# DHA SUFFA UNIVERSITY

MEASUREMENT & INSTRUMENTATION LAB
ME-3103L

## Lab # 06
## Push Button with LED

**Name:** _____ **Reg. #** M E - __ __ __ __ __ __

**Class:** _____ **Section:** _____ **Max Marks:** 20

## INSTRUCTIONS

I. Submit all the lab tasks and post lab tasks printed on A4 paper with **question**, **code**, **picture** and **schematic** of circuit, stapled together with lab manual and filled rubrics.
II. Explain the code by adding **comments**. Marks will be **deducted** for programs without explanation.
III. The due date of submission is exactly **7 days after performing the lab.**
IV. Reports handed **after the deadline** will not be considered.
V. It is always good to mention your name, ID and page # on each page.

## OBJECTIVE

To understand the working of push buttons and perform the measurement on serial monitor using Arduino.

## EQUIPMENT

- 1 x Arduino Uno (w/ USB cable)
- 1 x Breadboard
- Jumper Wires
- 1 x LED
- 2 x 1k Ohm Resistors
- 1 x Push Button

## COMMANDS

- **Change Status of an LED**
  Status = !Status;

- **Counter Operator**
  Count++;

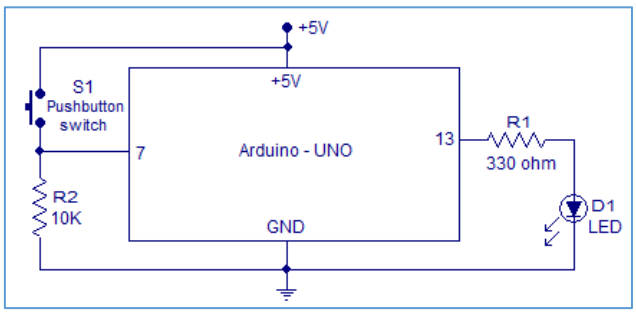
- **Switch Case**
  Switch (expression){
  Case 1;
  …}

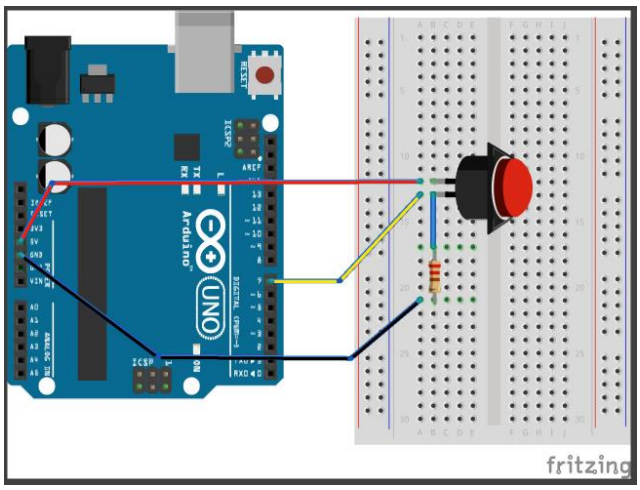
## SCHEMATIC AND WORKING OF THE SENSOR

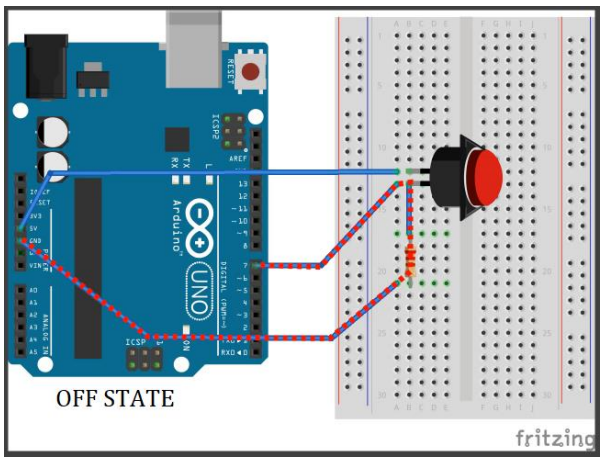
In this experiment let us see how we can use the digital pin to read the state of a push button. In the circuit, one terminal of the push button is connected to 5V pin and the other terminal is connected to the 1k ohm resistor which is further connected to the ground pin. The other terminal is also connected to pin 7 which is used to read the state of a push button as it is turned ON and OFF.

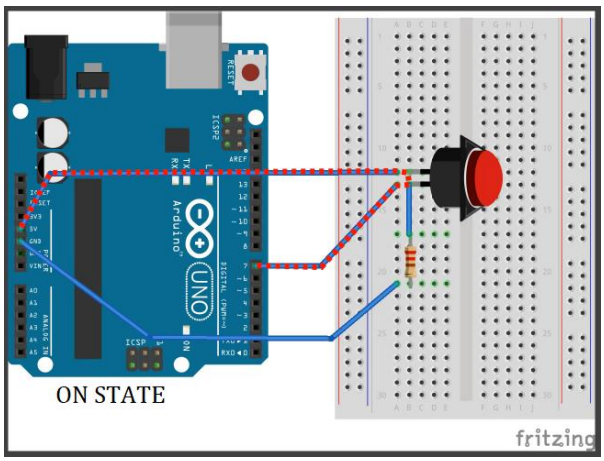
Here we have two scenarios. In the first scenario, when the push button is NOT pressed, it is in the OFF state. Which means there is no path for the current to flow through it as it has infinite resistance. Therefore, all the current will flow through the path of 1k ohm resistor (refer to OFF state schematic) connected to the ground and the output read by pin 7 will display LOW or 0V.

In the second scenario, when the push button is pressed, it is in the ON state. Which means that the current gets the path to flow and the current will choose the LEAST resistive path (refer to ON state schematic) through the button terminal connected to 5V rather than going to the highly resistive 1k ohm path and the output read by pin 7 will display HIGH or 5V.



## LAB TASKS

**Q1)** Develop the program to read the state of a push button. Watch serial monitor and take screenshot of both states. Add them in your lab report as our regular exercise.

**Q2)** Develop a simple counter which displays the “number of times the push button is pressed”. Using snipping tool, add the screenshot in your lab report when the counter value is 10.

**Q3)** Develop the program which changes state of an LED by using a single reset push button (i.e. when the button is pressed, the LED should turn ON and when the button is pressed again, it should turn OFF).

## POST LAB TASKS

**Q1)** Suggest a real life example of controlling an LED or any other instrument with the help of a push button.

**Q2)** If you want to develop a program that consist of 3 LEDs and 1 push button such that when button is pressed, LED 1 turns ON. When the button is pressed again, LED 2 turns ON and LED 1 turns OFF at the same time and so on for the LED 3. This can be easily achieved by using SWITCH CASE structure.

Write down the syntax and code for above problem statement by using SWITCH CASE. Only write case structure.