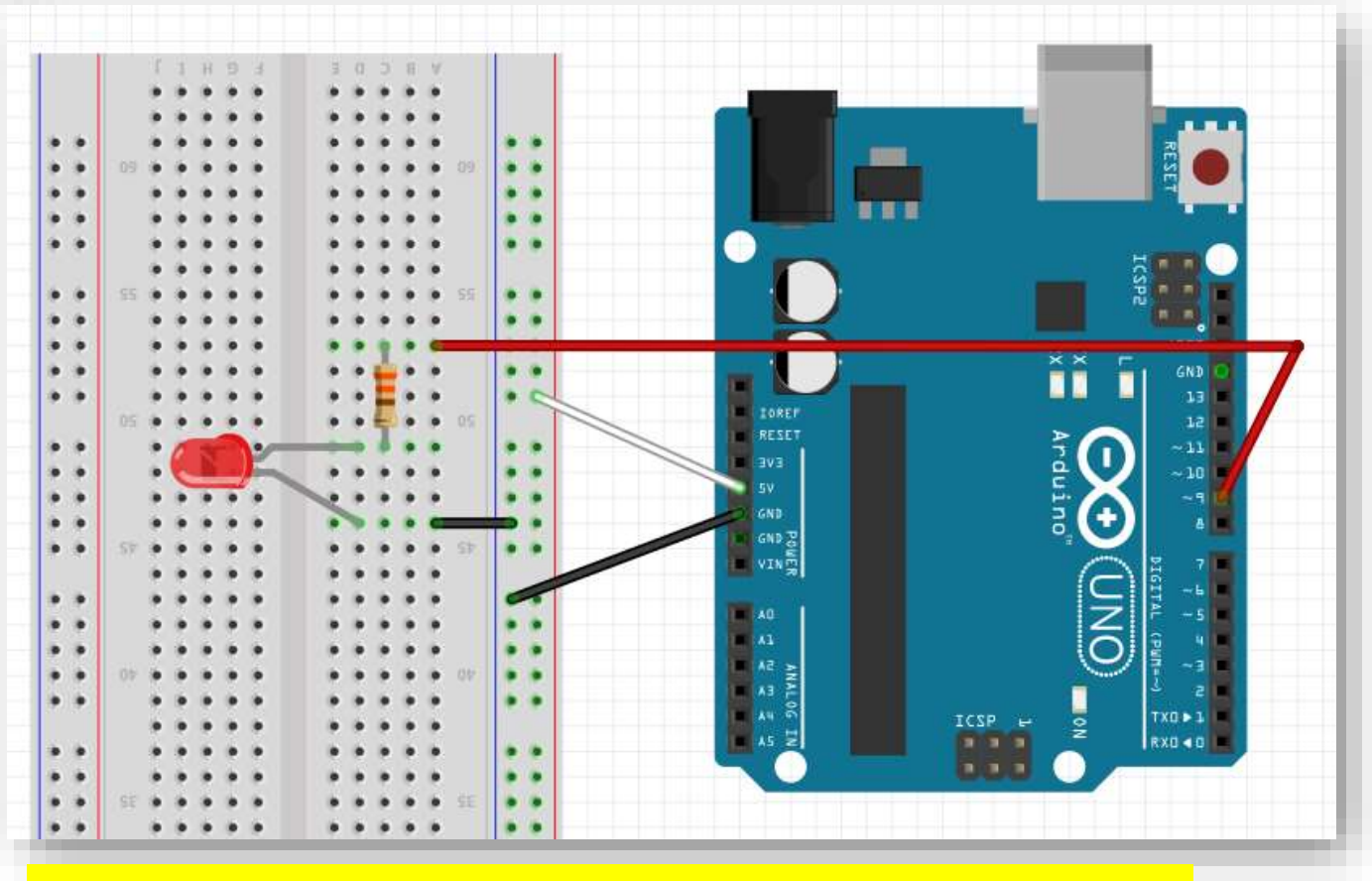

# Arduino circuits

# 0.A1 Potentiometer (가변 저항기)




**Parts : 가변저항기**

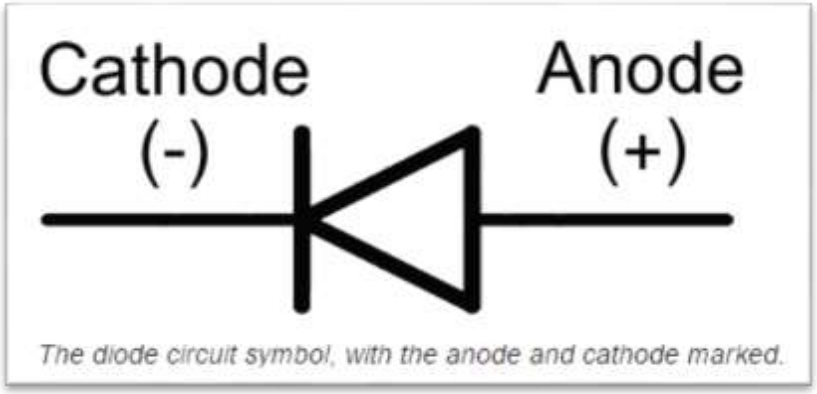
# 0.A2 single LED



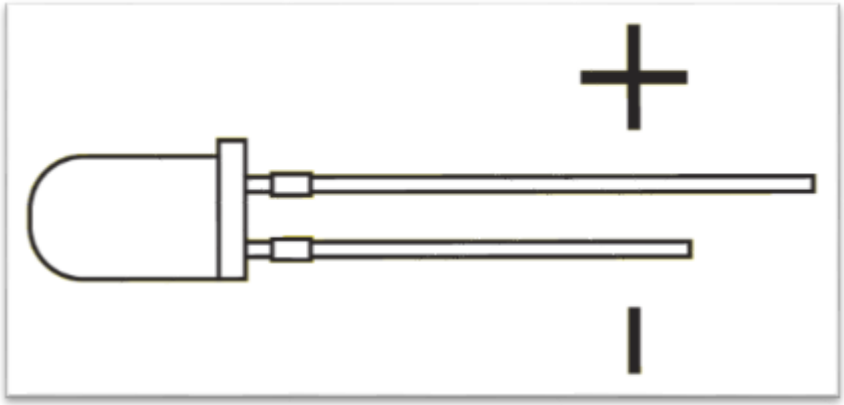

**Parts : LED (1), R (330 Ω X 1)**

# 0.A2 single LED

## Polarity of Diode and LED



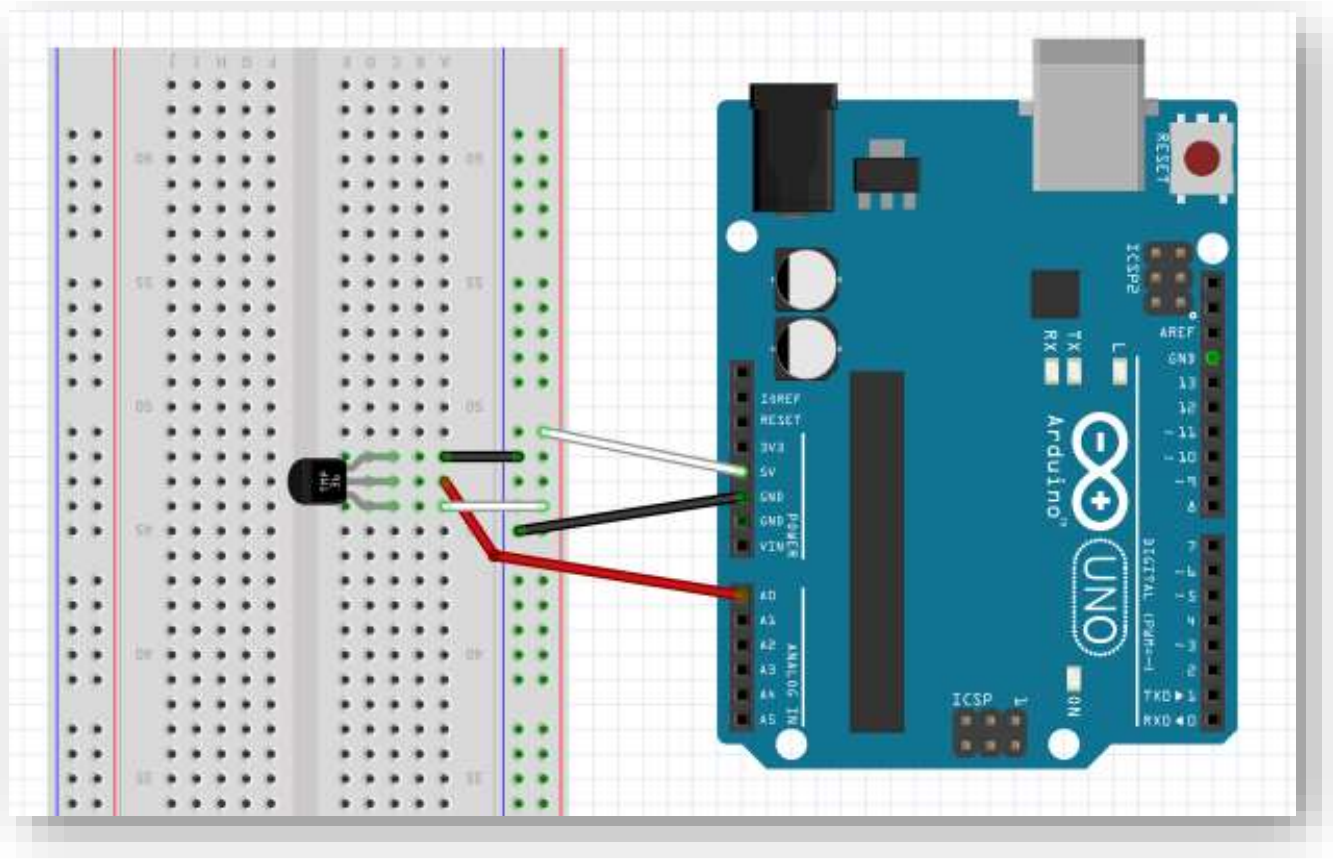
The diode circuit symbol, with the anode and cathode marked.



**Find the longer leg, which should indicate the positive, anode pin.**

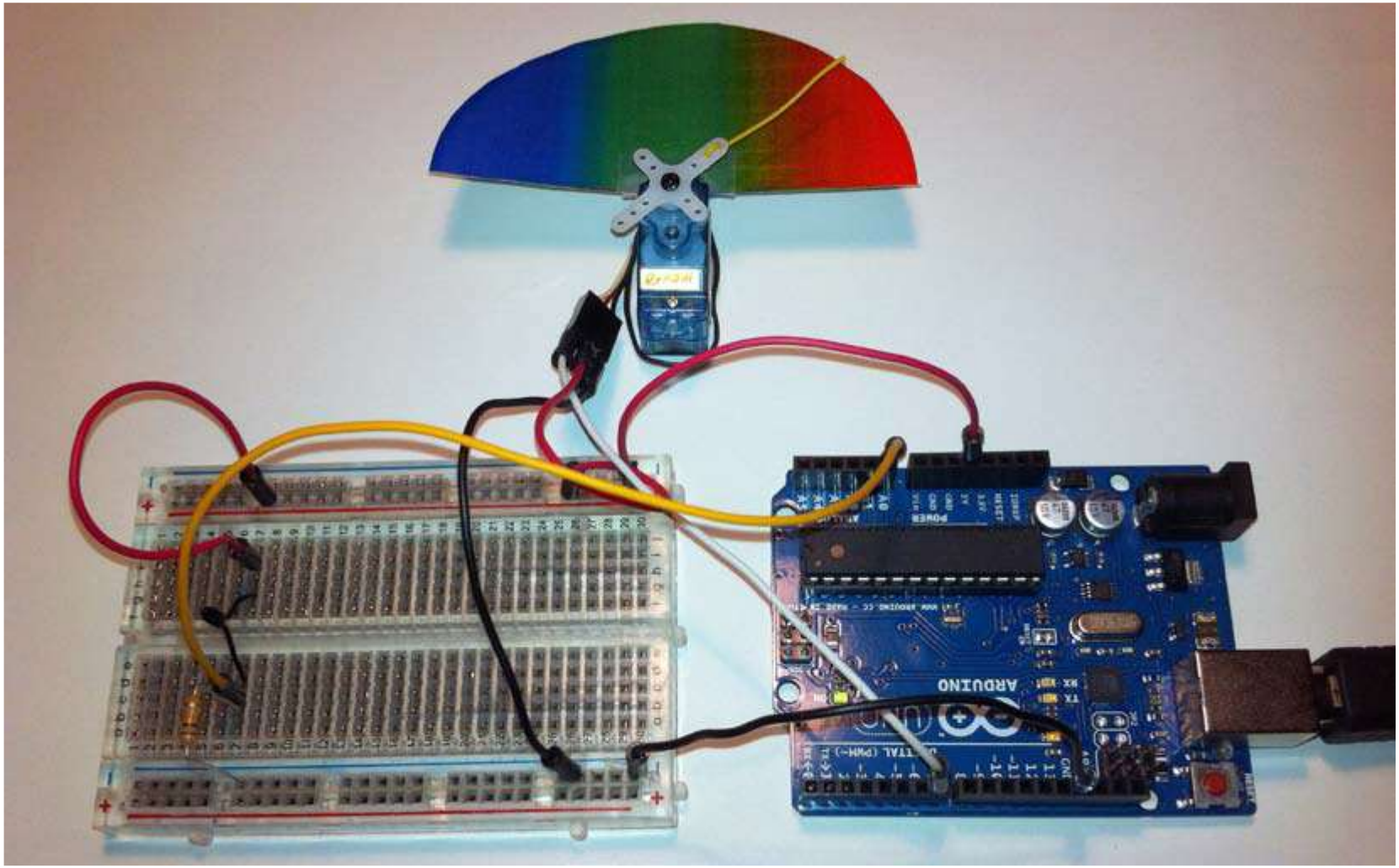
https://learn.sparkfun.com/tutorials/polarity/diode-and-led-polarity

# 0.A3 Temperature sensor (TMP36)

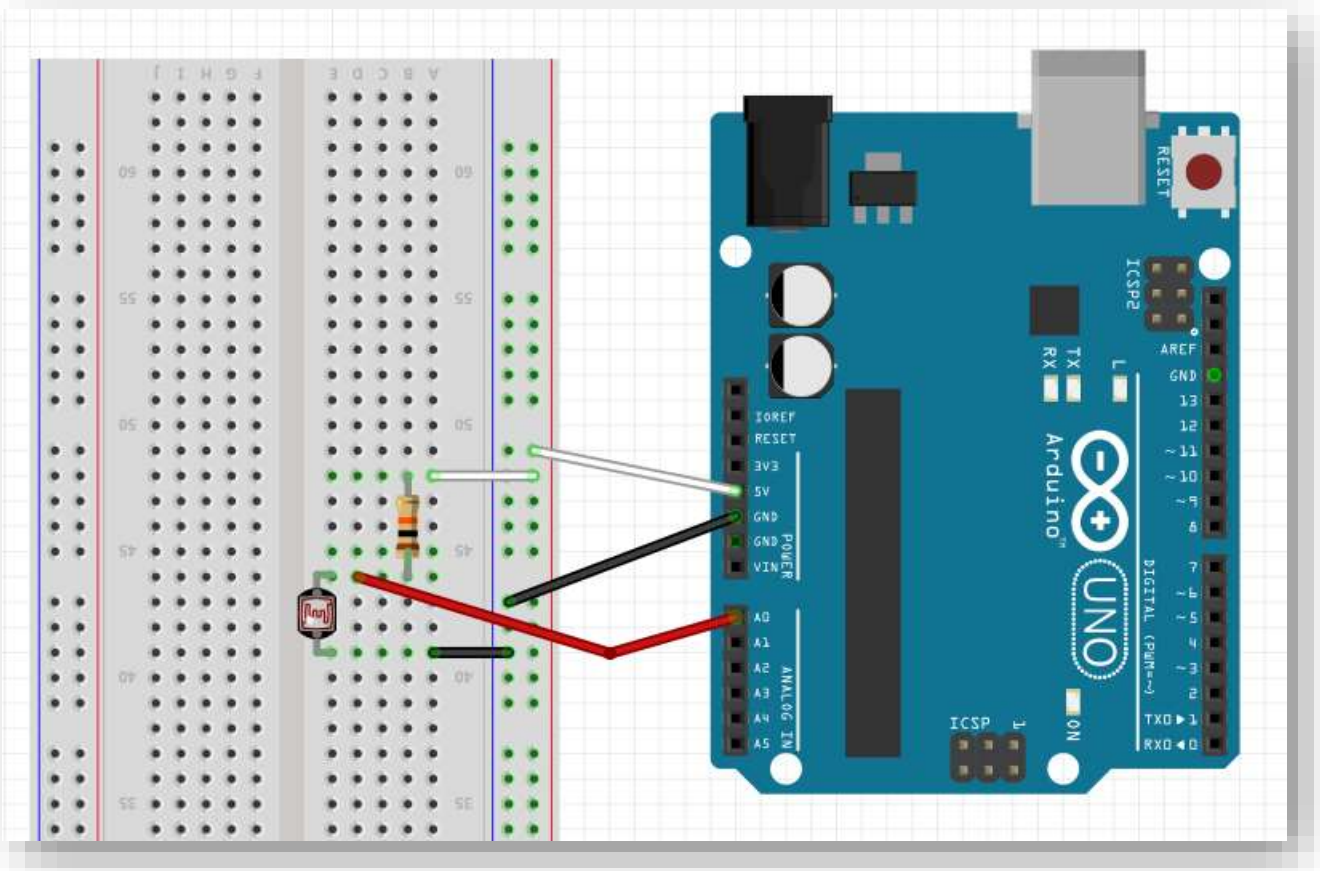



**Parts : Temperature sensor (TMP36)**
**A0 : analog signal input**

# 0.A3. DIY3 Servo

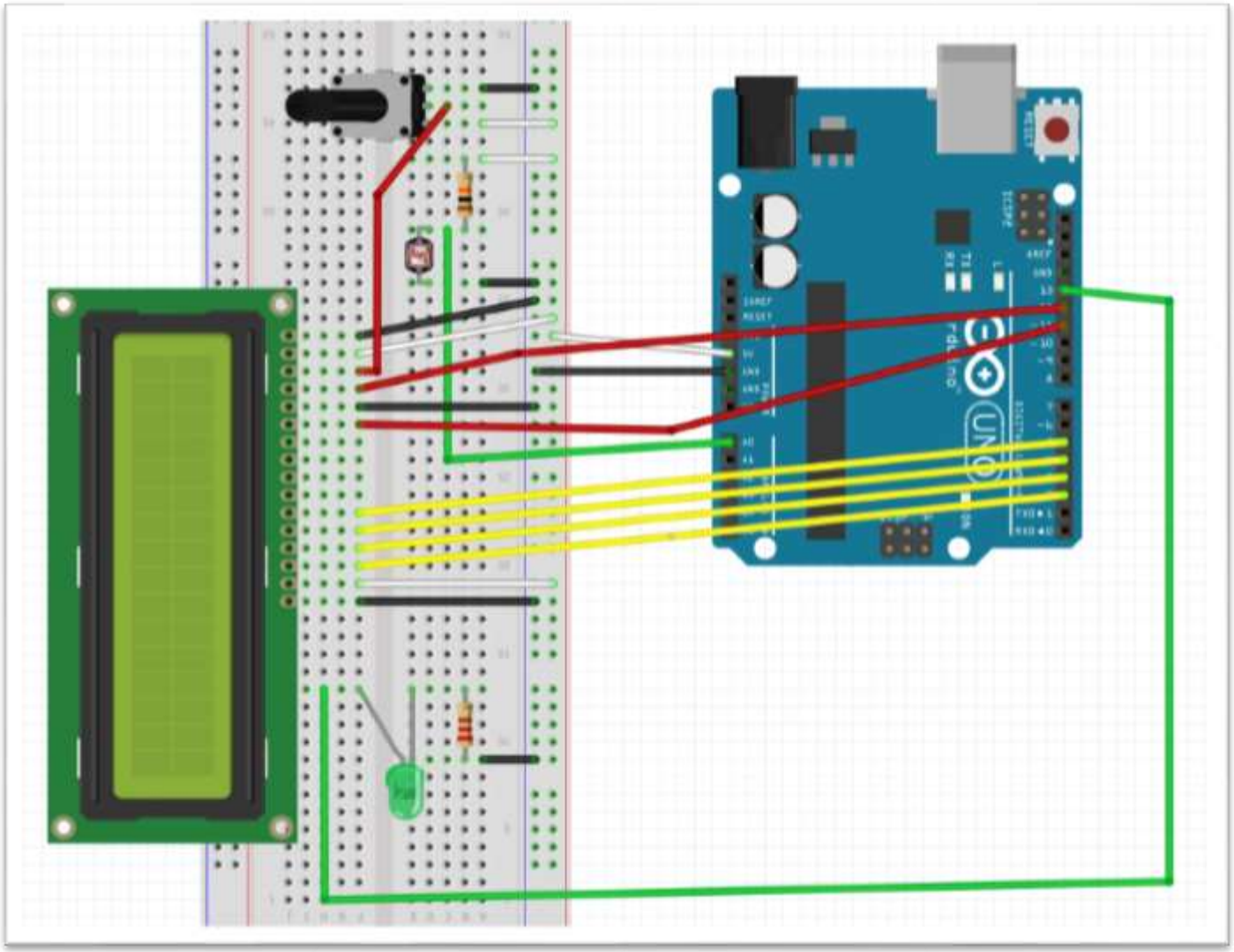


# 0.A4 Luminosity sensor : photo cell LDR

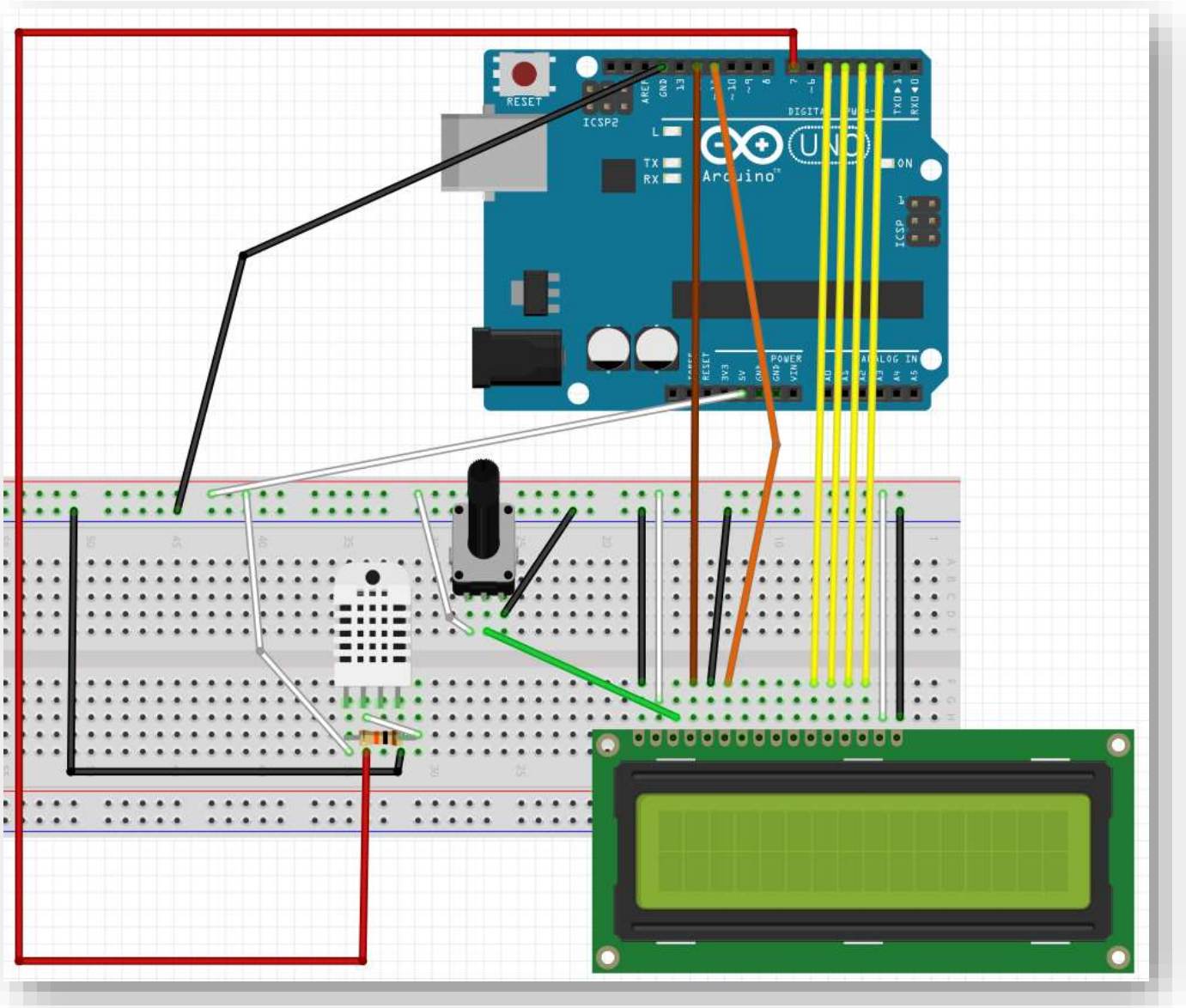



**Parts : 20 mm photocell LDR, R (10 kΩ X 1)**

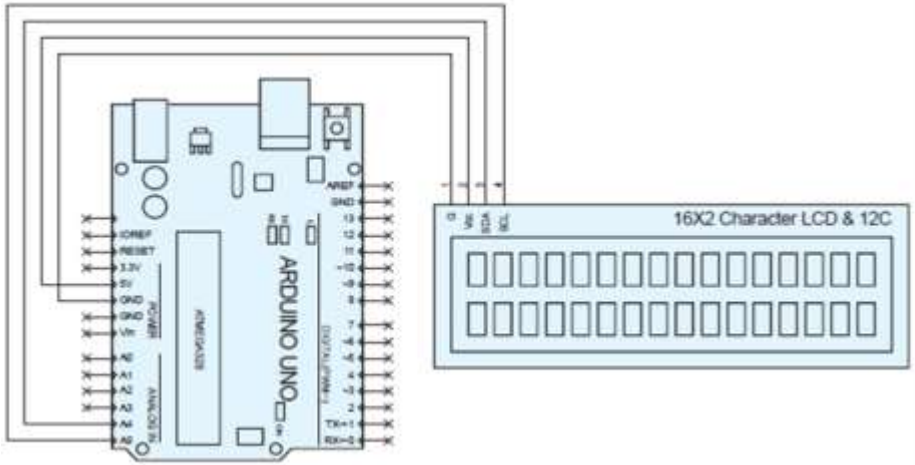
# 0.A5 Display of luminosity



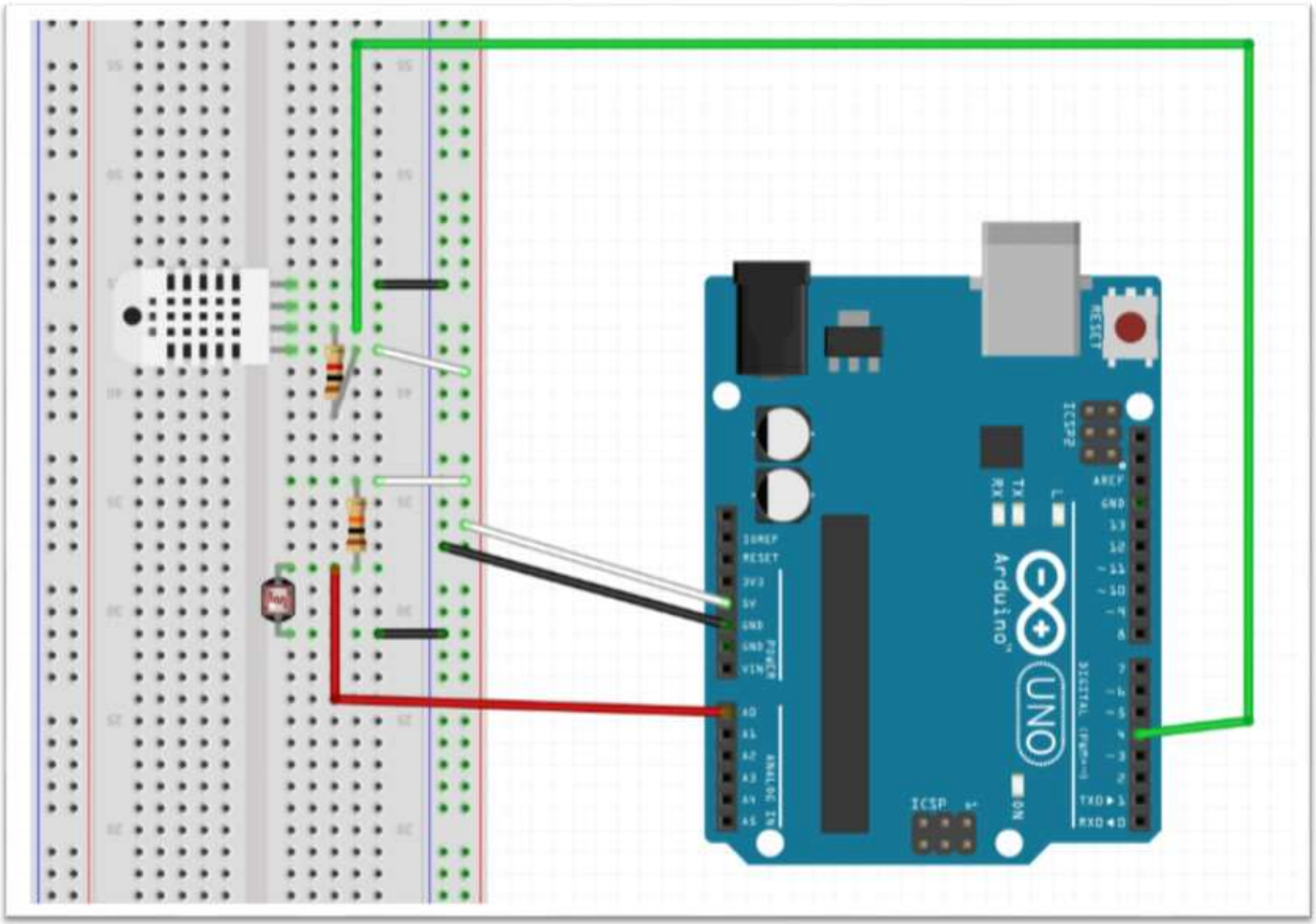
# 0.A6 Display of Temperature & Humidity



# 0.A6-1 I2C LCD module




# 0.A7 DHT22 & CdS



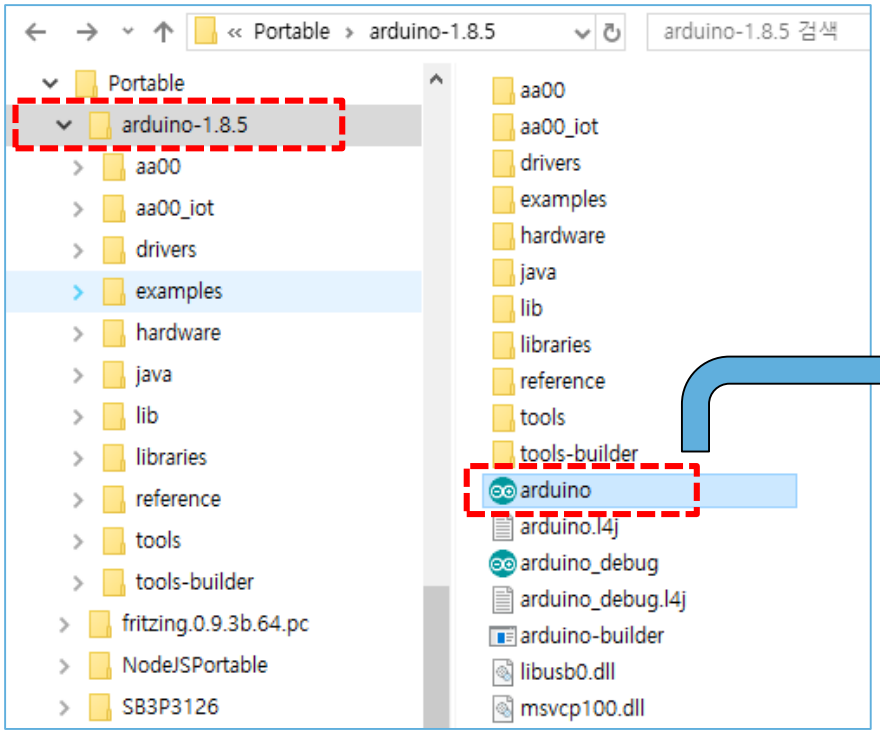

# Arduino SW: IDE

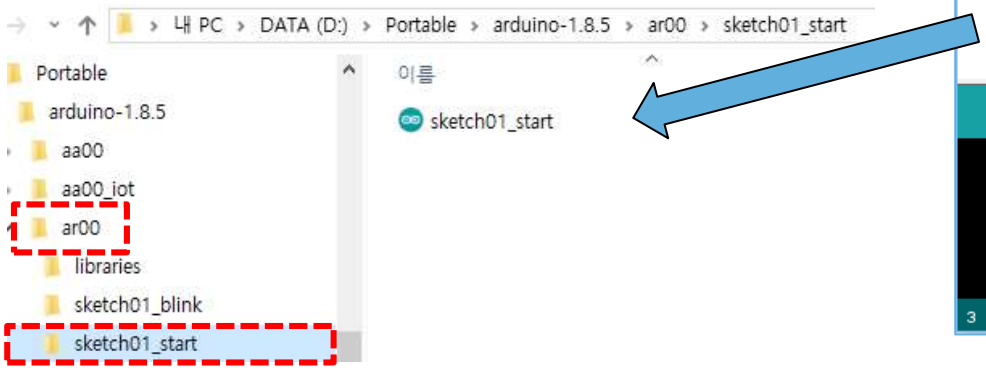

https://www.arduino.cc/

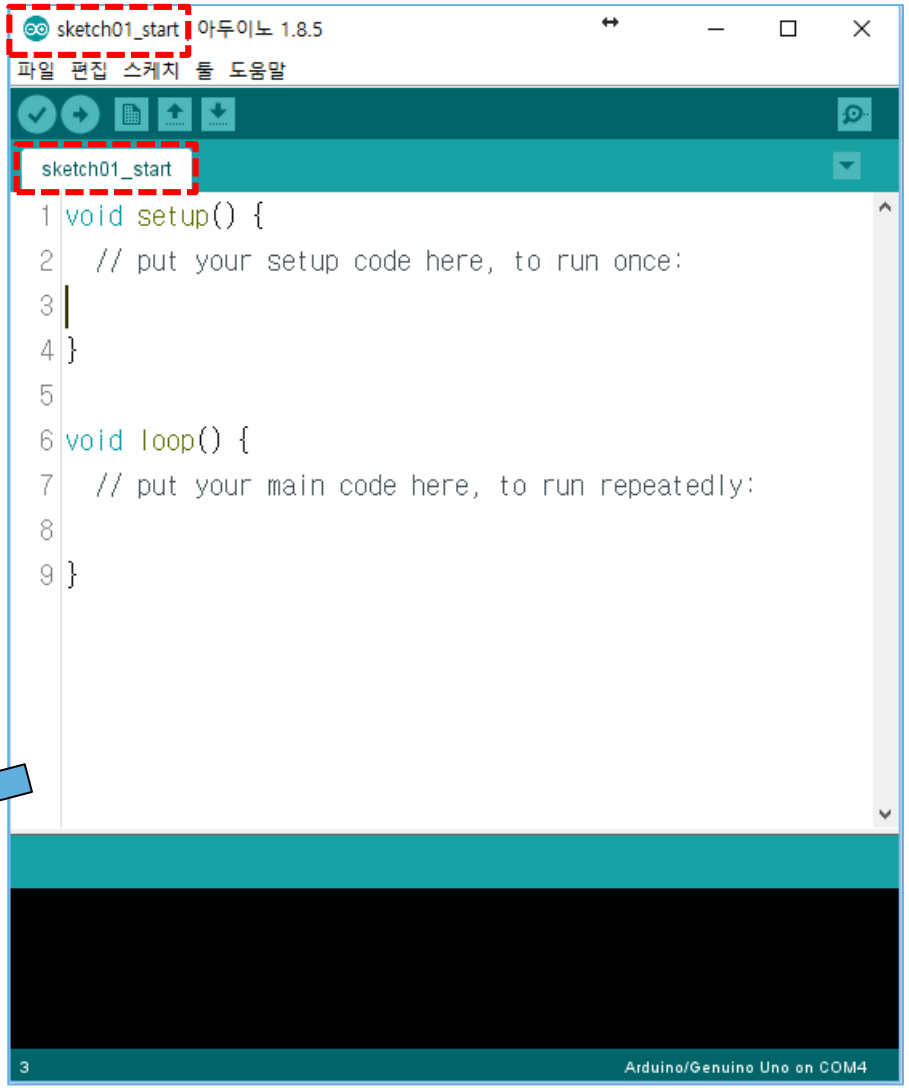
# A1.1 Arduino IDE – portable ver.

# A1.2 Arduino Portable (V1.8.5~13)

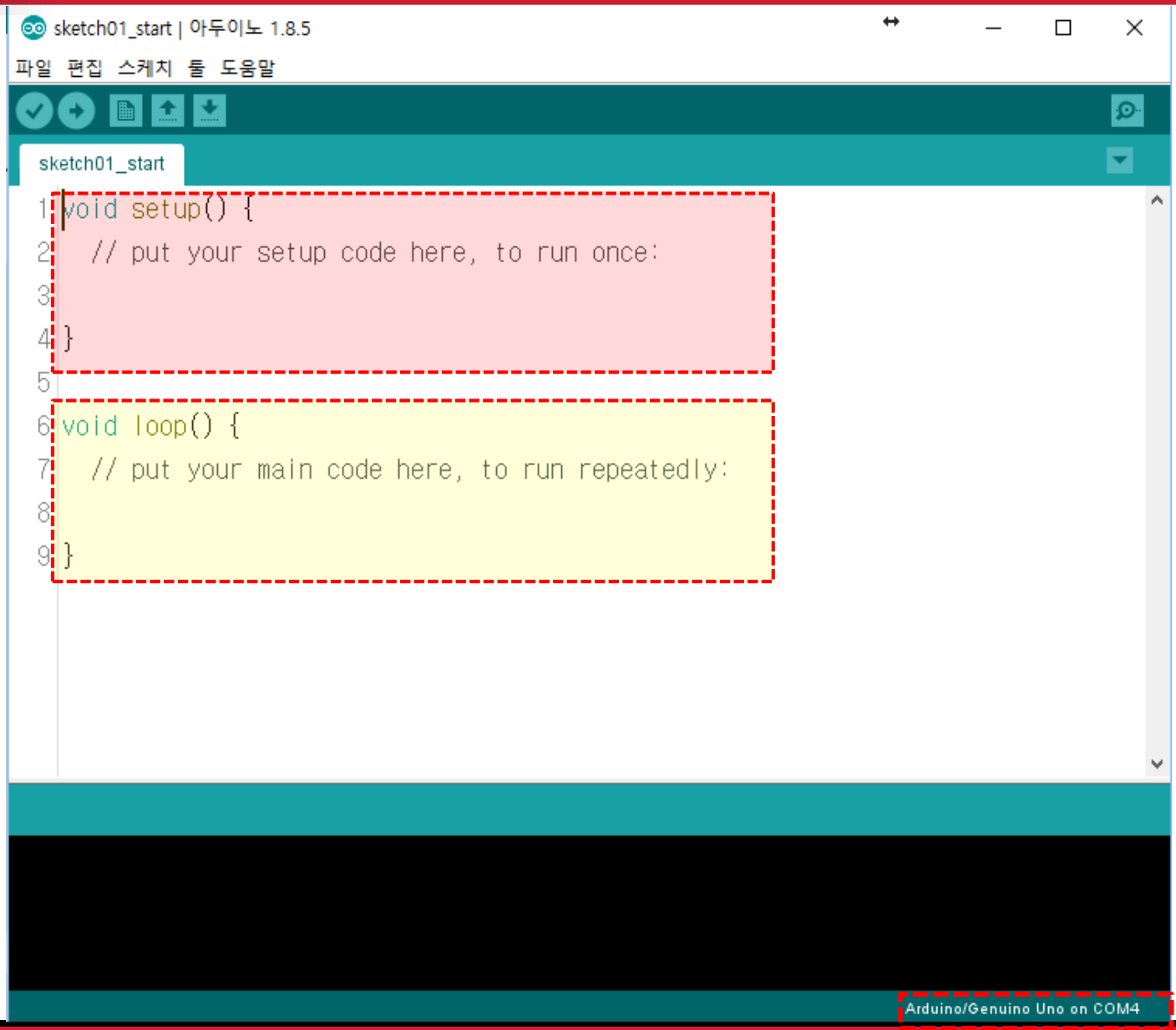
## Make folder arnn in portable Arduino folder od HDD D-drive



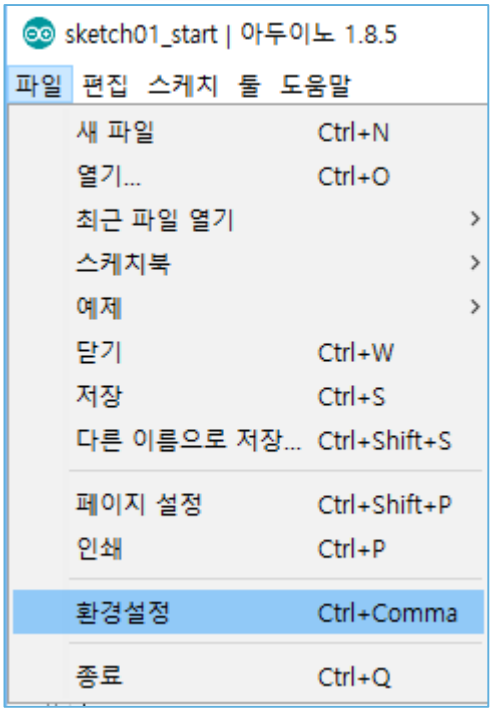



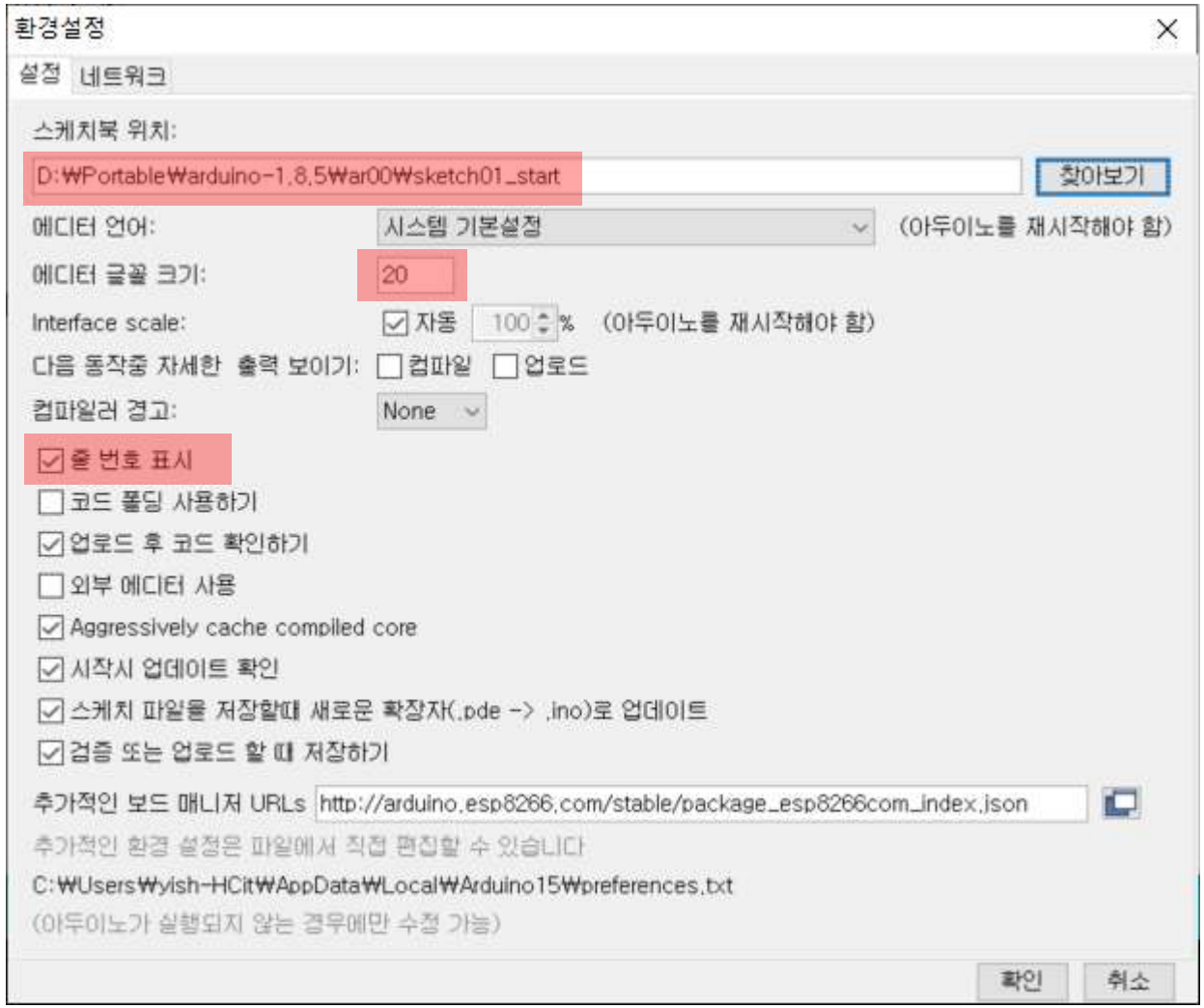



# A1.3 Arduino Portable IDE



# A1.4 Arduino Portable IDE



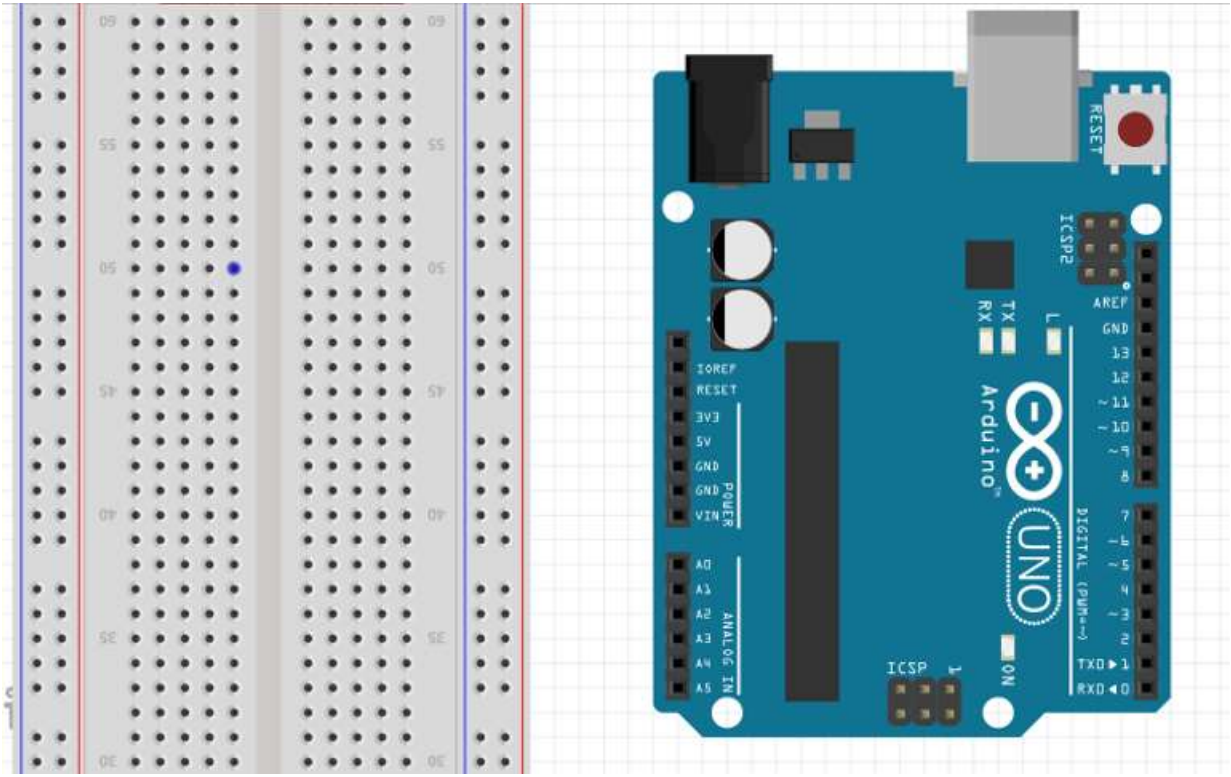



# [Practice]

- [wk01]
  - Make my Arduino

# wk01 : Practice-00 : My Arduino

- **[Target of this week - 1]**
  - **Make my arduino**



# wk01 : Practice-00 : My Arduino

- [Target of this week - 2]
  - Make my account in github.com (use google email as id)
  - Make github repo ‘arnn’

  - Email the address of your github repo to me.
  - chaos21c@gmail.com

# Lecture materials

## References & good sites

- ✓ http://www.arduino.cc Arduino Homepage
- ✓ http://www.github.com GitHub
- ✓ http://www.google.com Googling
- ✓ https://www.youtube.com Youtube