

Arduino

Task 2:

Make changes in the first code such that the LED toggles when you press the pushbutton. The change should take place the moment we leave the pushbutton free . For eg, if we press and hold the pushbutton for two seconds then the toggle should take place the moment we leave the button.

```
1  int buttonPin = 2;
2  int ledPin = 3;
3
4  int buttonState = 0;
5  int lastButtonState = 0;
6  int ledState = 0;
7
8  void setup() {
9      pinMode(buttonPin, INPUT);
10     pinMode(ledPin, OUTPUT);
11 }
12
13 void loop() {
14     buttonState = digitalRead(buttonPin);
15
16     // Detect when button is RELEASED (HIGH -> LOW)
17     if (buttonState == LOW && lastButtonState == HIGH) {
18         ledState = !ledState;
19         digitalWrite(ledPin, ledState);
20         delay(200); // debounce delay
21     }
22
23     lastButtonState = buttonState;
24 }
25 |
```

The components used and Circuit diagrams are the same as the ones shown in task 1, so here I'll just be explaining the code and working.

Code:

As we can see the only difference in both this code and the code in task one are

Line 16 from the code of task 1: `if (buttonState == HIGH && lastButtonState == LOW)` and

Line 17 from the code of task 2: `if (buttonState == LOW && lastButtonState == HIGH)`.

Lemme explain what's happening here and why. So in code 1 the compiler is detecting 'Rising Edge' condition, in the sense it's detecting the change when you are actually pressing the button. LED state high when button is pressed means the LED toggles as soon as the button is pressed, and nothing will happen if you hold the button pressed unless the button is pressed again. But in code 2 the compiler is detecting 'Falling Edge' condition, in the sense it's detecting the change when you are releasing the button after pressing the button. LED state low when the button is released means the LED toggles when you release the button is released after the press, you can press it as long as you want to but the change will happen only when you let the button go. (In arduino, when the button is pressed it reads it as HIGH(1) and when the button is released it reads it as LOW(0).

Working Principle:

So, the ultimate working principle is; when the button is pressed, the arduino reads it as high on the pin 2, and when the button is released, it transits from HIGH to LOW. Arduino will detect this transition change and then it toggles the LED state. The `delay(200)` ensures debouncing, preventing multiple toggles due to switch noise.

Tinkercad link:

<https://www.tinkercad.com/things/4n7rSodoQ34-led-on-off?sharecode=Jcnib2Qv1Sql8NMJaVQn1NSiV9U02sDNGJUx1B4OJYY>

THANK YOU

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