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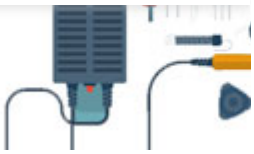

ARDUINO

Make Your Own Arduino Board by using Atemga328 IC – A DIY

by Sarah Yasin | December 31, 2018 | 2 comments

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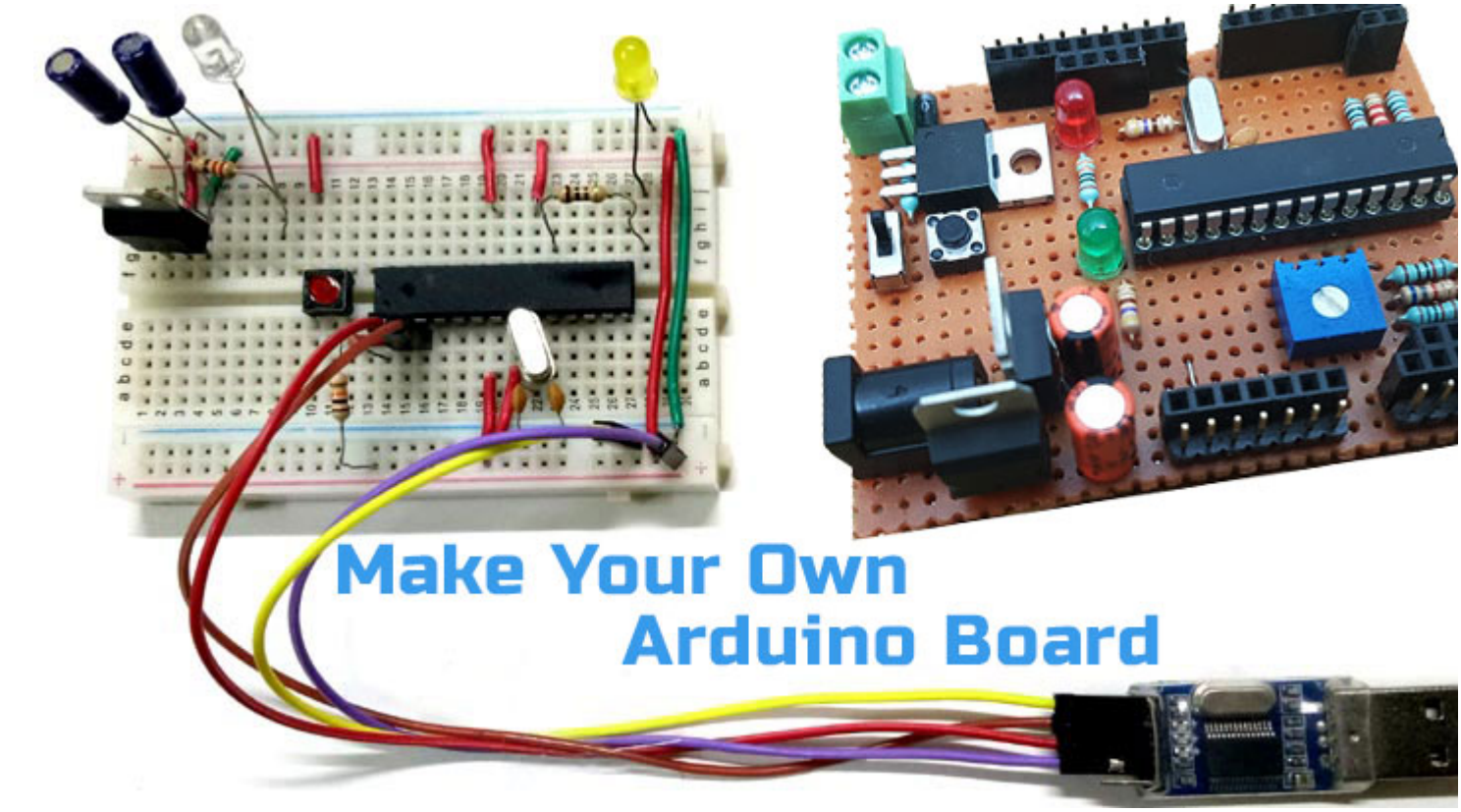
Atmega328 IC is the brain of the Arduino board. Arduino board is popular for use in pro but is not suitable for industrial use. Instead, we can use Standalone Atmega328 IC which be programmed with Arduino IDE without using the Arduino board. In this project, we w replacing the Arduino board with Atmega328 IC and other components. First, we will hav burn the Arduino Bootloader and then program it using FTDI or Arduino board.



Components Required:

- Atmega328 IC

- 22pF ceramic capacitors (2)
- 10uF capacitor(2)
- 10 K resistor
- 1k resistor
- Jumper wires

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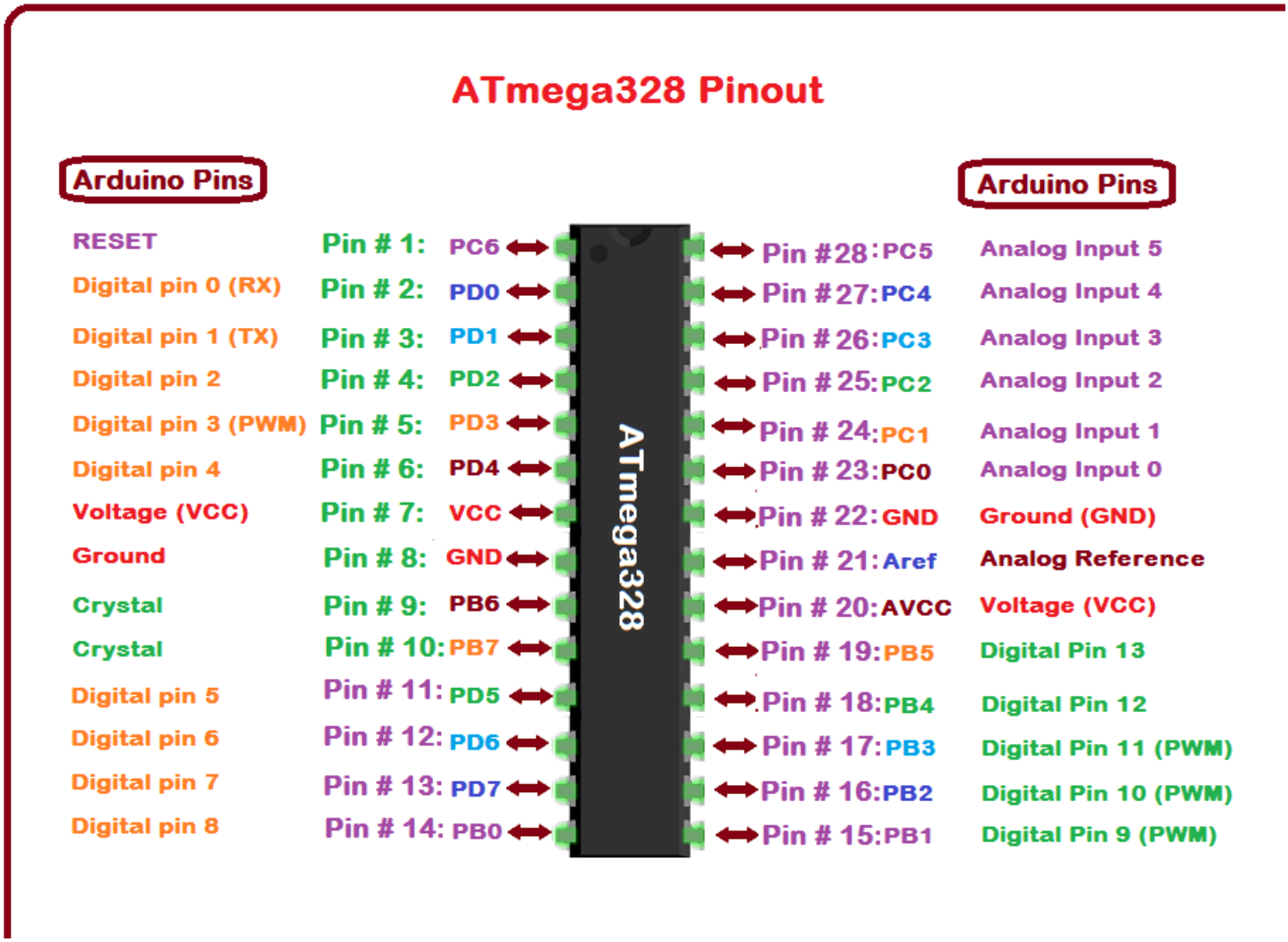
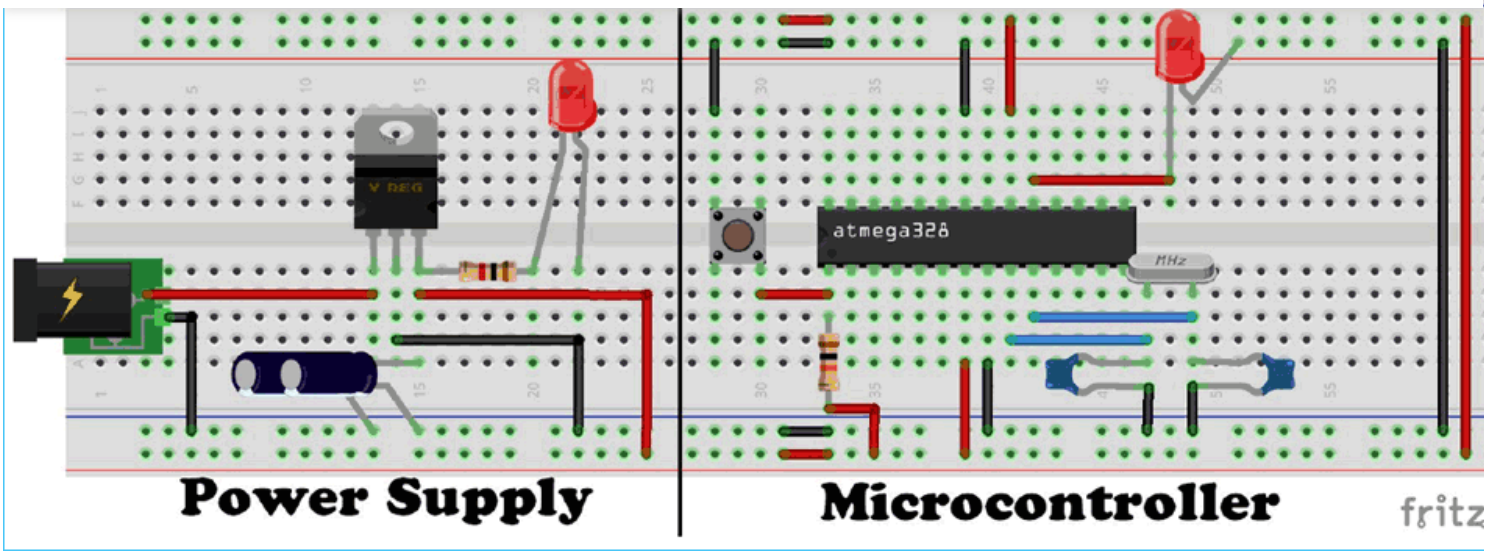
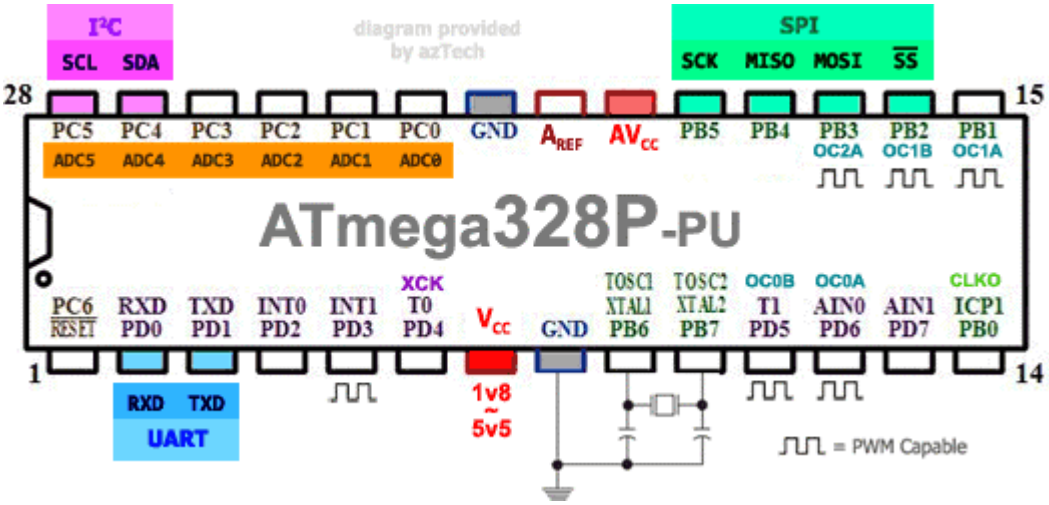
Pin Diagram of Atmega328







1: Power supply part:

We are using LM7805 to get 5V output as the Atmega328 IC runs of 5V power supply. Th to keep the voltage regulated, however, if you have a 5V supply, leave this step. A capacitor is used at input and output of LM7805 to bypass any AC component to ground. 5V output will be shown by the LED used.

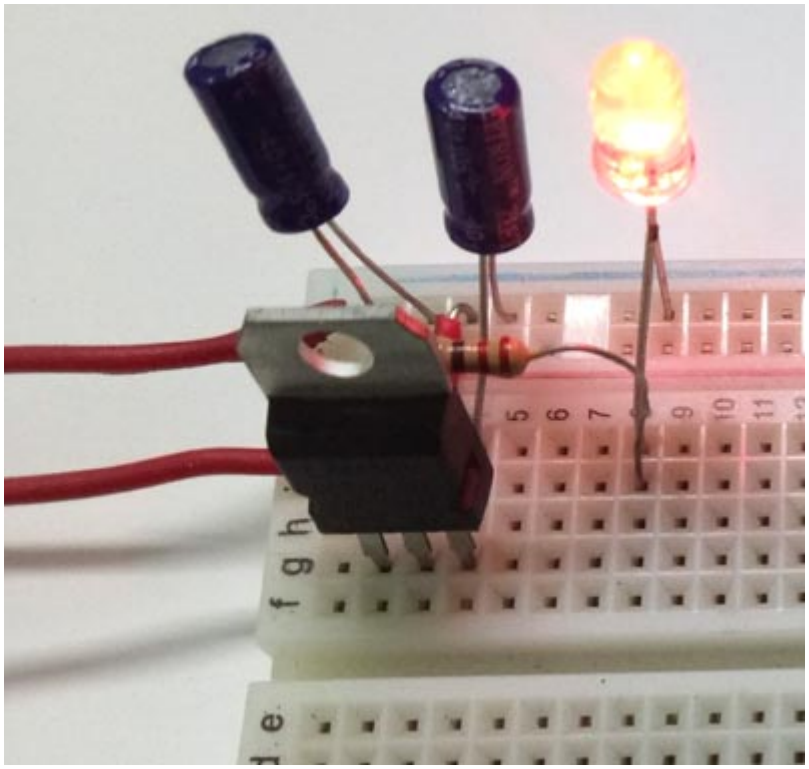
2: Microcontroller part:

The Atmega328 is the main component on our breadboard. Connect a 16MHz external cr

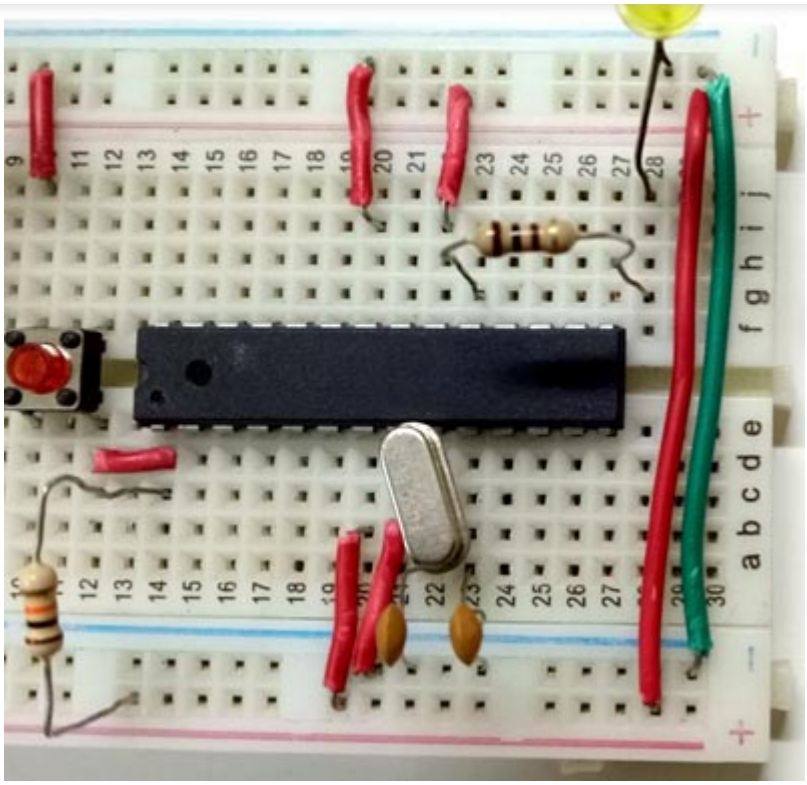
Making your Own Arduino Running on Breadboard:

1: Building the Arduino Circuit on Breadboard:

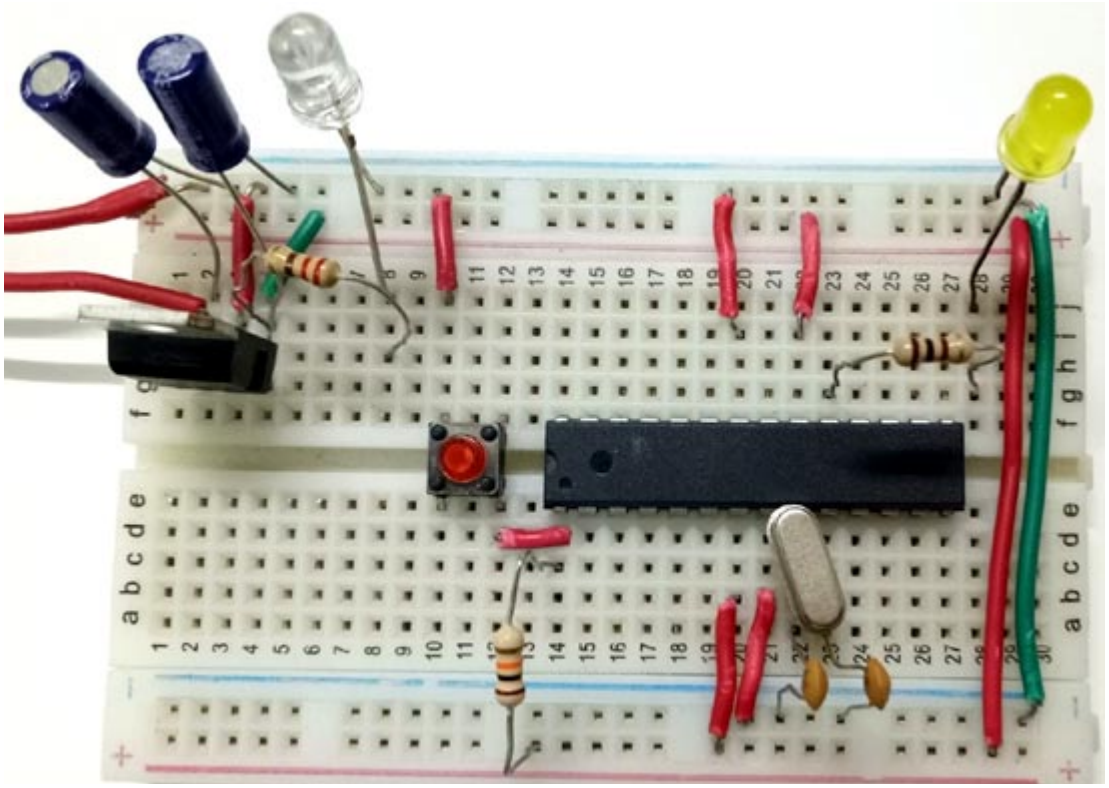
Connect the power supply part and testis using external power supply to LM7805.



Next connect the microcontroller components. Make sure to test the connections carefully.



Now, connect the microcontroller part and power supply using jumpers. This is our Arduin the breadboard.

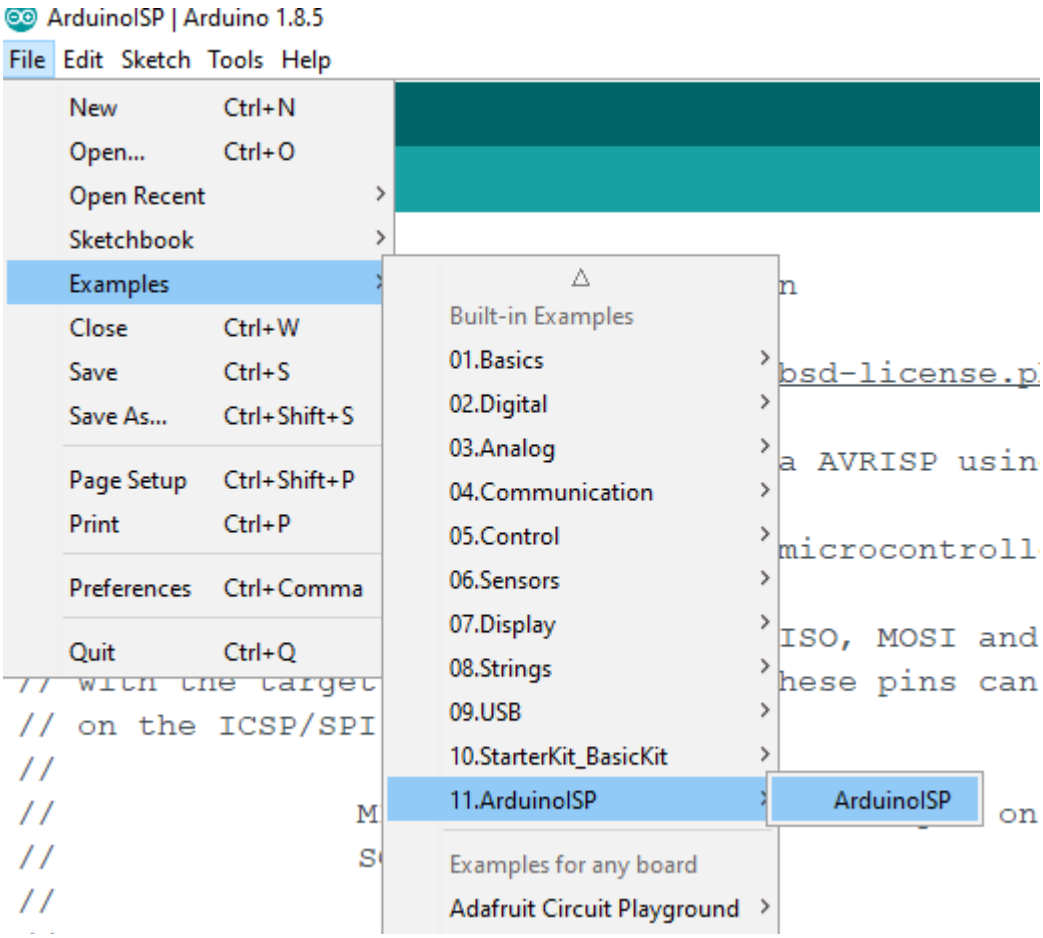


2: Burning the Bootloader into Atmega328 IC:

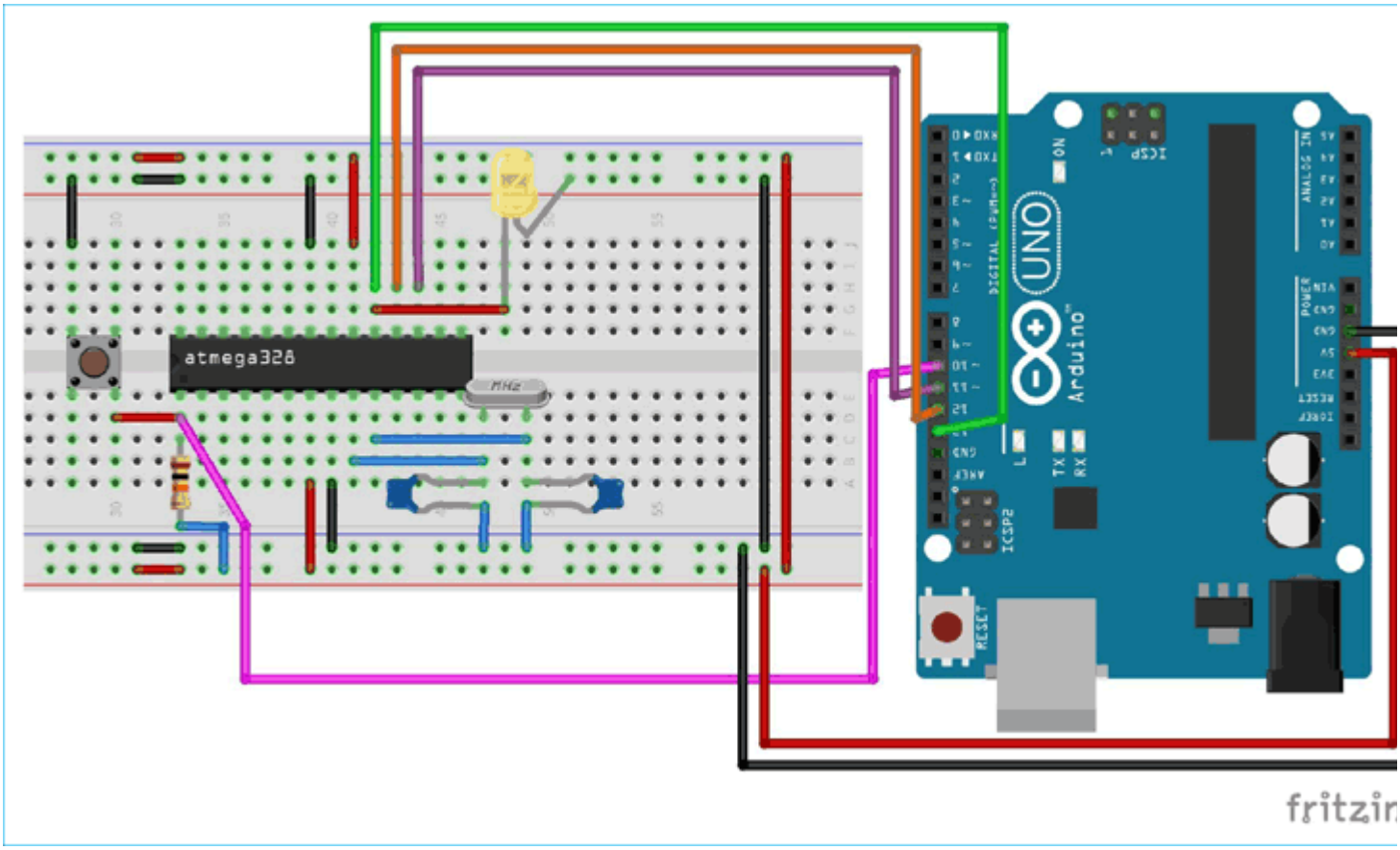
A bootloader is an executable code which is stored in the microcontroller's memory. I allow the IC to accept code form the PC and store it in the microcontroller's mer Bootloader also reduces complexity and allows for easier programming of the microcontr In other words, you can program it just by using a USB cable. The Atmega328 does not a bootloader so first, we will upload the bootloader. We can either use USBasp programm the Arduino UNO board to upload the bootloader. Arduino UNO is easier to use so we wil this method.

Upload the Arduino Bootloader in Atmega328 Chip:

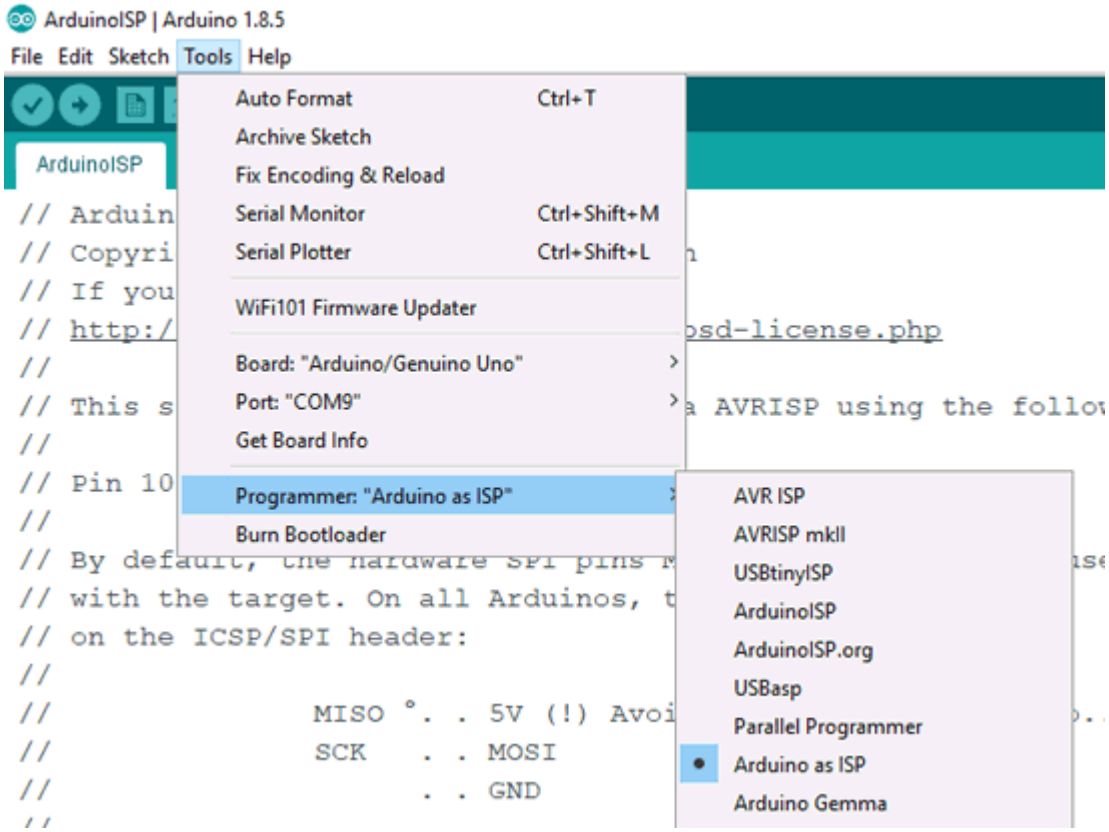
First, open Arduino IDE. Go to File>Examples>ArduinoISP.



your Arduino board from the computer and connect it with Atmega328.



Next, reconnect the Arduino with the computer and open Arduino IDE. Go Tools>Programmer as “Arduino as ISP”> Arduino as ISP.



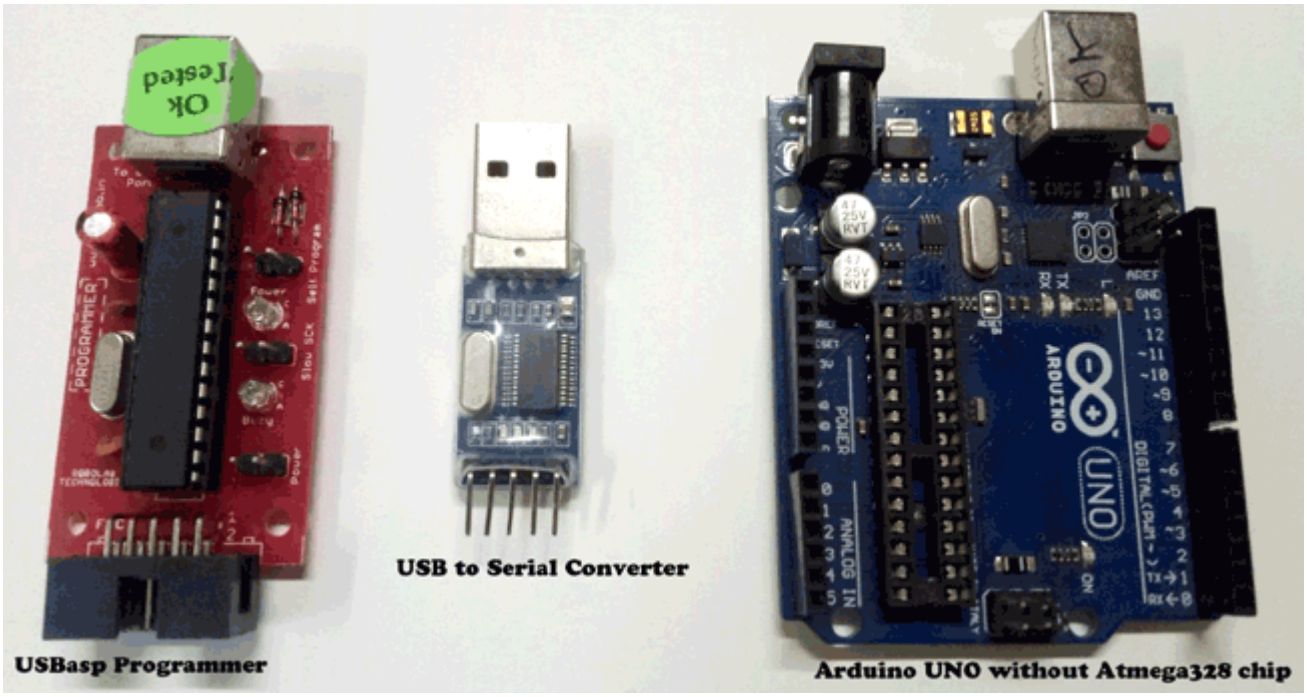
Next go to Tools again and select “Burn Bootloader” below the programmer option. bootloader is now uploaded, check for errors in uploading.

```
// Copyright (c) 2008-2011 Randall Bohn
// If you require a license, see
// http://www.opensource.org/licenses/bsd-license.php
//
// This sketch turns the Arduino into a AVRISP using the following Arduino pins:
//
// Pin 10 is used to reset the target microcontroller.
//
// By default, the hardware SPI pins MISO, MOSI and SCK are used to communicate
// with the target. On all Arduinos, these pins can be found
// on the ICSP/SPI header:
//
//               MISO °. . 5V (!) Avoid this pin on Due, Zero...
//               SCK   . . MOSI
//                     . . GND
//
// On some Arduinos (Uno,...), pins MOSI, MISO and SCK are the same pins as
// digital pin 11, 12 and 13, respectively. That is why many tutorials instruct
// you to hook up the target to these pins. If you find this wiring more
// practical, have a define USE_OLD_STYLE_WIRING. This will work even when not
```

Done burning bootloader.

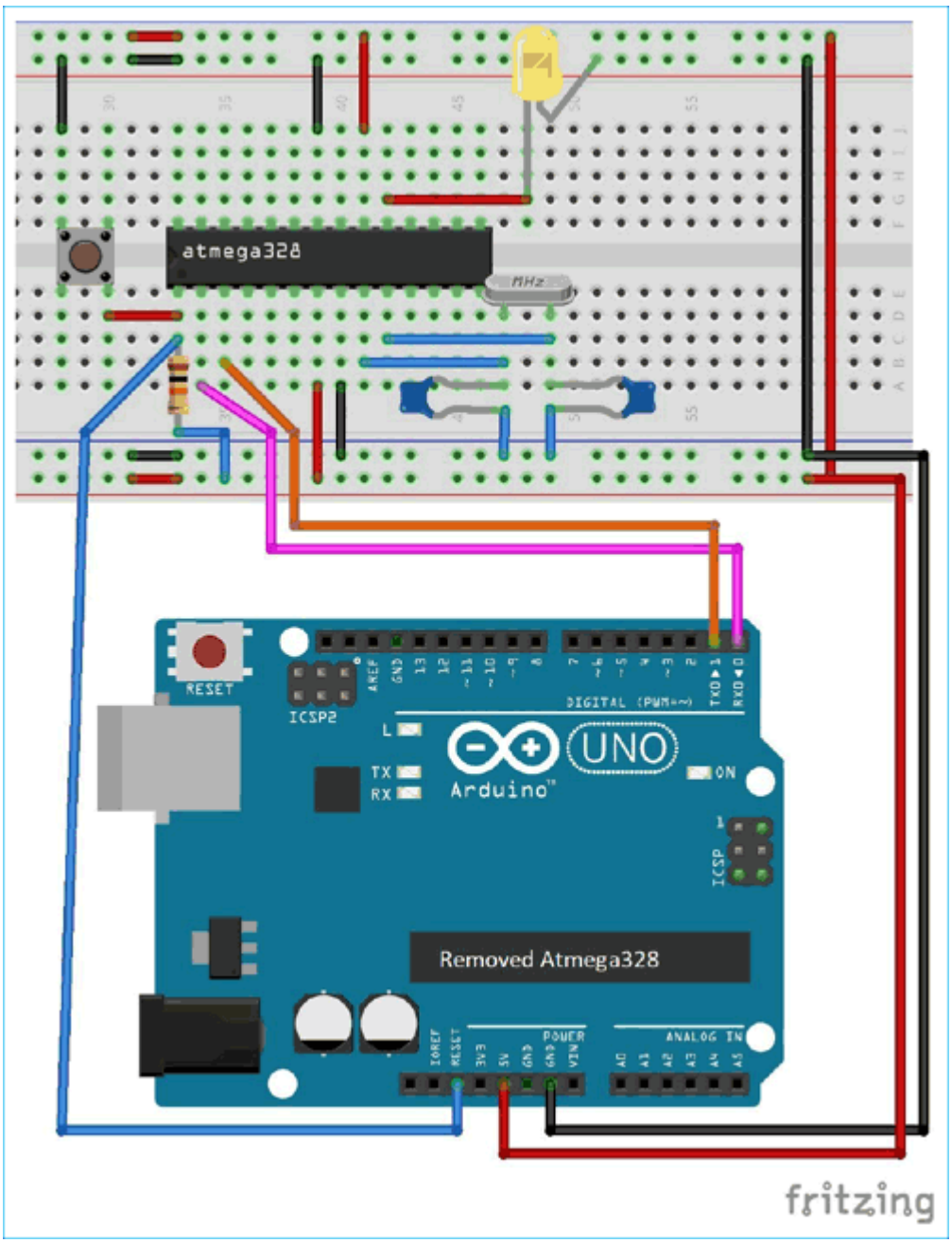
How to Program Arduino Bootloader uploaded Atmega 328 IC:

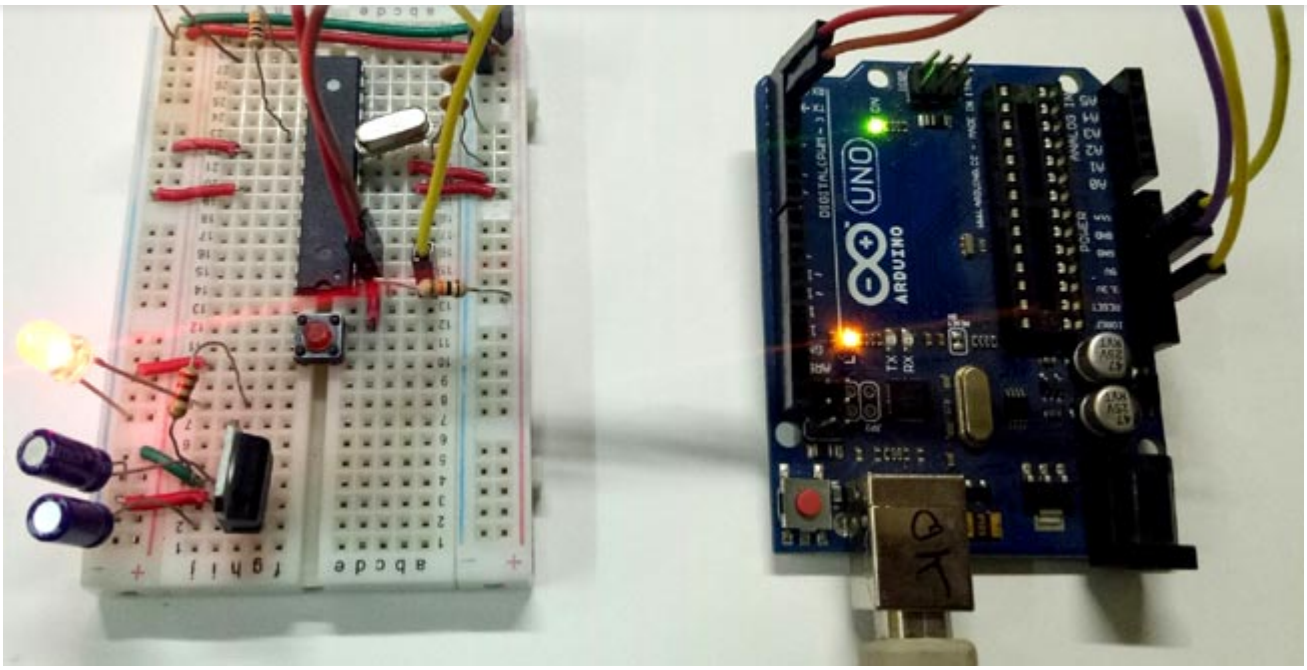
There are several ways to program the Arduino Atmega328. We will show you two methoc



1: Programming Atmega328 Chip using Arduino board:

and choose Arduino Uno from the Board menu, select programmer as USBasp and selec com port of the board. Next, choose the blink program from Examples and select Upload. will observe that the LED on the breadboard will start blinking.





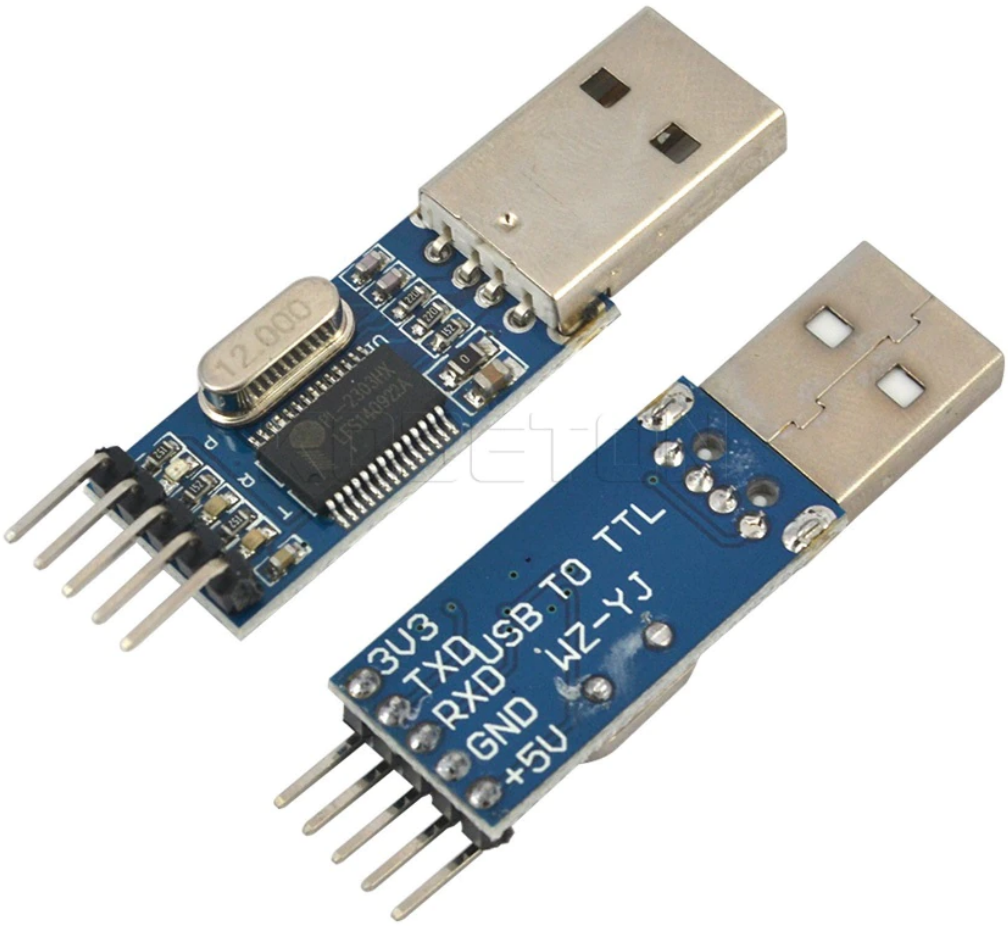
2: Programming Arduino Atmega328 Chip using USB to Serial converter:

This method is useful if you do not have an Arduino board. First, make the neces connections. Connect the

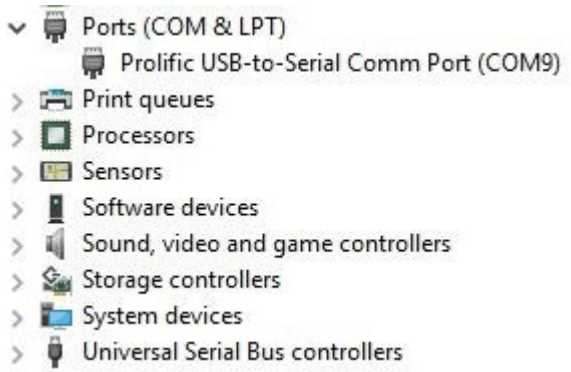
RXD pin of FTDI to Tx pin (pin3) of Atmega328,

the TXD pin of FTDI to Rx pin (pin 2),

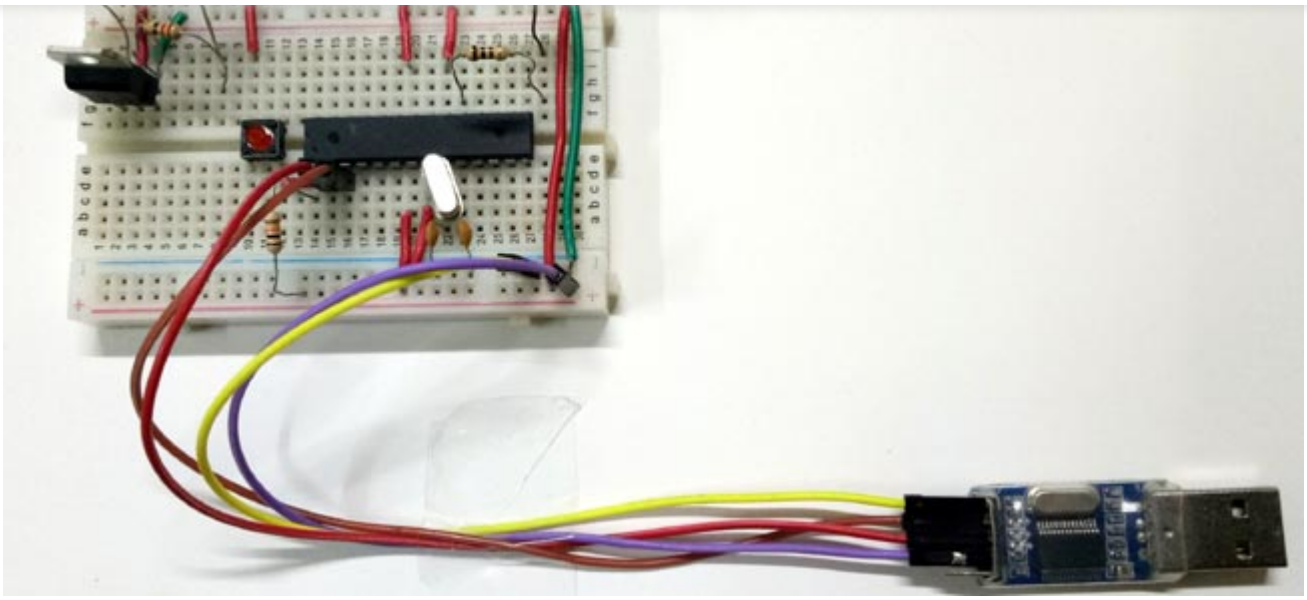
GND to GND (pin 8) and 5V to Vcc (pin 7).



Next, connect the FTDI with a computer and go to Device Manager in the control panel expand your Port section. Go to Tools>Ports and select the com port number.



Next, we will upload the blink program to the Breadboard Arduino. Go



In case your FTDI module has no Reset (DTR) pin, press the reset button on the breadb and select upload. If it says ‘Compiling Sketch’ then keep it pressed and release as soon says ‘Uploading’.

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Sarah Yasin is working as a Tech Content Writer for Electronicslovers.com. She is Part of ElectronicsLovers Community - Click Here To Read Her profile

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