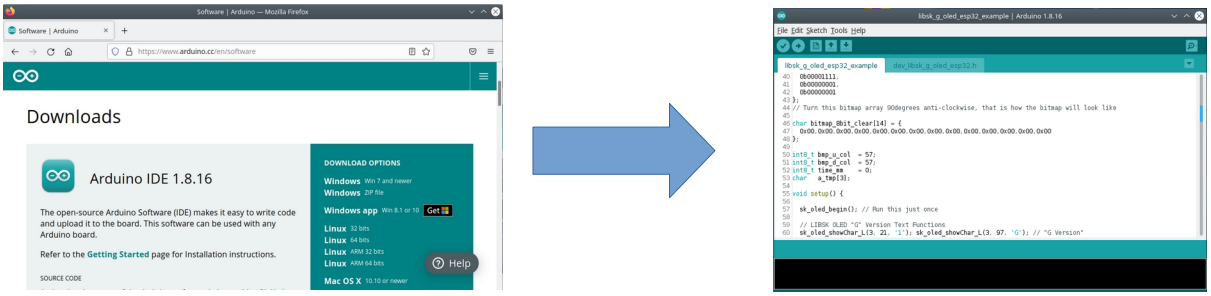
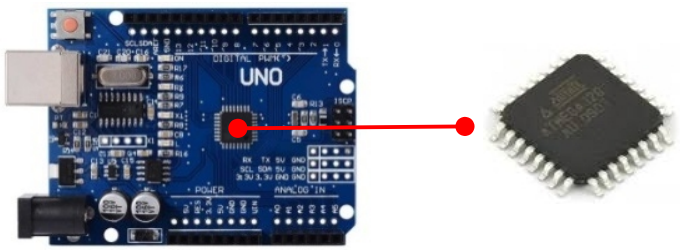
What do we need to get started ? The Basic Hardware and Software

Desktop Computer or Notebook Computer with USB support to run Integrated Development Environment – Arduino (IDE) Software



Intergrated Development Environment – Arduino (IDE) Software



Arduino Uno Development Board (with ATMEGA328 micro-controller)

USB 2.0 Type A/B Data Cable

BASIC SETUP
1. Desktop/Notebook Computer
(with Arduino IDE Software)

2. Arduino Uno (ATMEGA328P)

3. USB Type A/B Cable

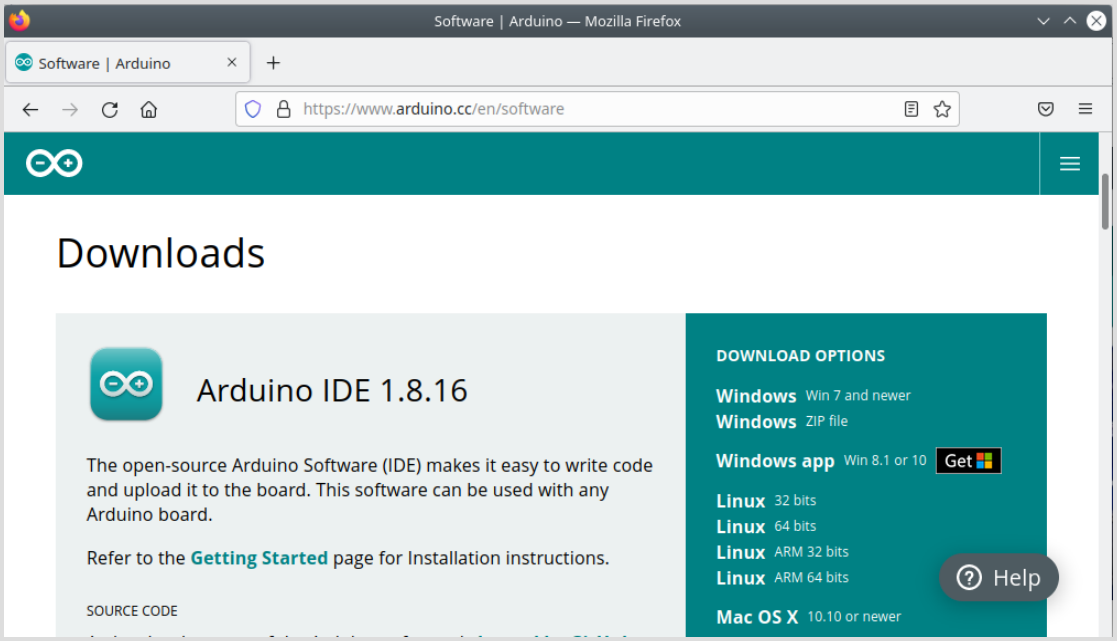
4. Solderless Breadboard

Desktop Computer or Notebook Computer with USB support
to run
Integrated Development Environment – Arduino (IDE) Software

The Arduino IDE Software requires very little Computer resources. Computers as old as year 2007 with 2Gb RAM will be good enough run the Arduino IDE Software.

If you already have a Computer. You can proceed to download and install the Arduino IDE Software.

The Arduino IDE Software is Open Source Software, we can download and use it for **FREE!!!** The Arduino IDE Software can be downloaded from this website, **https://www.arduino.cc/en/software**



1.Download Arduino IDE Software version according to your Operating System
2.Install the Arduino IDE Software

IF you do not have a Computer,

You can try get an old computer to run the Arduino IDE Software (as old as, from year 2007). Those old computers are mostly waiting to be discarded and very often you can **get them for FREE.**

In the worse case scenario, just pay a visit to your local “junk yard/store” and you can easily get one for less than RM100

After that, you can **Install a 64-bit FREE lightweight Linux Operating System** into your old computer.

When we want to install Linux into our Old Computer, you do not have to worry about the missing Computer installation CD for those old computers because we do not need to use the Computer installation CD

1. Download the Linux 64-bit Arduino IDE Software
2. Install the Arduino IDE Software

The Arduino Uno Development Board
with **ATMEGA328P micro-controller**

For this component, **we have to buy**

Fortunately, it is not expensive and it is **easily available on the online stores**. The price of this board is not fixed. However, we should be able to get one **for less than RM20 each.**

This board has **ATMEGA328P micro-controller attached.**

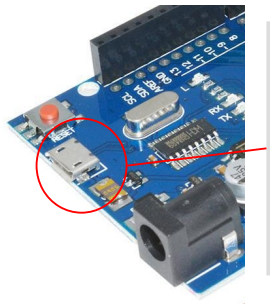
There are many version Arduino Uno board in the market. As long as they are using the ATMEGA328P or other ATMEGA328 variant micro-controller. They will work more or less the same

USB 2.0 Type A/B Data Cable

For this component, it normally comes with the Arduino Uno Board when we purchase the Arduino Uno Board

IF we already have this cable, we can buy the Arduino Uno Board without this cable (slightly cheaper). This is the same cable by printers and scanners

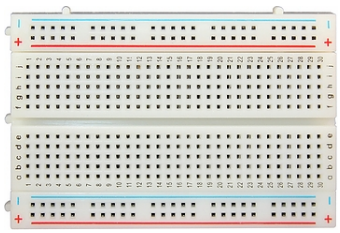
You will probably be able to get this cable for FREE from those people with old discarded printers or scanners



Some Arduino Uno board have the micro-USB Connector

These board uses the micro-usb cable that is normally used by the the older Andriod smartphones.

I personally prefer the bigger Type B connector as this micro-usb connector is more “fragile”



Solderless Breadboard (Optional but useful to have one)

This component is optional, you can make your own if you wish. However, for convenience sake, we will just buy it. It is very cheap, **cost us less than RM3 each.**

This component is very useful. It is used for temporary connect and hold various electronic components together.

The pin holes on the Solderless Breadboard are specially spaced to fit most electronic components

What is a ATMEGA328P micro-controller ?

Physically, a micro-controller are ussually a small rectangular shaped chip with alot of metal legs coming out (like the pictures on the left)

They are similar to our regular Computers. However, with all the CPU, RAM and Harddisk are bundled into a single chip. Although they are not as obvious as our regular Computer, they are everywhere. Almost all the smart electronic devices around us have some kind of micro-controllers inside them. From simple things like Remote Controls, Micro-wave Oven, Washing Machines to advanced equipment like Mobile Phones, , Washing Machines, Car Electronics, Robotic Arms, Automated Factory Machineries, Medical equipment, Security equipment, Aero-space equipment, and etc...

Micro-controllers comes many sizes and specifications from different manufacturers

One of the micro-controller is called the **ATMEGA328P** micro controller. Sometimes it is just **“ATMEGA328”** without the letter **“P”** or with some other letters. Sometimes it comes with different shape or size. As long as it has **“ATMEGA328”**, they will work more or less the same

The **ATMEGA328P micro-controller** is cheap and easily available. For learning purpose, we will normally use the Arduino Uno Development board because the **Arduino Uno board comes with the ATMEGA328P chip**. We can also buy and use the ATMEGA328 chip alone, on its own

Although the ATMEGA328 micro-controller is cheap, it is not a toy, it is a very stable and capable micro-controller. It has been used in the real commercial world inside various electronic devices, like 3D Printers, CNC machines, drones, home securities and etc... just like any other micro-controllers. As long as its specification allows it, you can use it.

The ATMEGA328 micro-controller is also very good as a micro-controller learning tool. Once we know this well, the other types of micro-controllers should not be very different