Control Three LED’s using a Push button switch

Introduction

ATmega328 is an eight bit AVR (Advanced Virtual RISC) based microcontroller.It is a powerful microcontroller with a built-in internal memory of around 32Kb.Most Arduino boards consist of an Atmel 8-bit AVR microcontroller with varying amounts of flash memory, pins, and features. Arduino Uno is a microcontroller board based on the ATmega328.

AVR microcontrollers are very easy to use. All AVR microcontrollers require Integrated Development Environment(IDE) such as Atmel Studio. Using this IDE, we can create, compile and debug program on all AVR microcontrollers.

About Project and Working

Here we are going learn how to control the working of three LED’s using a push button switch. first we will connect the 3 LEDs with PB1 PB2 and PB3 of PORTB of the microcontroller. A push button switch is then attached to PB0 pin and pulled-up using a 10K resistor. The remaining terminal of the switch is grounded. The function of a pull-up resistor is to insure that while leaving the switch as not pressed, the status of the PB0 pin should remain high. There are 20K pull-up resistors built into the ATmega chip that can be accessed from software also. But here we are using an external pull-up circuit. When the switch is pressed, the three LED’s will glow and will turn off while we release the switch. This is how the circuit will work.

Objective

For one set of LED and the Push button, when button is pressed LED is set ON and when the button is released, LED will be set OFF. for the other set, its the opposite effect.

components

- Atmega 328 microcontroller
- LED
- Resistors (330 ohm) and (10 kilo ohm)
- Push buttons
- Fixed Volt
- Ground Resistor (0v)

- Push Button
- A Push Button is a type of switch work on a simple mechanism called “Push-to-make”. Initially, it remains in **off state or normally open state** but when it is pressed, it allows the current to pass through it or we can say **it makes the circuit when pressed**. Normally their body is made up of plastic or metal in some types.
- Push Button structure has four legs, two on one side and other two on another side. So, we can operate two lines of the circuit by single Push Button. Two legs on both the sides are internally connected as shown in the figure above.