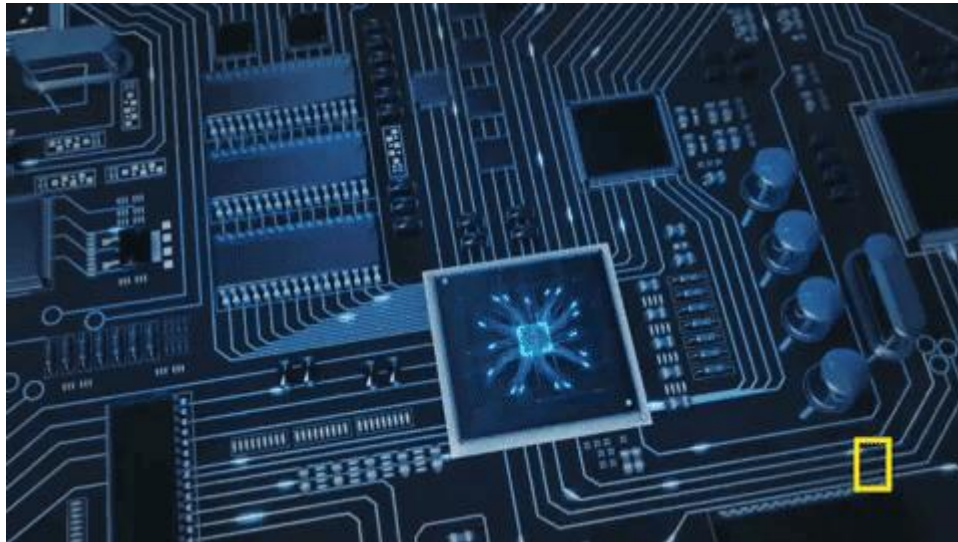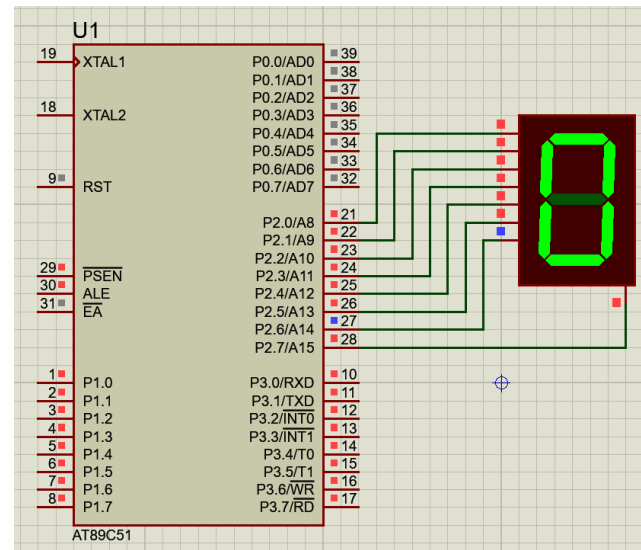# "Think Make Break Repeat"
Introduction and Programming with Arduino

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Department of EEE
Emitting Elite Energy

SESSION-1

SESSION OUTLINE

1.1: Arduino Fundamentals
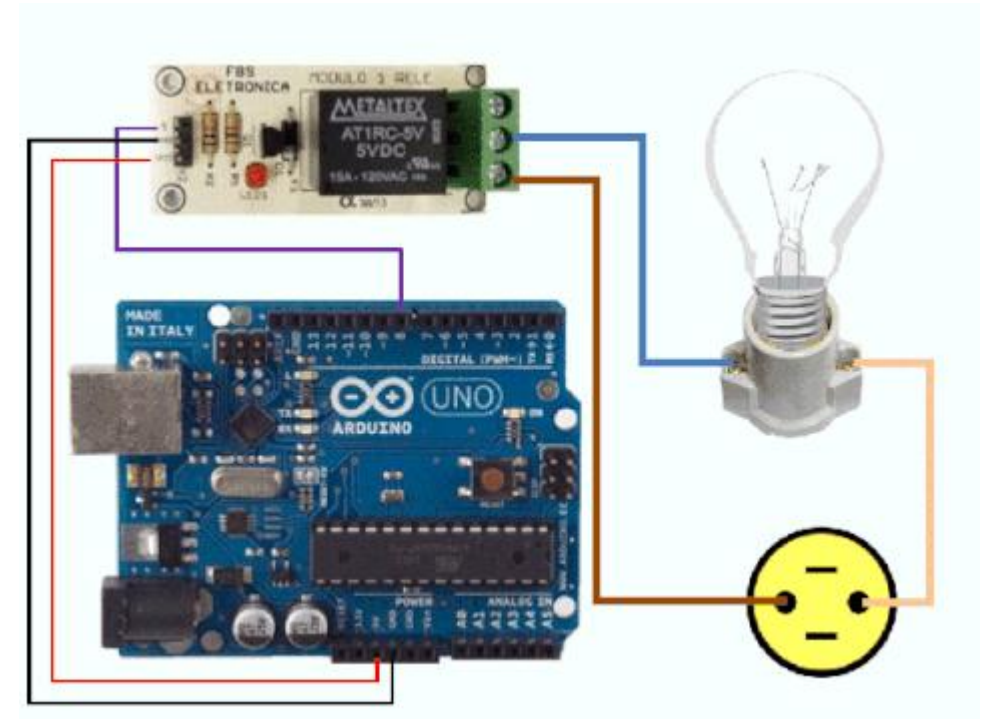 **1.1.1Arduino Platform**

  1.1.2 Arduino Board

  1.1.3 Arduino UNO Board:

1.2.What is used for?
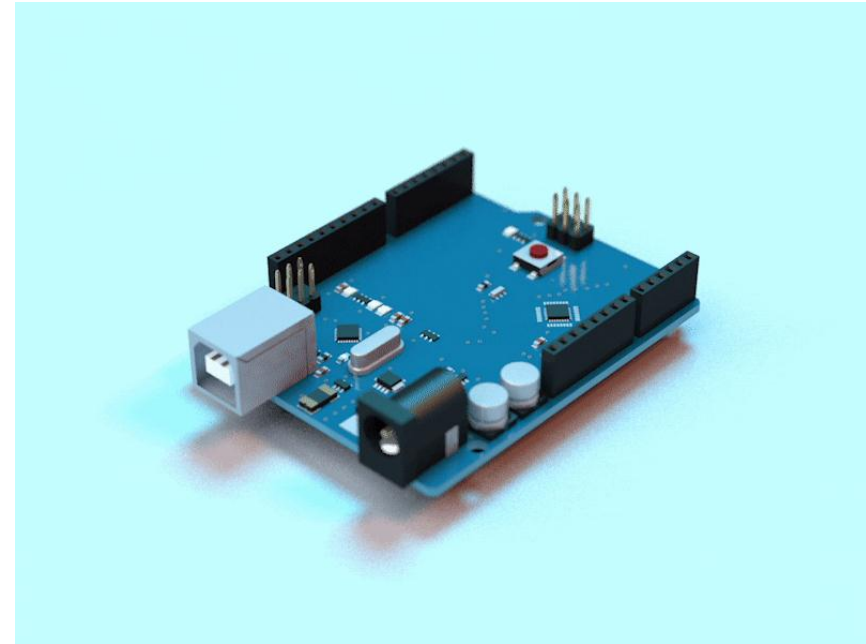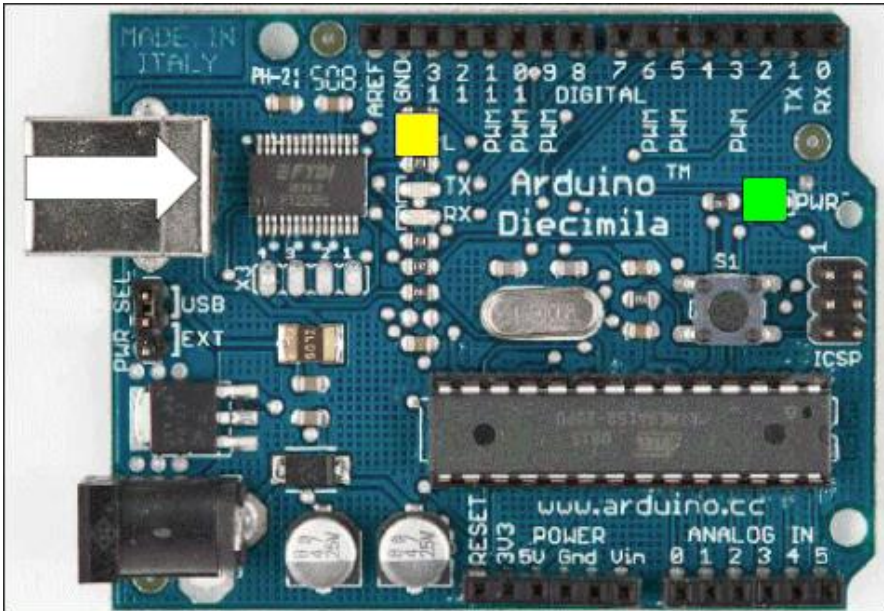 **1.2.1 What can it do?**

1.3. Why Arduino?

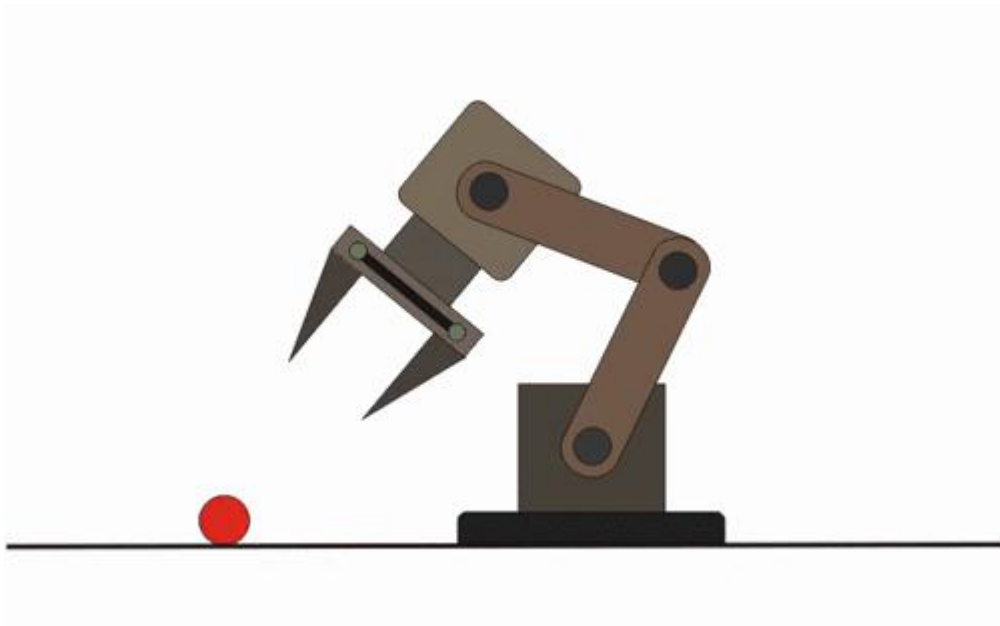# ARDUINO

Arduino is an open-source prototyping platform in electronics based on **easy-to-use hardware** and **software**.

Robotic Applications
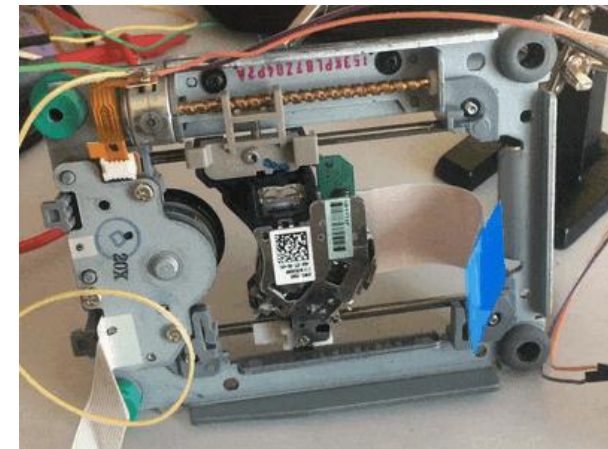

Light on a sensor

switching on an LED

Printers
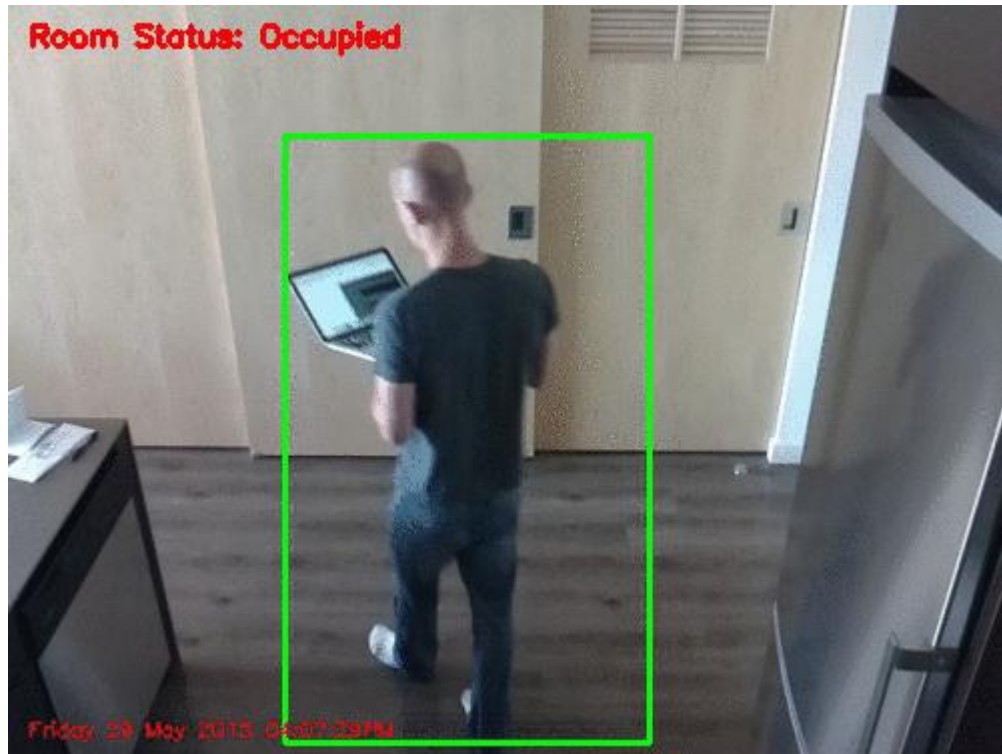
Motion sensing
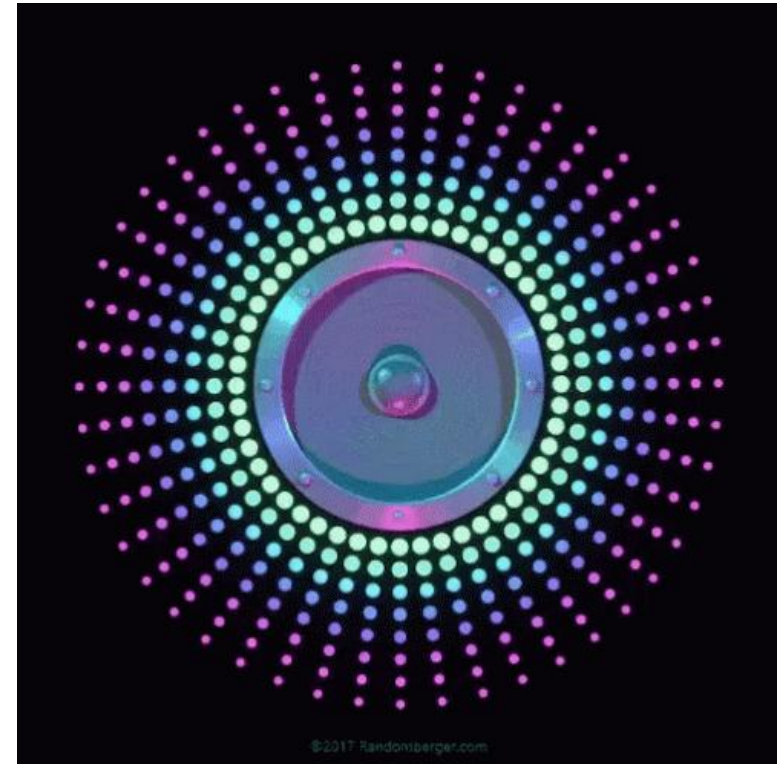
Playing songs through a speaker

1.1: Arduino Fundamentals

Arduino is a physical Input/ Output board(I/O) with a programmable Integrated Circuit(IC)

1.1.1Arduino Platform

- The language to program is C based which eliminate the difficulty to program in **Assembly language** that mean the Arduino software convert the C code to the respective **assembly code of the Arduino and upload it.**

It includes a
- ❖ Code editor
- ❖ Compiler
- ❖ Up-loader

It also includes:

Code libraries for using peripherals
Such as serial ports and various types of displays

Arduino programs are called **"sketches,"** and they are written in a language very similar to C

1.1.2 Arduino Board

- The Arduino Board itself is a **blue circuit board**, the size of a **credit card** (but they also have models in other sizes). It has two rows of connectors (the 'headers'), a power connector and a USB connector.

- The brain of the board is an **Atmel microcontroller.** It's like a really small, very low power 'computer'. (It only has 32KB of storage, 2KB of RAM, and the 8-bit processor runs at only 16MHz).

1.1.2 Types of Arduino Board

Different Types Of Arduino Boards

- Arduino Uno (R3)
- Arduino Nano.
- Arduino Micro.
- Arduino Due.
- LilyPad Arduino Board.
- Arduino Bluetooth.
- Arduino Diecimila.
- RedBoard Arduino Board.

1.1.3 Arduino UNO Board:

- **Arduino Uno** is a microcontroller board based on the ATmega328P ([datasheet](#)).

- It has 14 digital input/output pins (of which 6 can be used as PWM (The pins marked with the (~) symbol can simulate analog outputs), 6 analog inputs(A0-A5), a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

- It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Digital Input/Output Pins. Connect signal pins of sensors, lights, etc here.

Plug in the USB cable here to connect to your computer.

Connect to a 9V battery here if you have an adapter
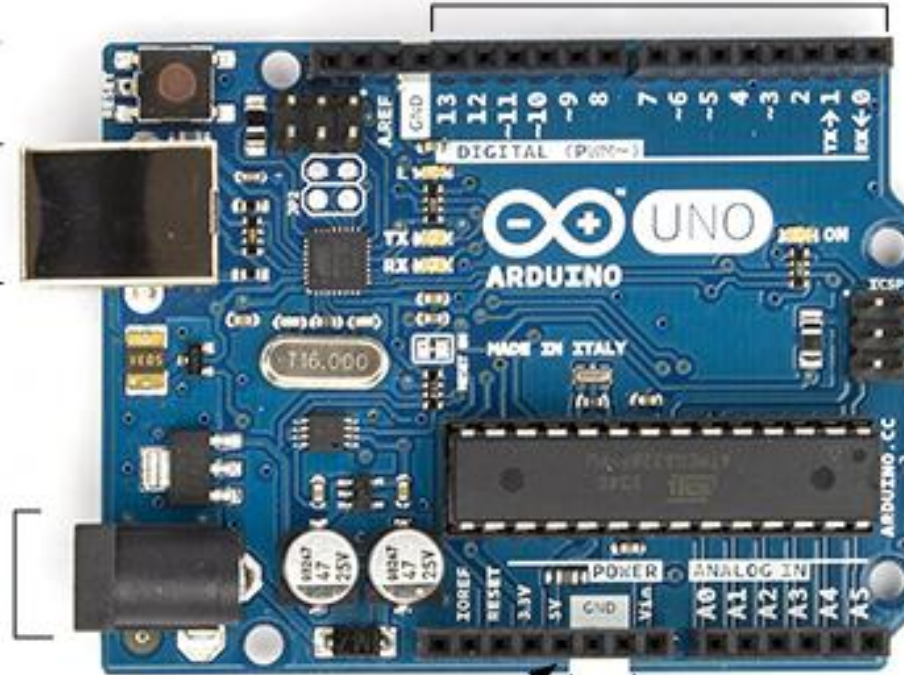
Provides 5V power to a circuit

Either of these will ground the circuit

Analog pins, for sensors that measure a continuum.

Quiz

What are the different types of Arduino Boards?

Options

1. Arduino UNO
2. Arduino Nano
3. Arduino Mini
4. All the options

1.2.What is used for?

1. What is used for?
2. Physical Computing projects/ research
3. Rapid Prototyping
4. Interactive experiments
5. When you think to control hardware with little knowledge and easy installation.

1.2.1 What can it do?

Sensors(to sense the environment)

→ *Push buttons, touch pads.*

→*Motion detection*

→ *Photoresistors (sensing light levels)*

→ *Thermistors (measuring temperature)*

→ *Ultrasound (proximity range finder)*

Actuators (to perform action)

→ *On/Off lights, LED's*

→ *Motors*

→ *Speakers*

→ *Dispays(LCD)*

1.3 Why Arduino?

1. It is Open Source, both in terms of Hardware and software.
2. It is cheap, the board itself and hardware components used in it.
3. It can communicate with a computer through serial Connection over USB.
4. It can be powered from USB or standalone DC power (5v)
5. It can work with both Digital and Analog electronic Signals. Sensors and Actuators.
6. You can make cool stuff! Automation vehicles, robot to take care of you and Automate your house and more :-)

Thank You