

# LESSON 7: PUSH BUTTON

## INTRODUCTION

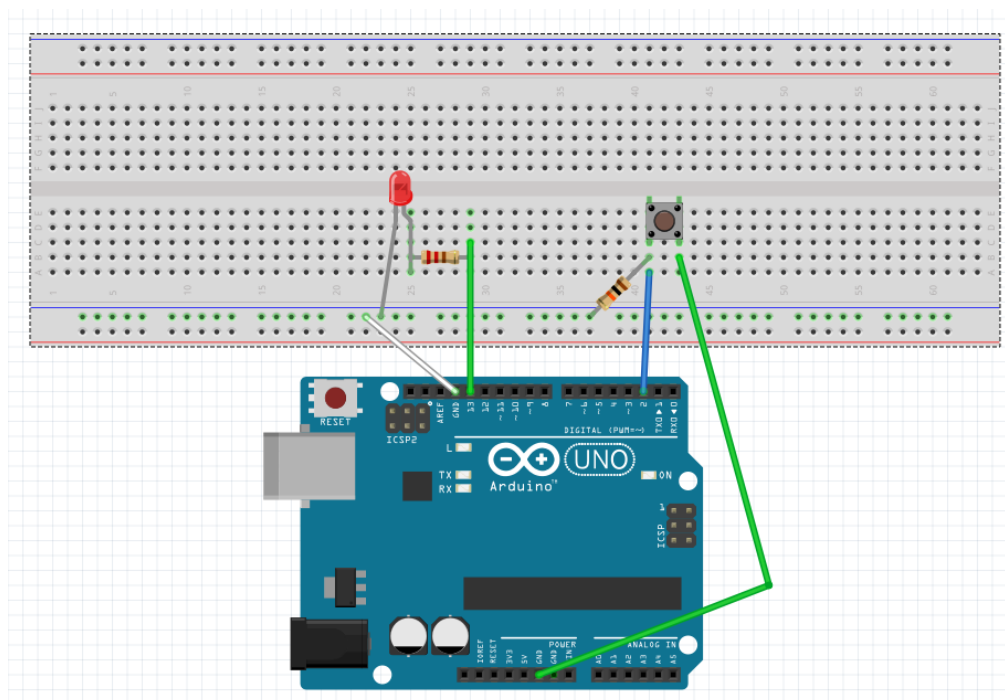
Push buttons or switches connect two points in a circuit when you press them. This example turns on one led when the button pressed, and off when the button unpressed.

## COMPONENTS

- Arduino uno
- Breadboard
- LED
- 220 Ohm & 10K Ohm resistor
- Push button
- Jumper wire

## CONNECTION

**STEP 1:** The circuit



1. Connect one of the Arduino GND pins to one of the long power rails on the breadboard – this will be the ground rail.
2. Connect the short leg of the LED to this same ground rail on the breadboard then connect the long leg to a row on the breadboard.
3. Connect the 220-ohm resistor to pin 13.
4. Place the pushbutton on the breadboard. Most buttons will straddle the center trench on the breadboard.
5. Connect a jumper wire from the 5-volt pin to one side of the pushbutton.
6. Connect a jumper wire from pin 2 to the other side of the pushbutton.
7. Connect one side of the 10k resistor from the ground rail on the breadboard to the other side to the pushbutton – on the same side that pin 2 connects.

## STEP 2: Program

```
// constants won't change. They're used here to
// set pin numbers:
const int buttonPin = 2; // the number of the pushbutton pin
const int ledPin = 13; // the number of the LED pin

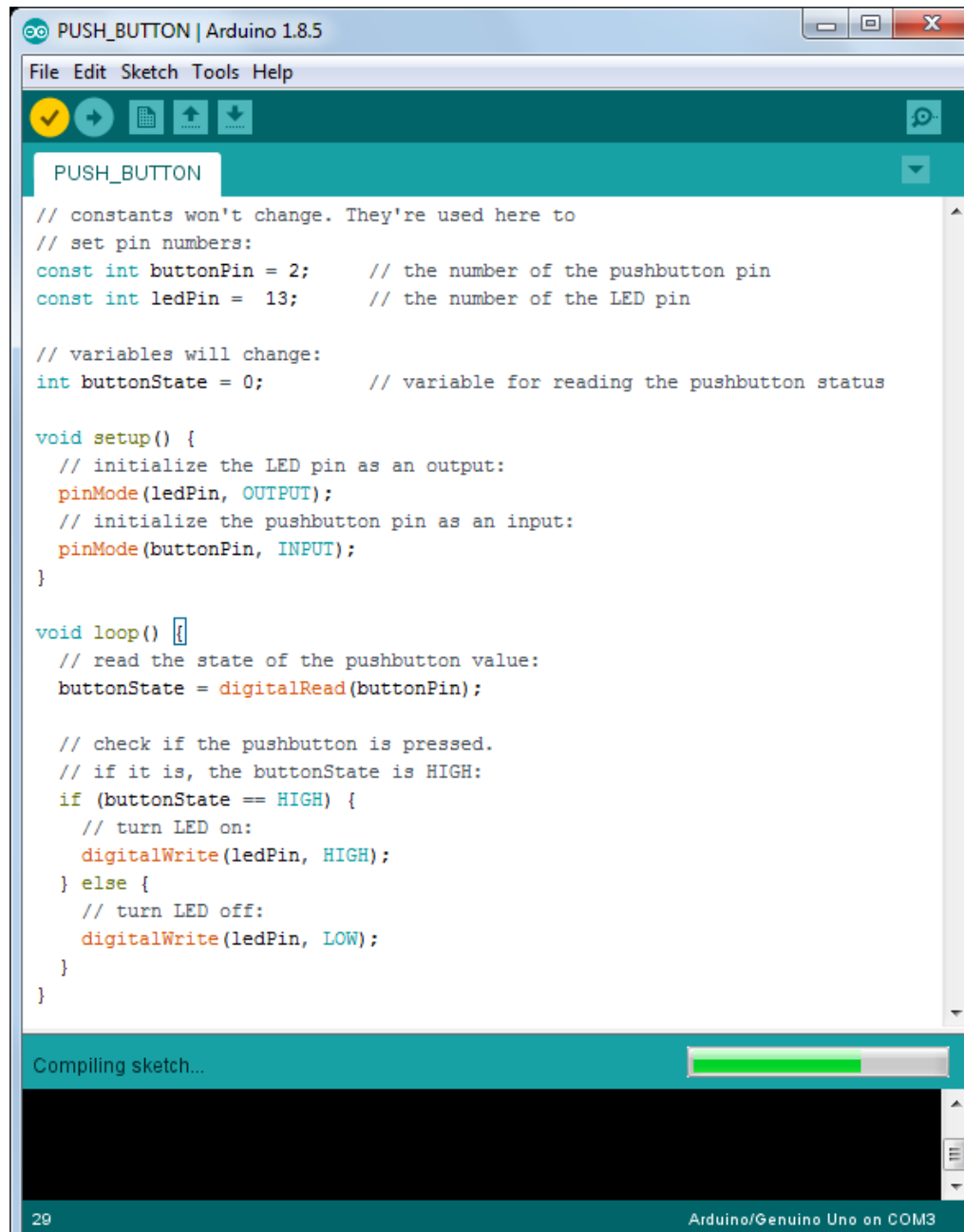
// variables will change:
int buttonState = 0; // variable for reading the pushbutton status

void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  // initialize the pushbutton pin as an input:
  pinMode(buttonPin, INPUT);
}

void loop() {
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);

  // check if the pushbutton is pressed.
  // if it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(ledPin, HIGH);
  } else {
    // turn LED off:
    digitalWrite(ledPin, LOW);
  }
}
```

**STEP 3:** Compile the code. Click the Verify button on the top left. It should turn orange and then back to blue.



```
Arduino IDE - PUSH_BUTTON | Arduino 1.8.5
File Edit Sketch Tools Help
PUSH_BUTTON
// constants won't change. They're used here to
// set pin numbers:
const int buttonPin = 2;    // the number of the pushbutton pin
const int ledPin = 13;     // the number of the LED pin

// variables will change:
int buttonState = 0;       // variable for reading the pushbutton status

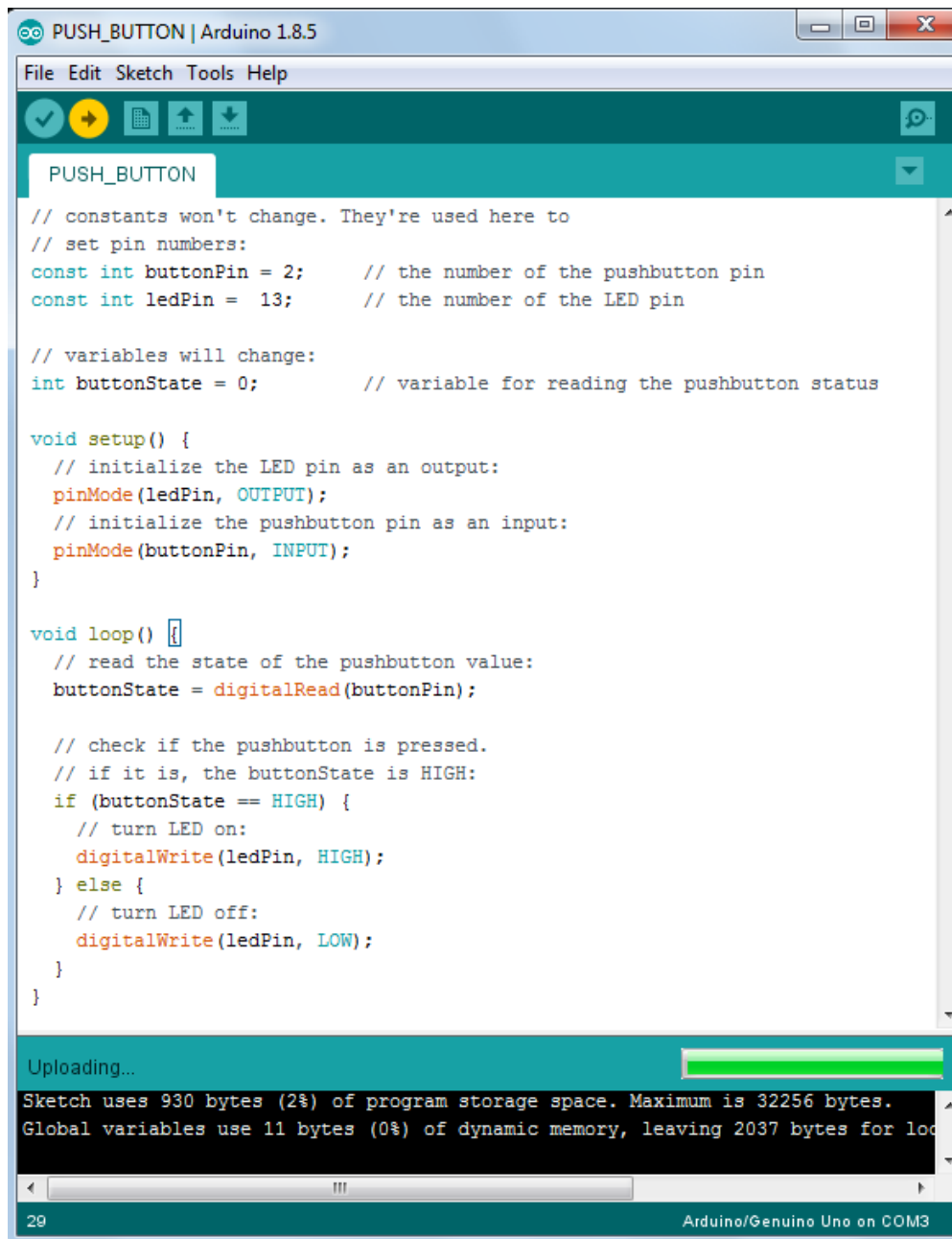
void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  // initialize the pushbutton pin as an input:
  pinMode(buttonPin, INPUT);
}

void loop() {
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);

  // check if the pushbutton is pressed.
  // if it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(ledPin, HIGH);
  } else {
    // turn LED off:
    digitalWrite(ledPin, LOW);
  }
}

Compiling sketch...
29 Arduino/Genuino Uno on COM3
```

**STEP 4:** Upload the sketch to Arduino UNO board. Click the Upload button. It will also turn orange and then blue once the sketch has finished uploading to your Arduino board.



The screenshot shows the Arduino IDE interface with the sketch 'PUSH\_BUTTON' open. The code is as follows:

```
// constants won't change. They're used here to
// set pin numbers:
const int buttonPin = 2;    // the number of the pushbutton pin
const int ledPin = 13;     // the number of the LED pin

// variables will change:
int buttonState = 0;       // variable for reading the pushbutton status

void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  // initialize the pushbutton pin as an input:
  pinMode(buttonPin, INPUT);
}

void loop() {
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);

  // check if the pushbutton is pressed.
  // if it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(ledPin, HIGH);
  } else {
    // turn LED off:
    digitalWrite(ledPin, LOW);
  }
}
```

At the bottom of the IDE, the upload progress bar is shown with the text "Uploading...". Below the progress bar, the following information is displayed:

```
Sketch uses 930 bytes (2%) of program storage space. Maximum is 32256 bytes.
Global variables use 11 bytes (0%) of dynamic memory, leaving 2037 bytes for local
```

The status bar at the bottom indicates "29" and "Arduino/Genuino Uno on COM3".

**RESULT:** When the pushbutton is open (unpressed) there is no connection between the two legs of the pushbutton, so the pin is connected to ground (through the pull-down resistor) and we read a LOW. When the button is closed (pressed), it makes a connection between its two legs, connecting the pin to 5 volts, so that we read a HIGH.