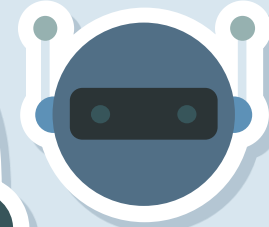
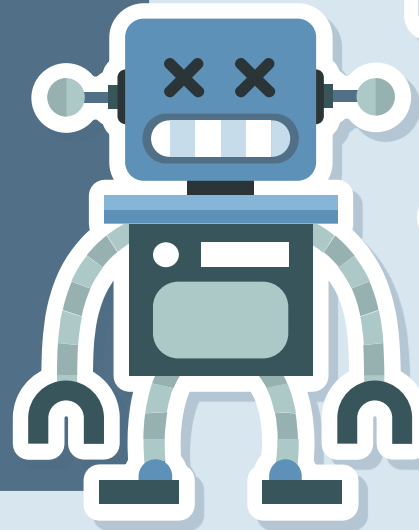
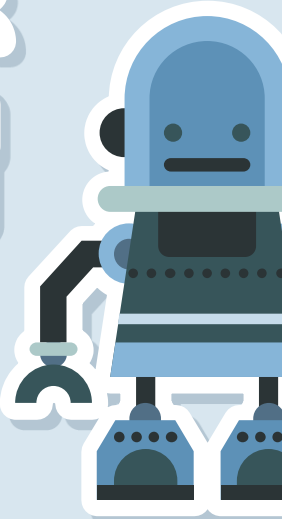
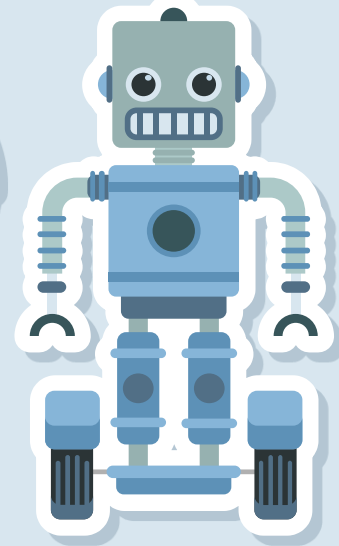
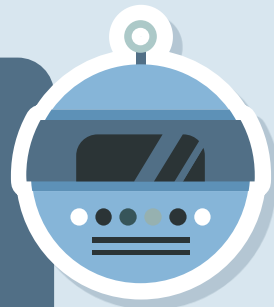
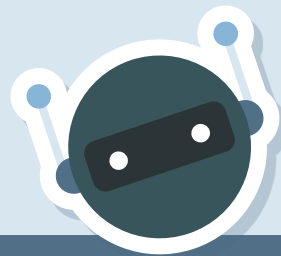
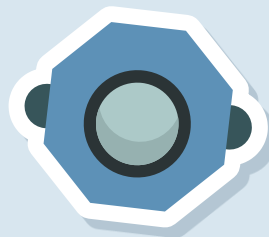


# Robotics





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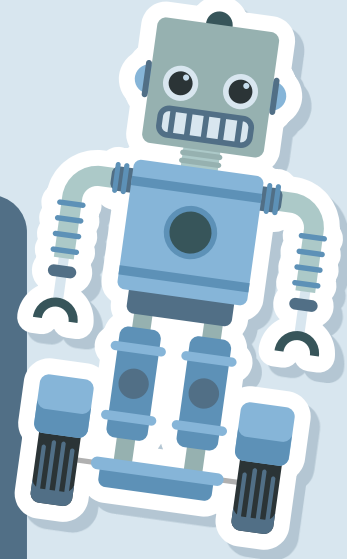
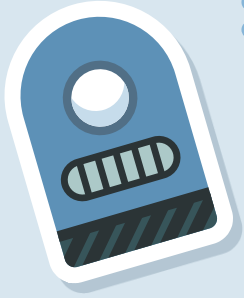
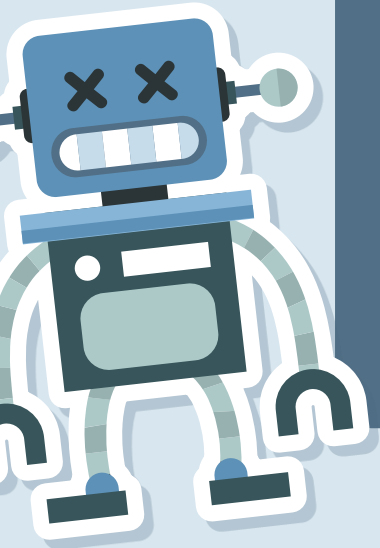


04

Task

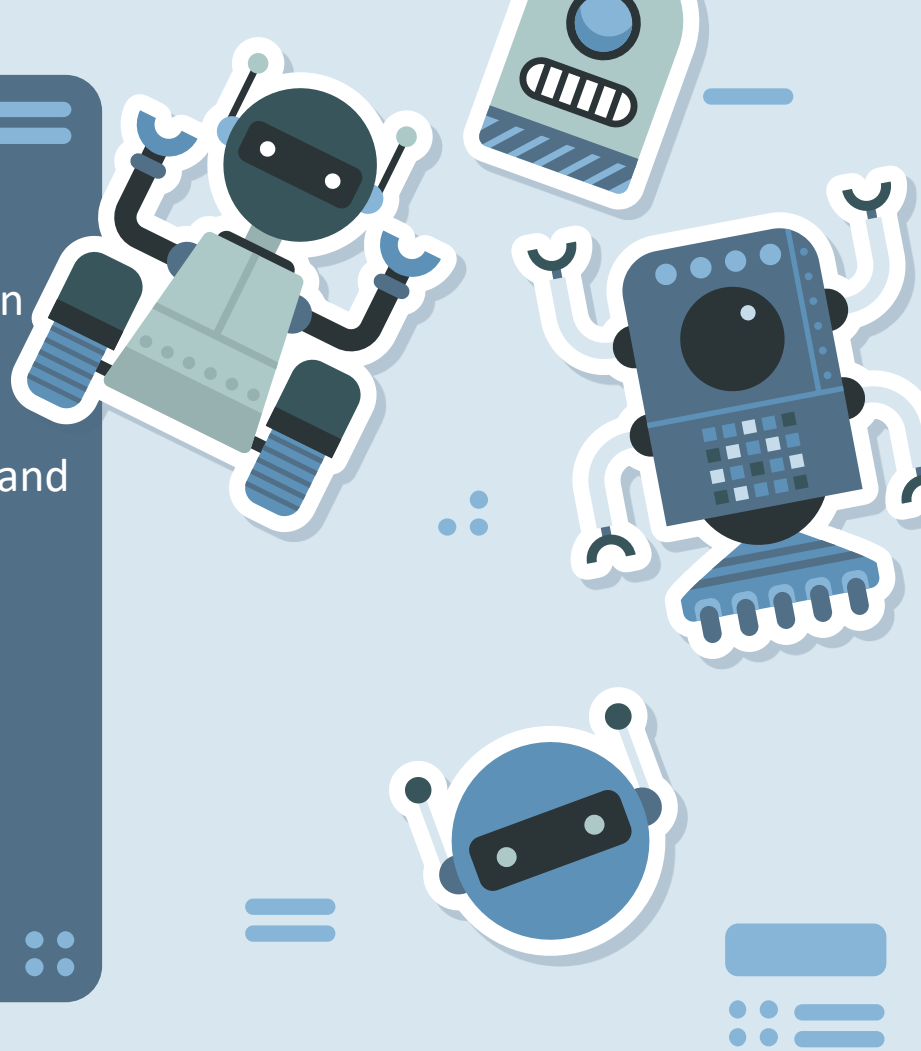


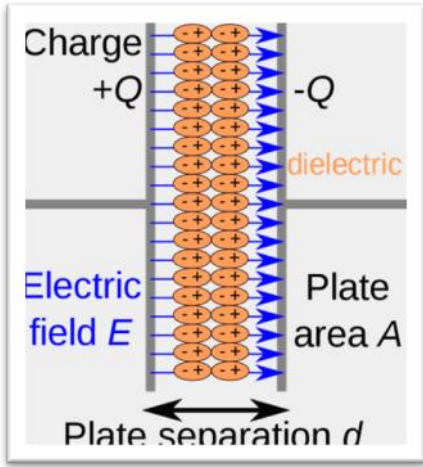
# Capacitors



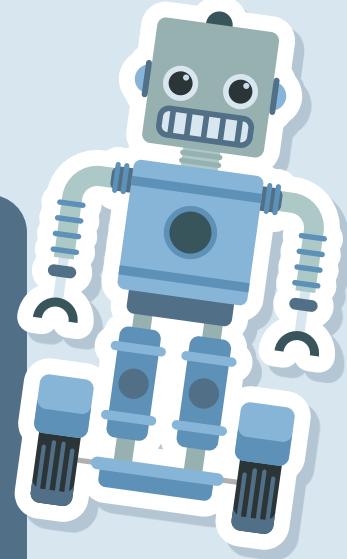
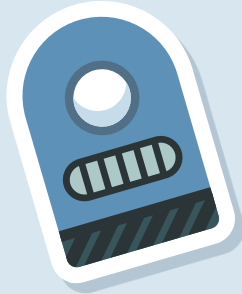
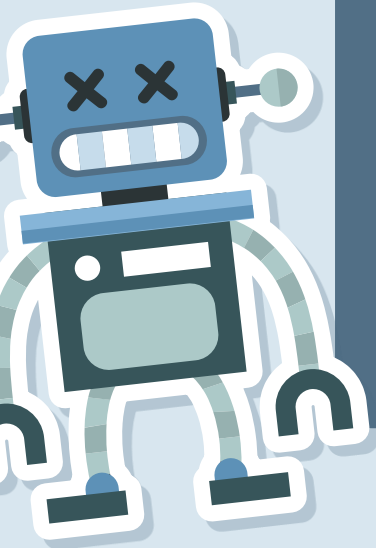
# Capacitors

- electronic device that stores electric energy in electric field.
- It is like a battery, but is smaller, lightweight and charges up much quicker.
- consists of two conductors separated by a nonconductive region.
- component designed to add capacitance to a circuit.





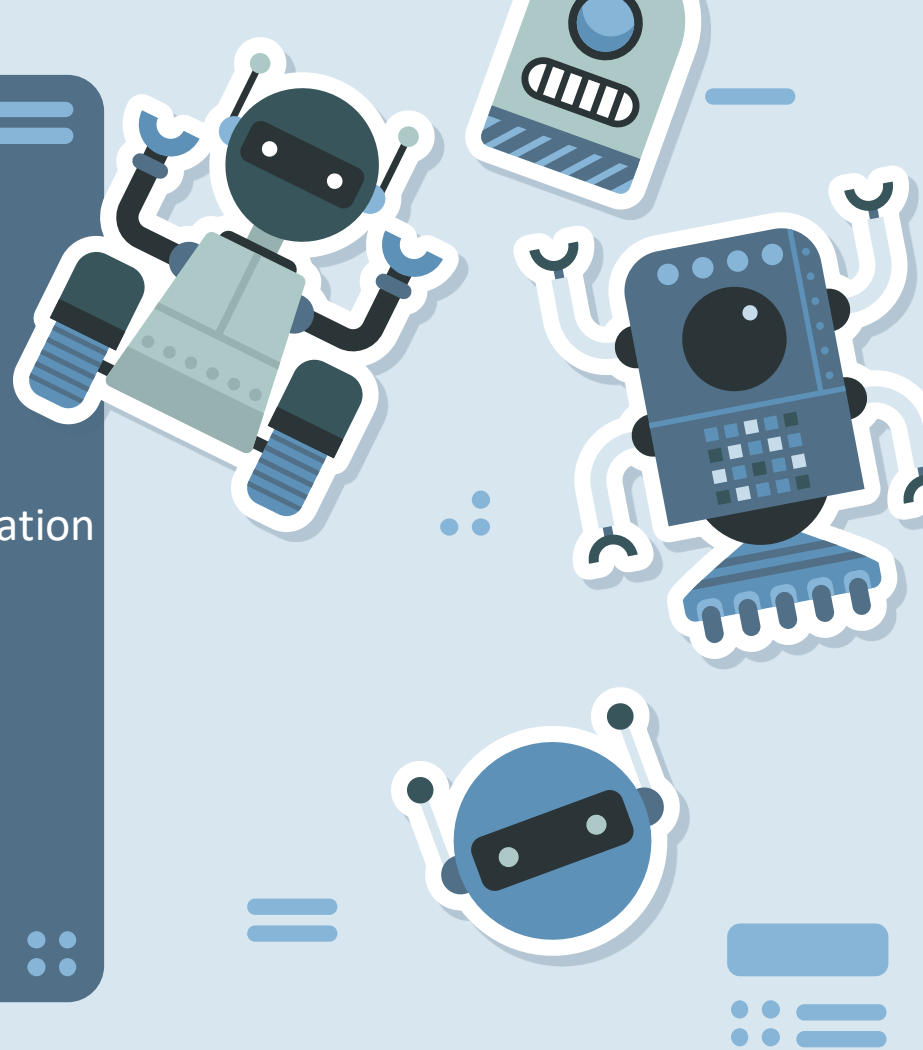
# Motors



# Motors

A device that converts direct current into mechanical energy.

**DC motors** were the first form of motor widely used, can change the direction of rotation by reversing the polarity.



# motor types:

## DC motors



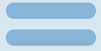
## Ac motors



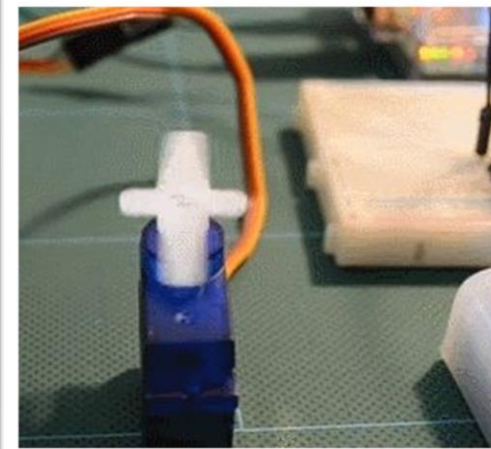


# Common Types of dc motors used in robots

## Universal motor

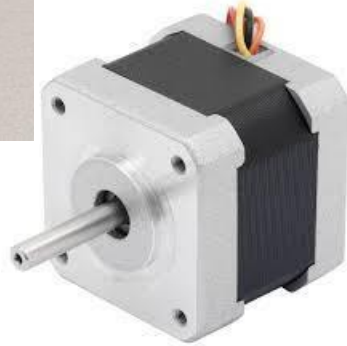
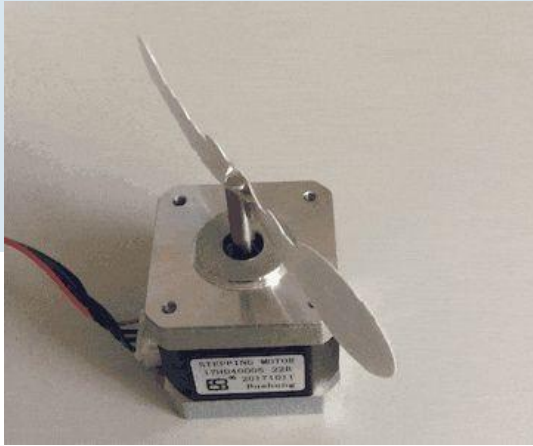


## Servo motor



# Common Types of dc motors used in robots

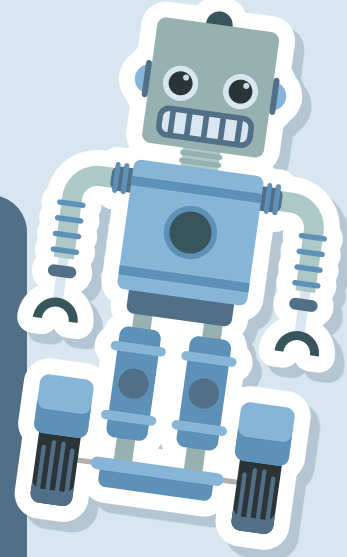
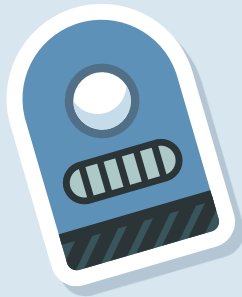
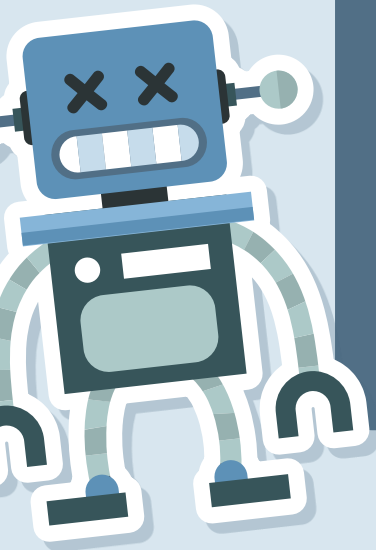
## stepper motors



## Brushless motor

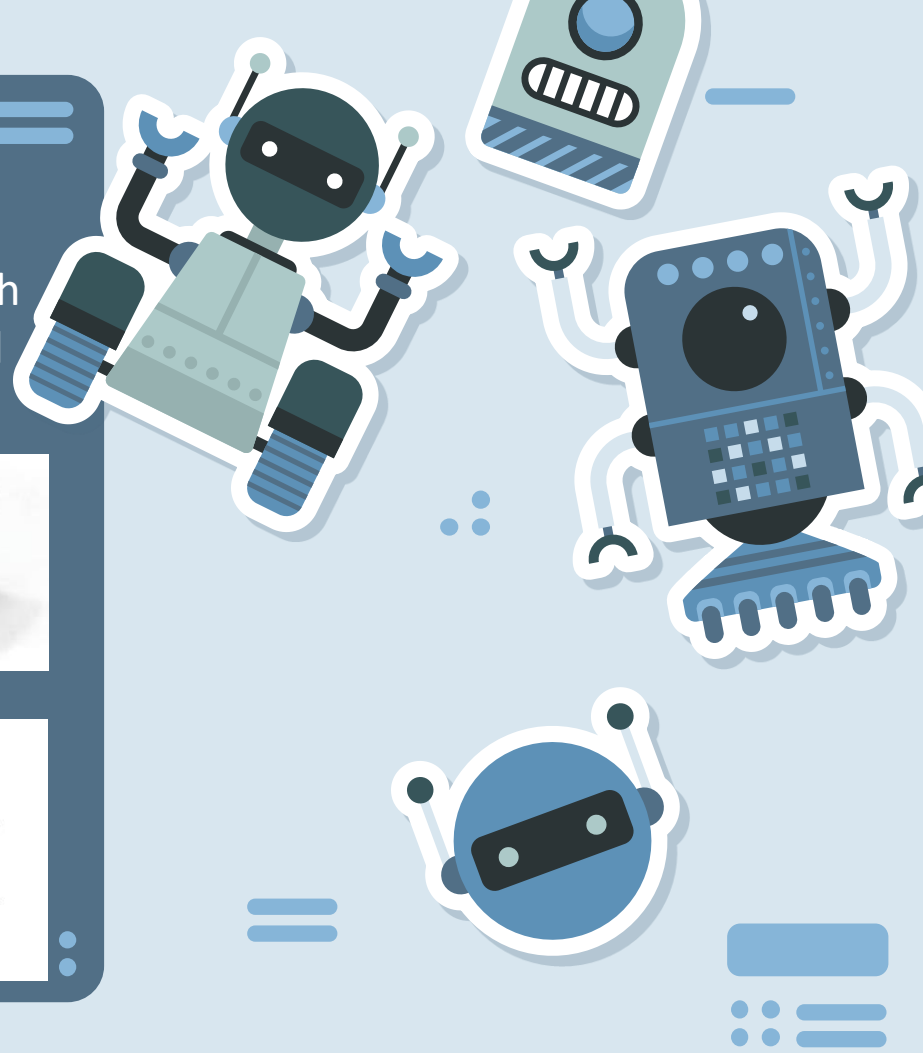


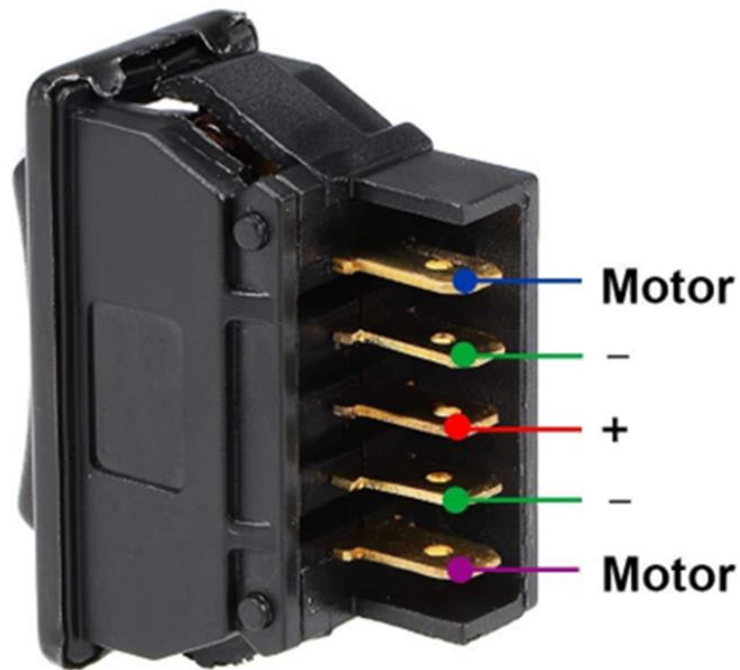
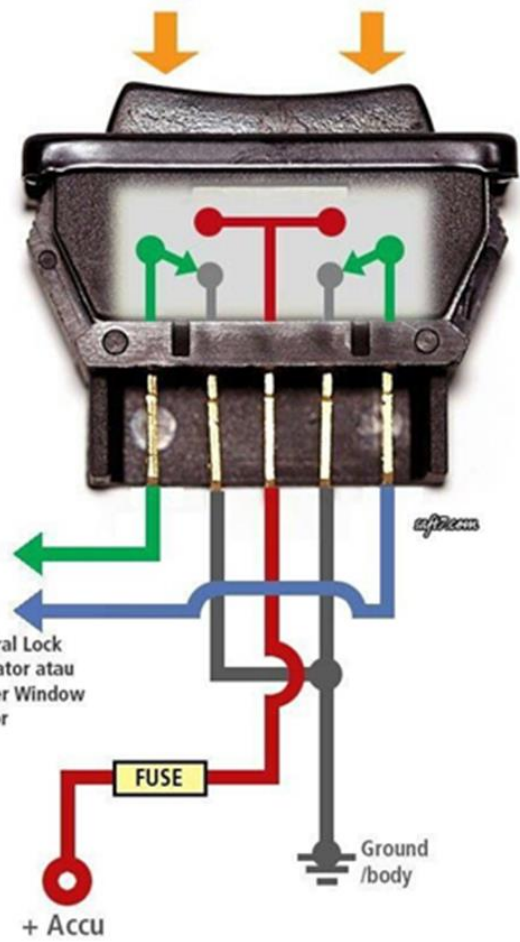
# Toggle switch



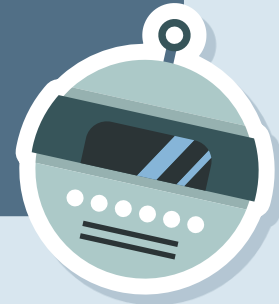
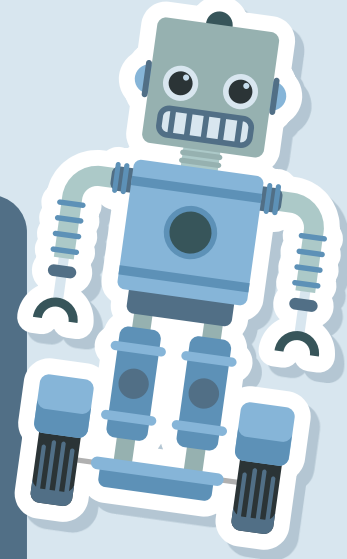
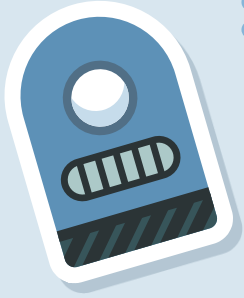
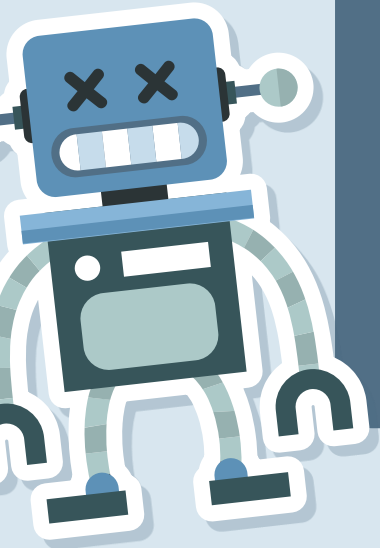
# Toggle switch

- A toggle switch is a type of electrical switch that is actuated by moving a lever back and forth to open or close an electrical circuit.
- There are two basic types: maintained contact and momentary toggle switches.



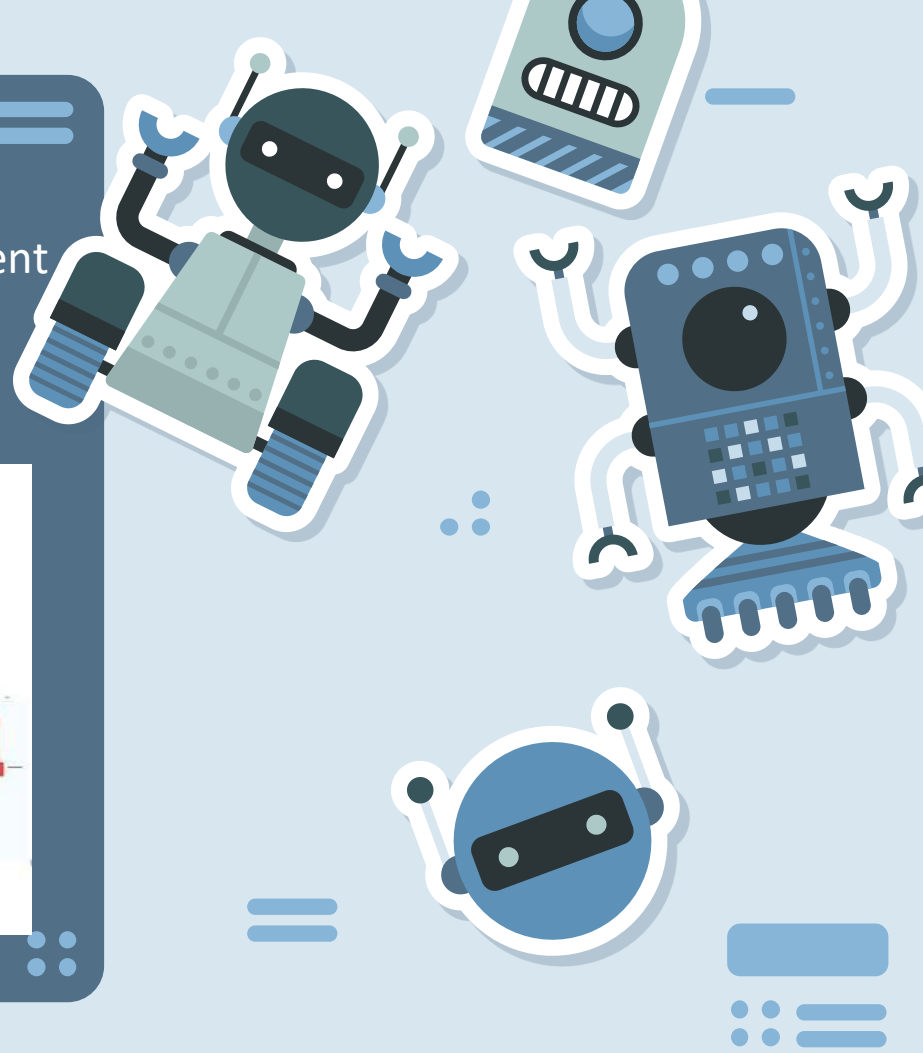
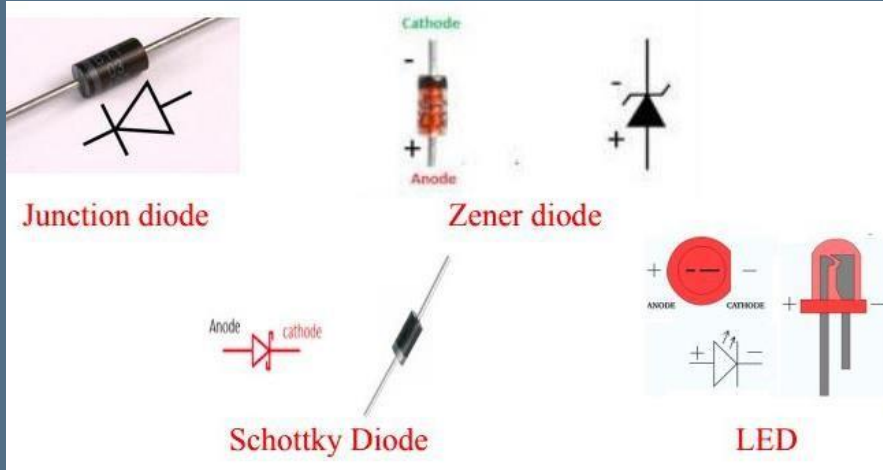


# Diode

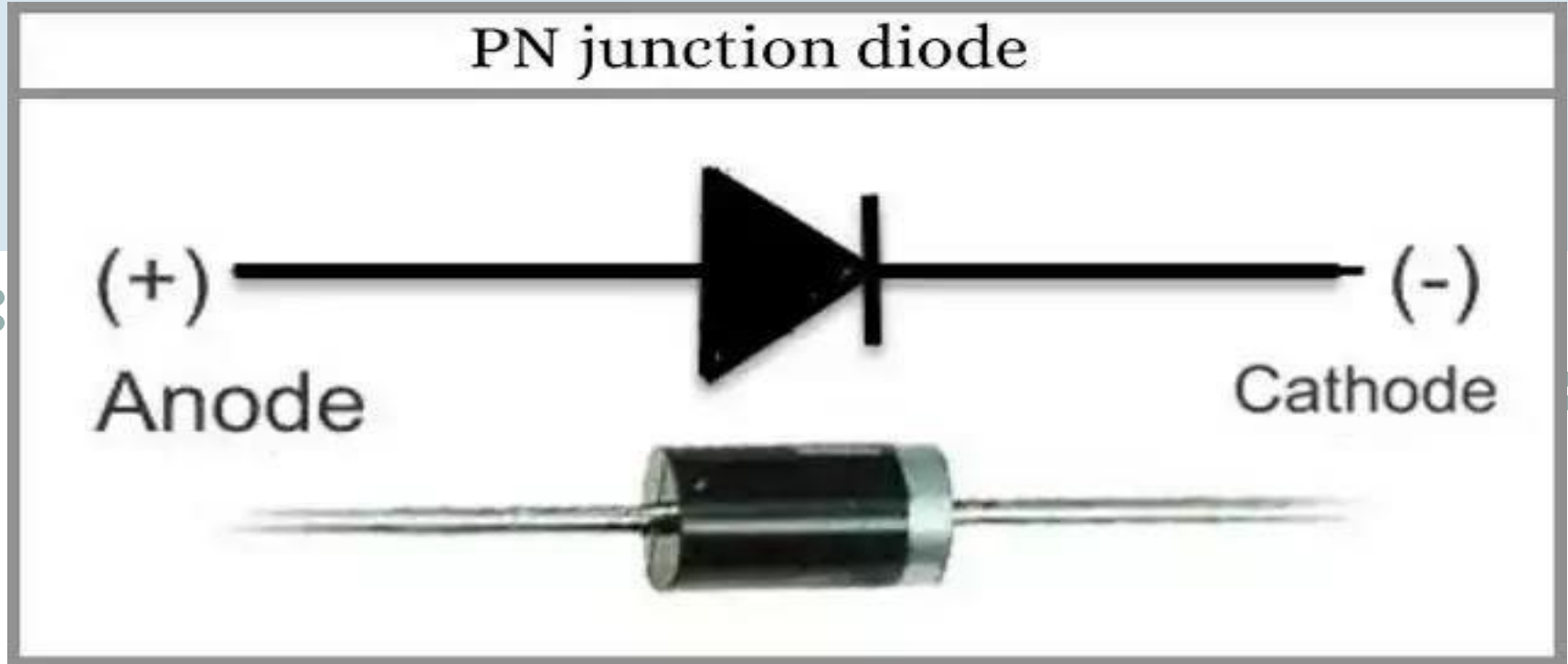


# Diode

- It is a semiconductor device that allows current to flow in one direction and prevent it from other direction.



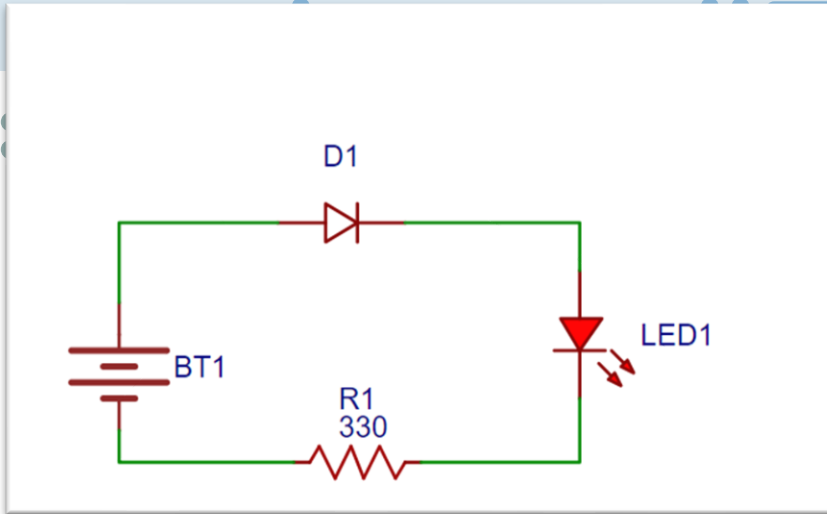
## PN junction diode (the common type):



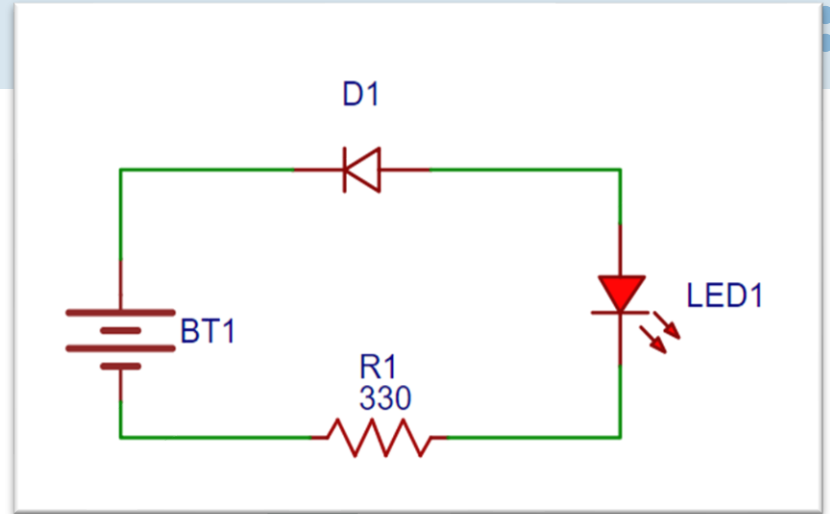


# PN junction diode (the common type):

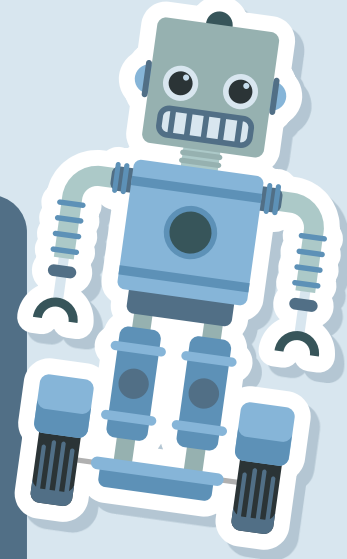
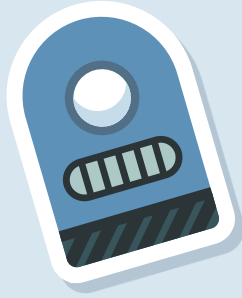
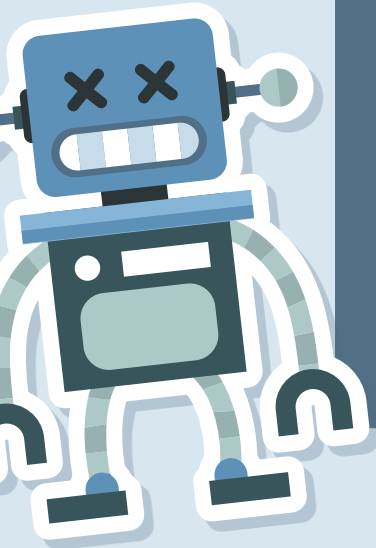
Forward bias:



Reverse bias:

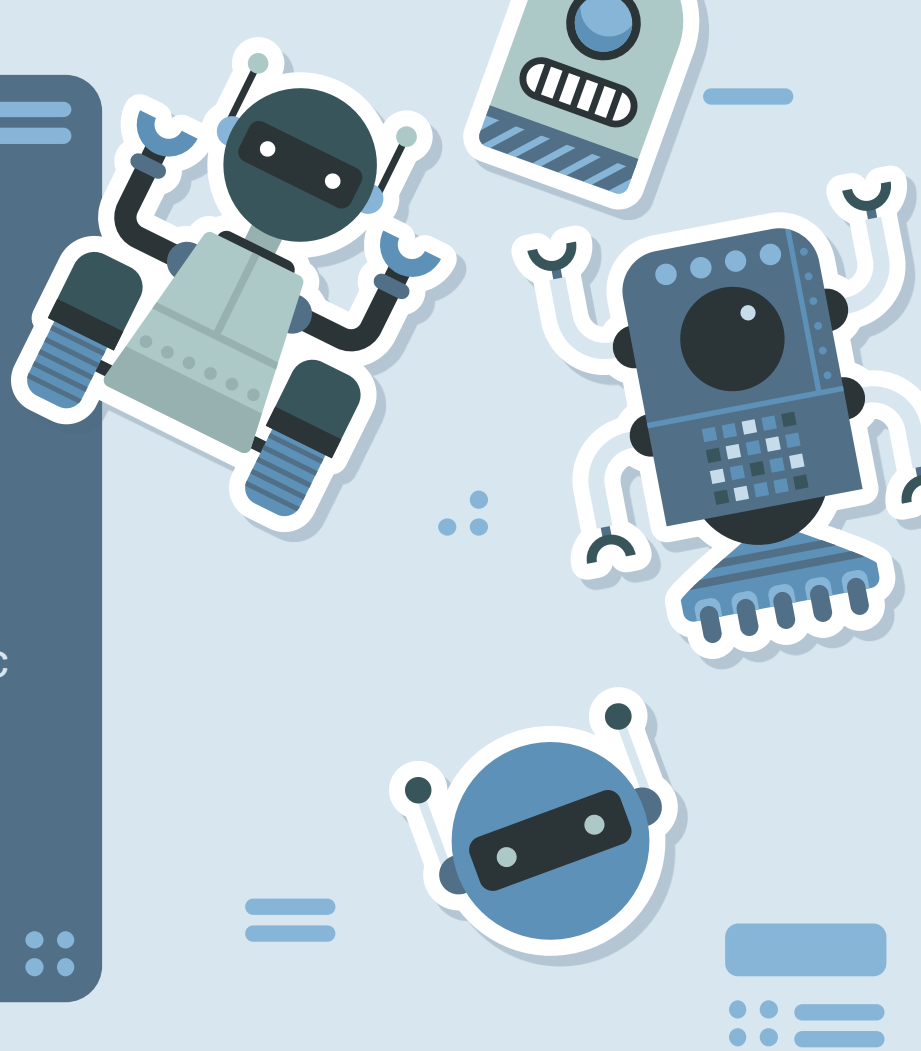


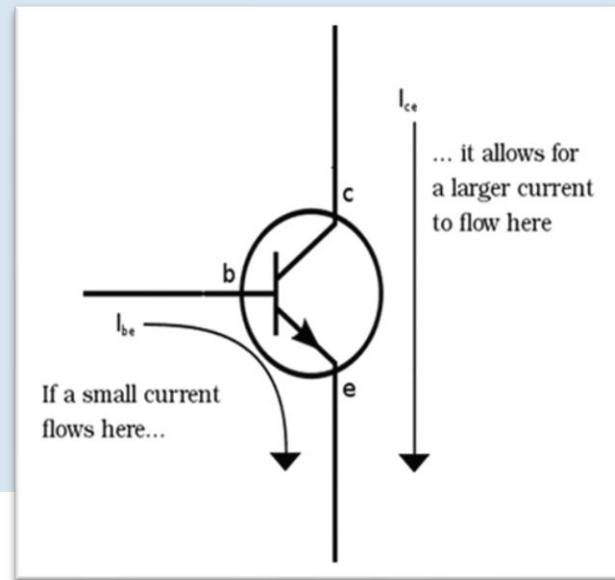
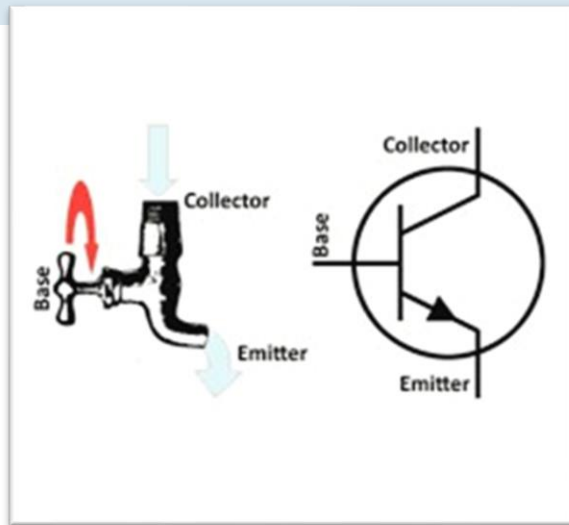
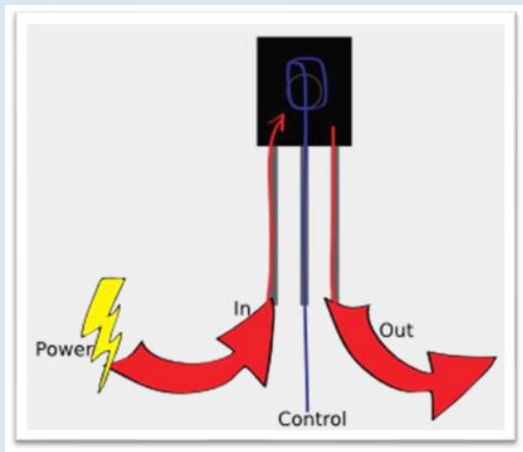
# Transistor



# Transistor

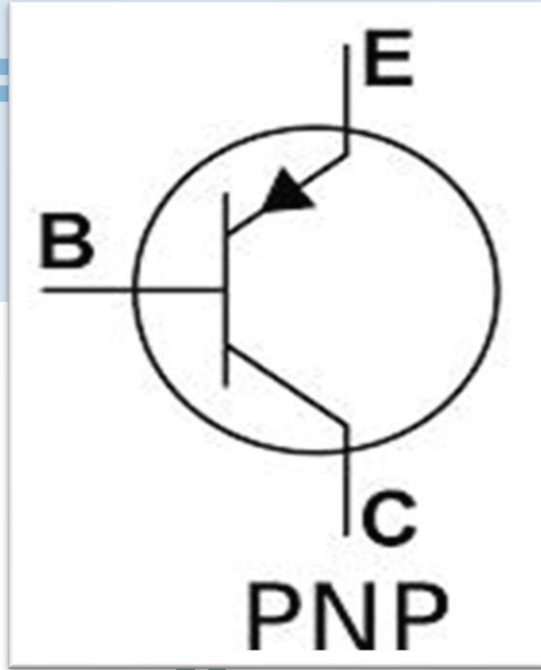
- Transistor: is an electronic component that can be used as part of as a switch.
- It is made of a semiconductor material.
- Transistors are found in most electronic devices.
- Transistors have three terminals: the emitter, the collector, and the base.



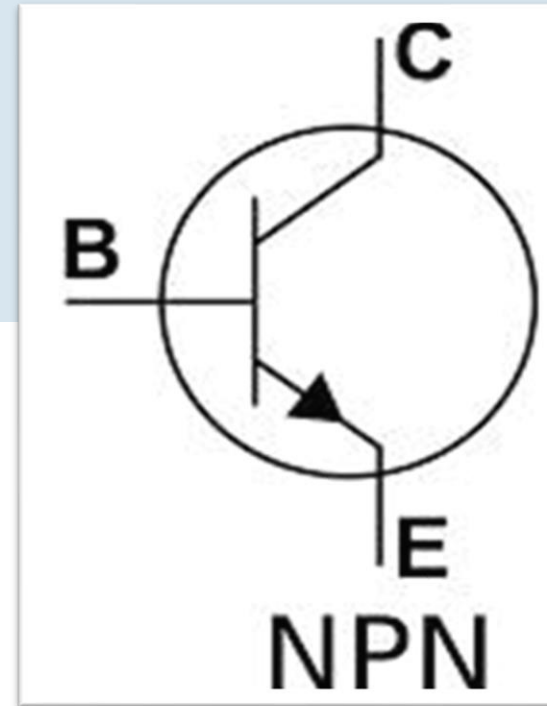


- There is two types of Transistors :

**PNP**



**NPN**



  
**Transistor**

  
**Amplifier**

  
**Switch**

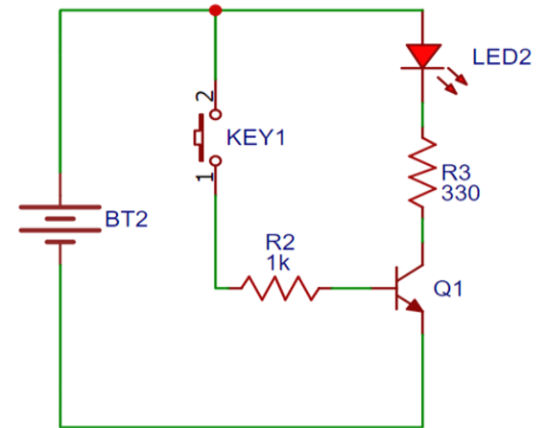
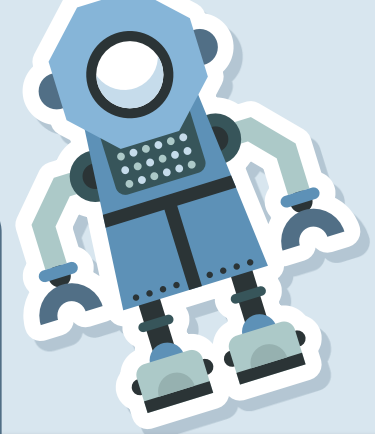
**Various Applications**

**Various Applications**

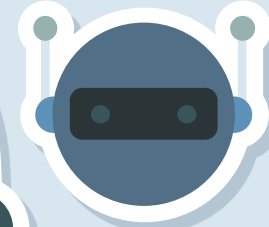
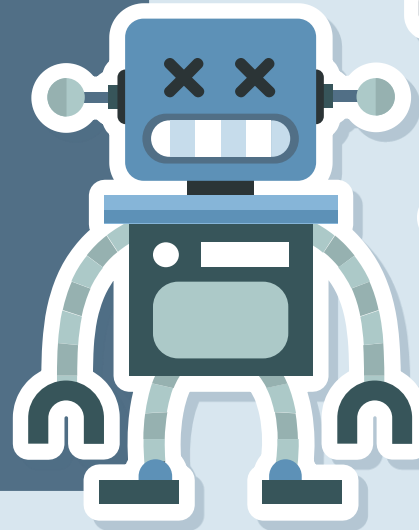
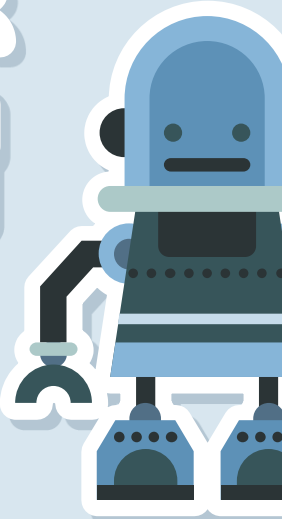
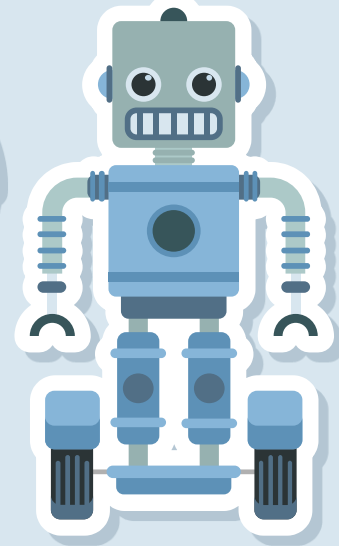
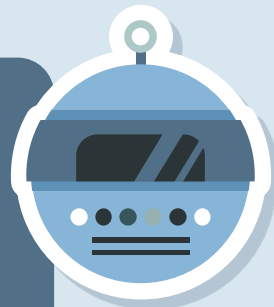


Critical thinking?!

HOW TO CONTROL A  
LED WITH  
TRANSISTOR???



# Thank you



Janaa Yehia