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IOT: First steps into home automation

Our road to automation

1. Getting started with Arduino
2. Let’s get communicating
3. Let’s make a networking
4. Let’s automate together

Session 1

1. Getting started with Arduino
2. Setting up IDE
3. Introduction to GPIO
4. Playing with GPIO

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Getting started with Arduino

- Programable Microcontroller
- USB (programming + power)
- DC-jack (5V power)
- Digital & Analog Inputs
- Digital & Analog Outputs
- Serial

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Getting started with Arduino

- C/C++
- 2 main functions
  - Setup
  - Loop

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Setting up IDE(s)

- Arduino IDE (Required)
  - https://www.arduino.cc/en/Main/Software
- VS Code (Recommended)
  - https://code.visualstudio.com

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Setting up Arduino IDE

- Prefference / Settings
  - Additional Boards
    - http://arduino.esp8266.com/stable/package_esp8266com_index.json
- Board Management
  - ESP8266

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Setting up Arduino IDE

http://arduino.esp8266.com/stable/package_esp8266com_index.json

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Setting up VS Code

- Extensions
  - Arduino by Microsoft

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Getting started with Arduino

```
void setup(){
  //Setup pins and serial connections
  Serial.begin(115200);
}

void loop(){
  //Do something
  Serial.println("Loop completed");
  delay(2000);
}
```

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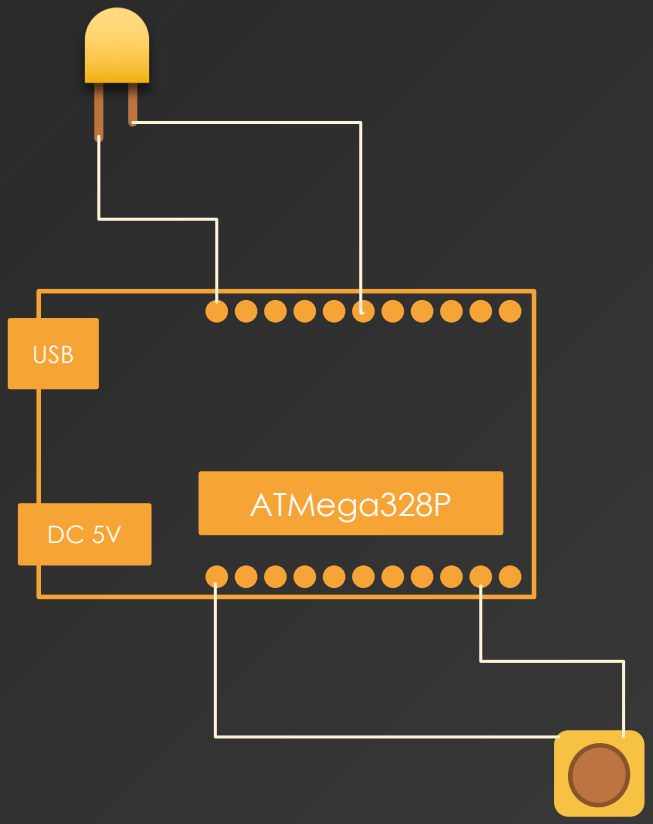
Playing with GPIO



- Blink a LED
- Ground to short arm
- Resistor (LED has 0 resistanse)
- Use pin 2
- pinMode = OUTPUT

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Playing with GPIO

```
#include "Arduino.h"
int LEDPIN = LED_BUILTIN;

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

void loop()
{
 digitalWrite(LEDPIN, HIGH);
 delay(1500);
 digitalWrite(LEDPIN, LOW);
 delay(1000);
}
```

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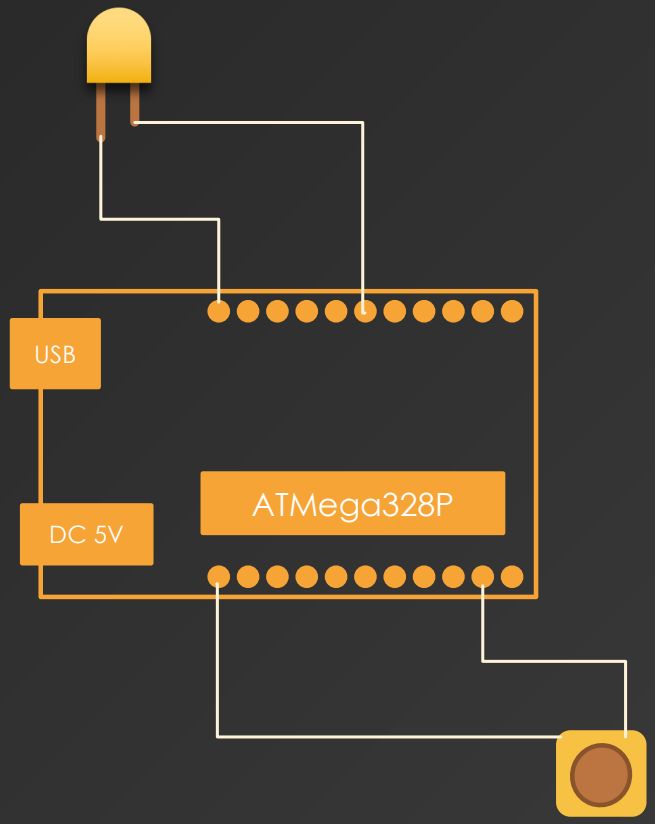
Playing with GPIO



- Toggle LED
- 5V to Switch
- Resistor (switch has 0 resistanse)
- Use pin 16
- pinMode = INPUT

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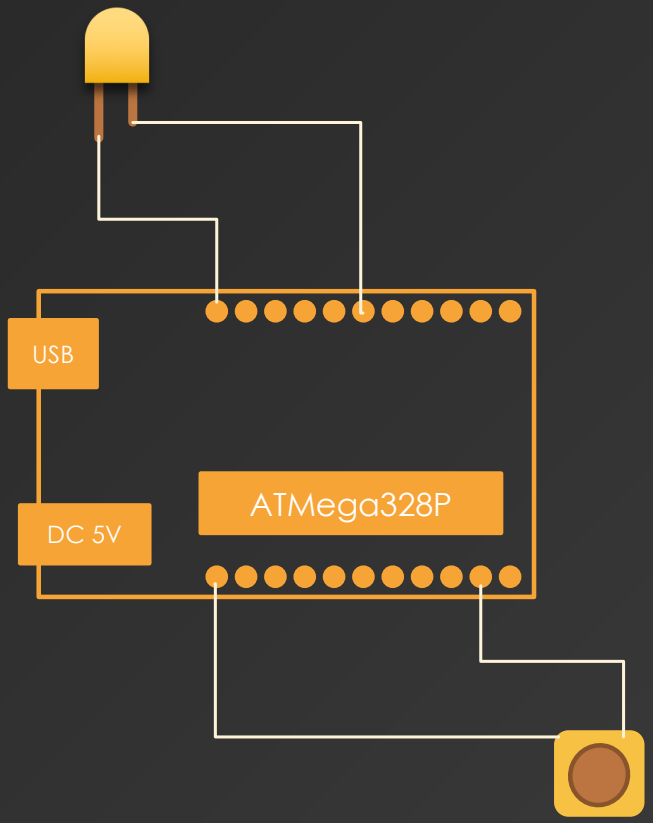
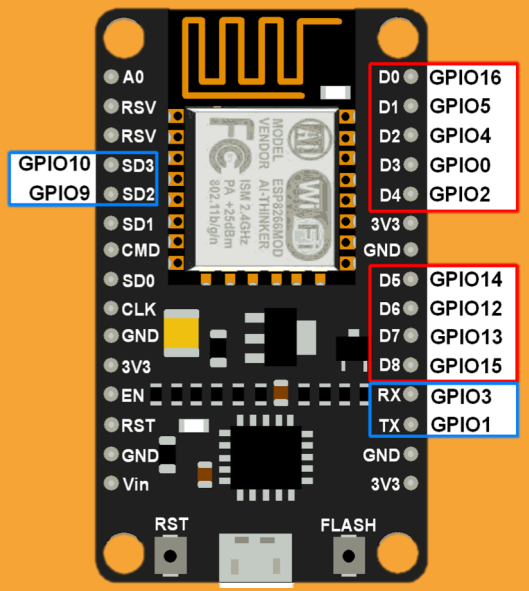
Playing with GPIO





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Playing with GPIO

```
#include "Arduino.h"
uint8_t LEDPIN = LED_BUILTIN;
uint8_t SWITCHPIN = D2;

void setup()
{
 pinMode(LEDPIN, OUTPUT);
 pinMode(SWITCHPIN, INPUT_PULLDOWN);
}

void loop()
{
 bool isOn = digitalRead(SWITCHPIN);
 digitalWrite(LEDPIN, isOn);
 delay(1000);
}
```

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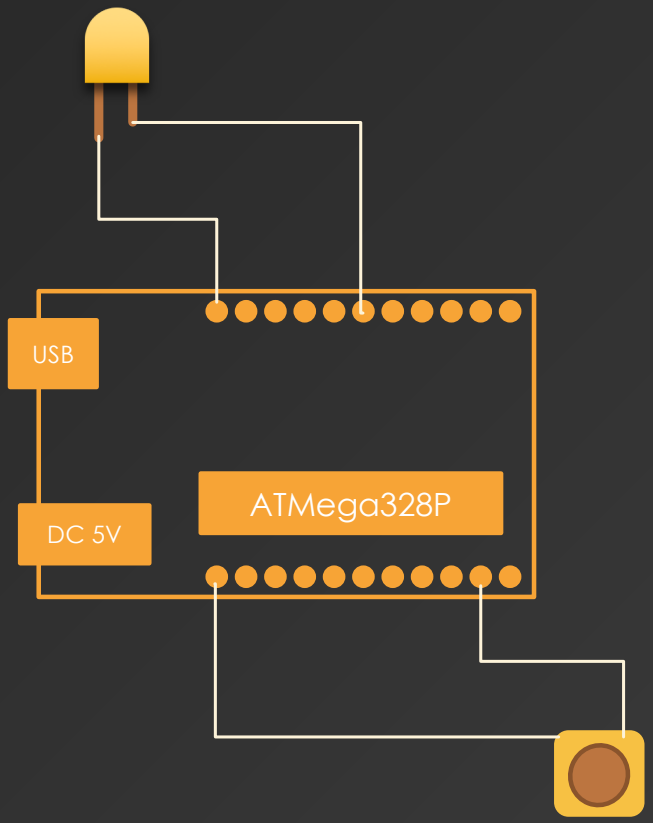
Playing with GPIO



- LED PWM
  - Adjust brightness with variable resistor
- Potentiometer or LDR
- analogRead(PIN)
- analogWrite(PIN, VALUE)

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Playing with GPIO

```
#include "Arduino.h"
uint8_t LEDPIN = LED_BUILTIN;
uint8_t SENSORPIN = D2;

void setup()
{
 pinMode(LEDPIN, OUTPUT);
 pinMode(SENSORPIN, INPUT);
}

void loop()
{
 int value = analogRead(SENSORPIN);
 analogWrite(LEDPIN, value);
 delay(100);
}
```

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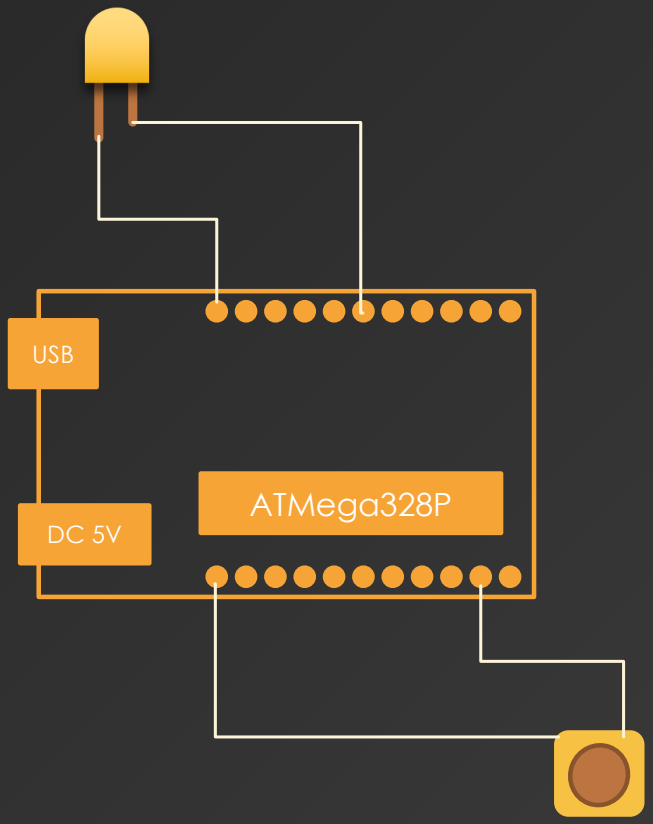
Playing with GPIO



- LED Dimmer
- Automatic light with toggle button
- Splitting code / making libraries