جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم

قسم الانظمة الطبية الذكية

Intelligent Medical Systems Department

Lecture: (1)

Arduino Overview

Subject: Embedded System

Class: Third

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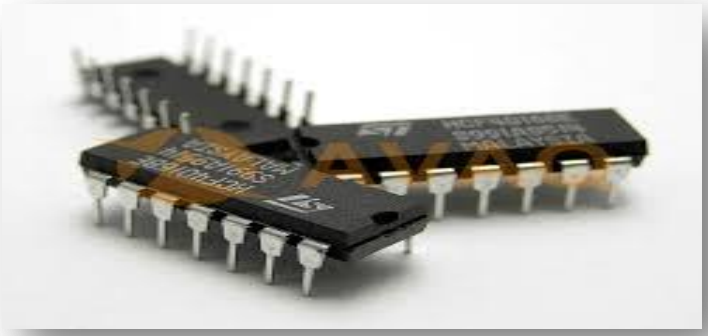
Study Year: 2024-2025

Introduction

Previously, working on the manufacture of an electronic circuit to perform a specific function means building a complex electronic design of electronic components such as resistors, files, transistors ... etc. Any change in part of electronic circuits meant a lot of complex processes such as welding and wire cutting, rethinking of electronic diagrams and many difficult things that took a long time. After the technological development, the integrated circuits (IC) were invented so that it was possible to put a complete electronic circuit on a small chip the size may be the size of a pinhead, even now it is estimated Nano meter, which cannot be seen only using special magnifiers.

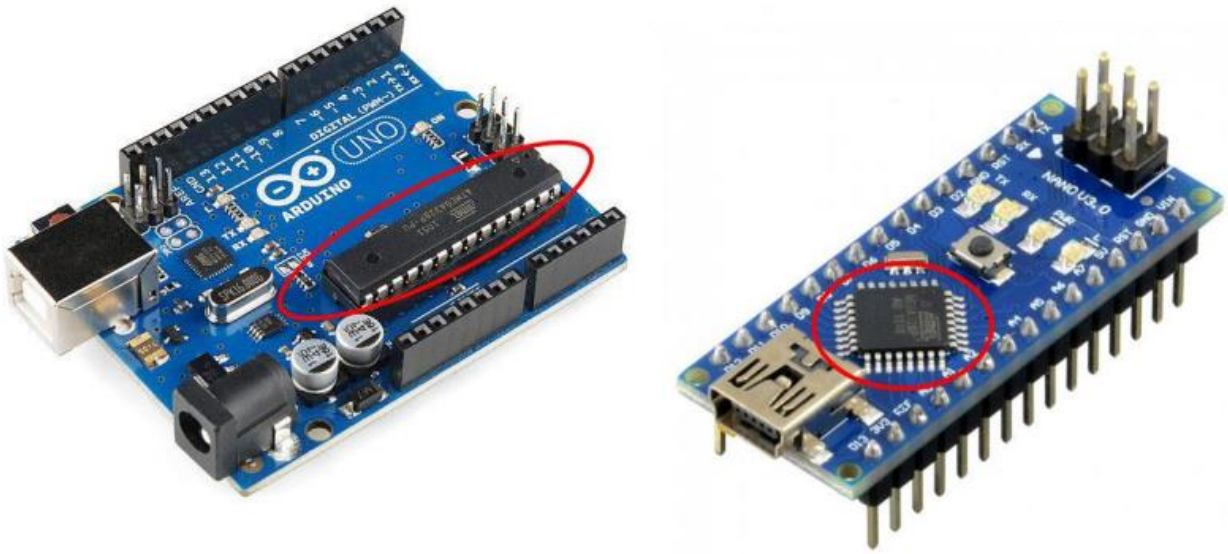


integrated circuits (IC)

The development of integrated circuits led to the emergence of microcontrollers. Microcontrollers are a small computer that contains RAM and ROM, as well as an input and output unit that is from the pins of the microcontrollers.

Arduino

Is an electronic development board that consists of an open-source electronic circuit with a microcontroller on a single board programmed by computer designed to make the use of interactive electronics in interdisciplinary projects easier. Arduino is programmed by its own programming language called Arduino C that derived from C, C ++ and processing programming languages.



Microcontroller on deferent types of Arduino Board

Why Arduino?

- ✓ **Simplicity**: Arduino is designed to suit everyone's needs in interactive electronics.
- ✓ **Price**: The Arduino is less expensive compared to other panels of the same type.

- ✓ **Self-Assembly**: You can download the Arduino data sheet free of charge from the official website and buy the pieces and assemble it yourself.
- ✓ **Multi-platform**: The program Arduino has the ability to work on Windows, Mac OS and Linux and most other electronic controls running on Windows only.

- ✓ **Easy and simple programming environment**: Programming Environment Designed to be easy for beginners, stable and powerful for professionals.

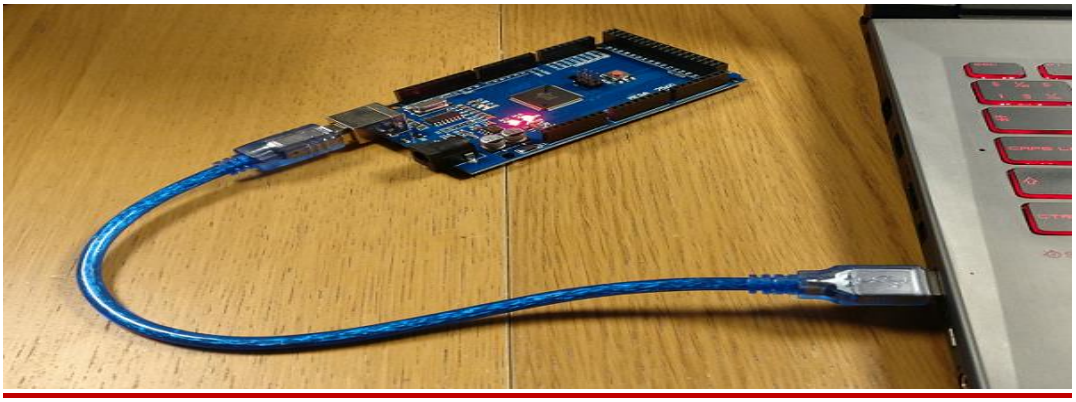
- ✓ **Open Source Software**: Available for all to download and programmers can modify it according to their needs.

- ✓ **Open Source Hardware**: Diagrams are published under license allowing circuit designers to design their own circuits.

Components of Arduino:

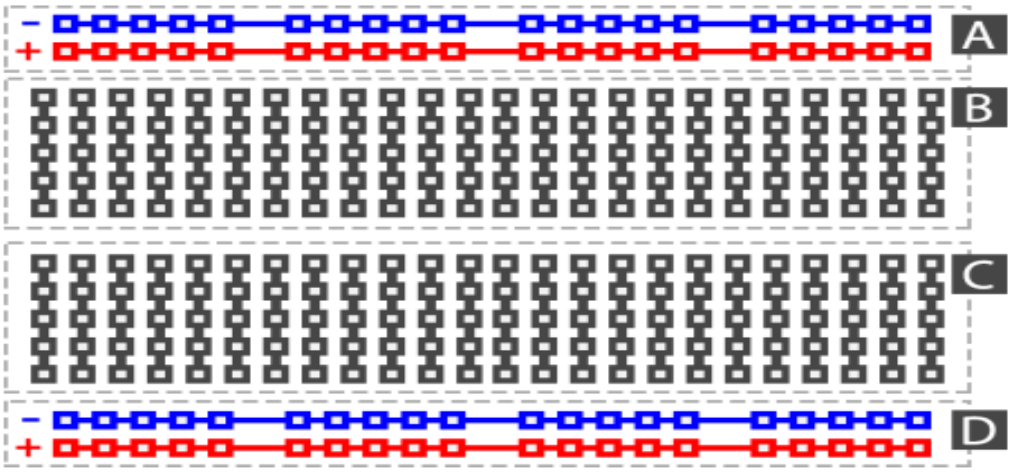
Programing of Arduino:

We need to use a program called Arduino IDE (you can download it from arduino.cc) and use the programming language Arduino C (derived from C, C ++ and the processing language).



Arduino IDE

BreadBoard: An important piece is used to connect the Arduino with other things associated with it by connecting wires. The board is supplied by connecting it to the Arduino (the positive with voltage and the negative with the GND).



Part A&D Battery Connect to the voltage and GND from Arduino (Horizontally. Part B&C to Connecting things with each other and with Arduino (vertically).

Wires: Used to connect things with each other and has three types:

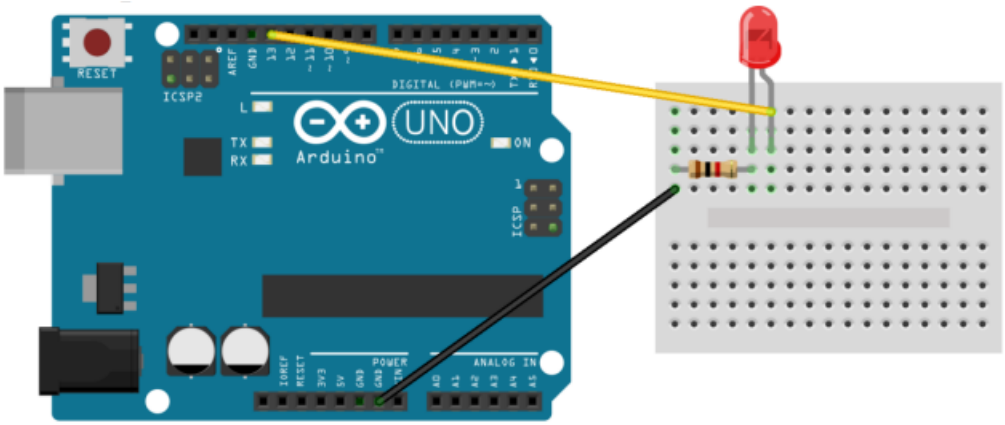
Male-to-Male | Female-to-Female | Mail-to-Female

Example:

(Blinking led)

Requirements: Arduino, BreadBoard, Resistor, Led, wires.

Connection map:



Code:

```
int LED = 13;
void setup () {
pinMode(LED, OUTPUT);
 }
void loop() {
digitalWrite(LED, HIGH);
delay(1000);
digitalWrite(LED, LOW);
delay(1000);
 }
```