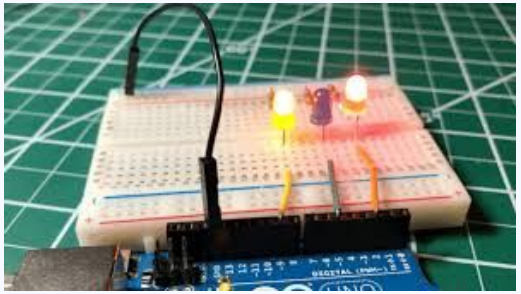
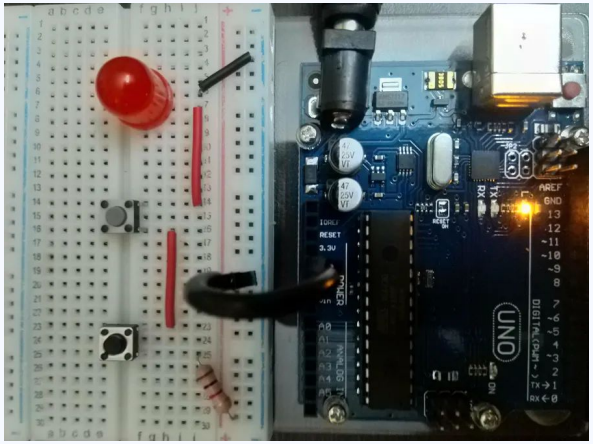
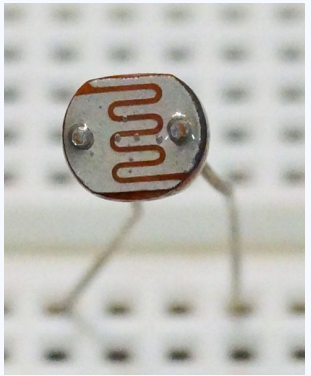
Digital and Analog Interfacing



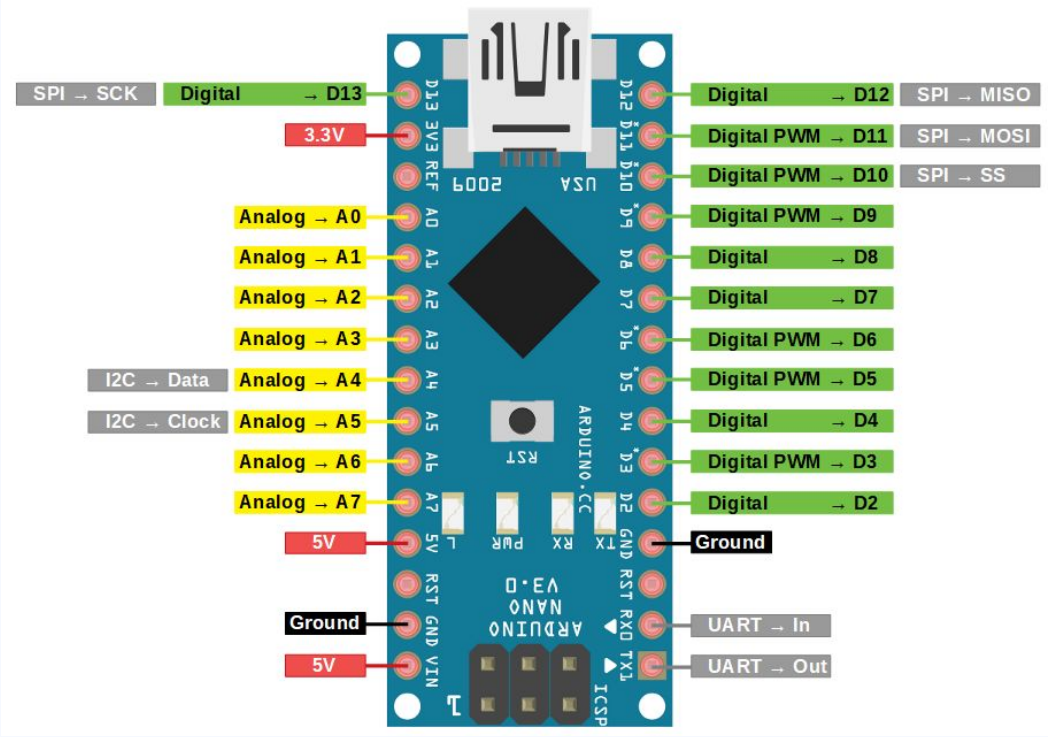




Quick Recap!

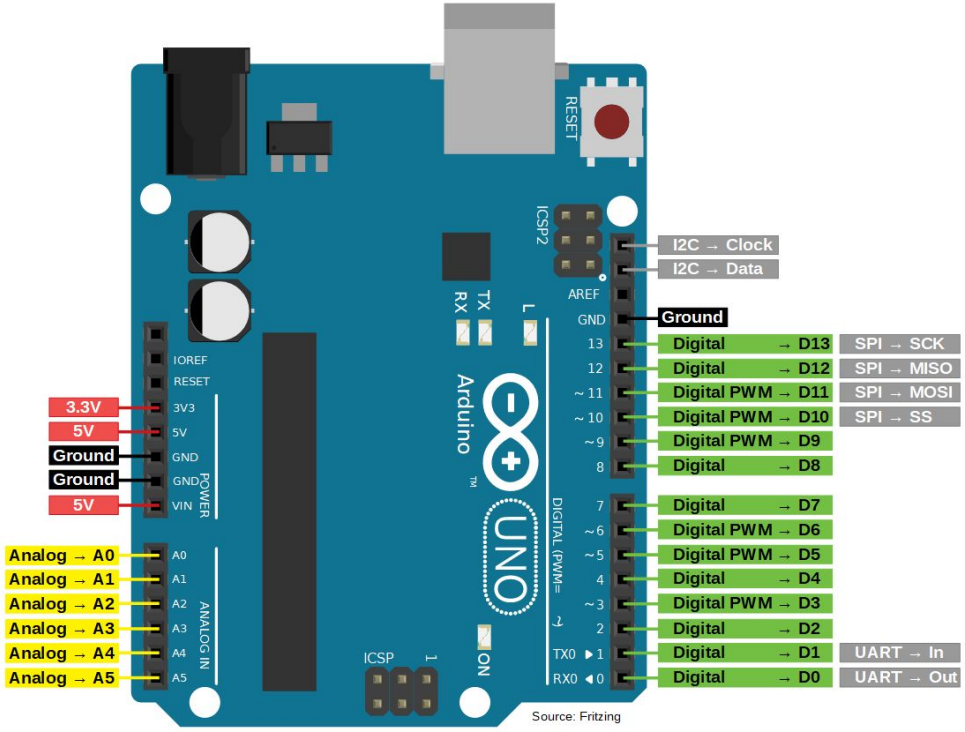
- Some programming basics
  - Data types, variables
  - If-else, for and while
  - functions
- Pin diagram of arduino nano
  - Analog and digital pins

Arduino Nano Pin Diagram



Pin Count
Total: **30**
Digital: **14**
Analog: **8**

Arduino Uno Pin Diagram

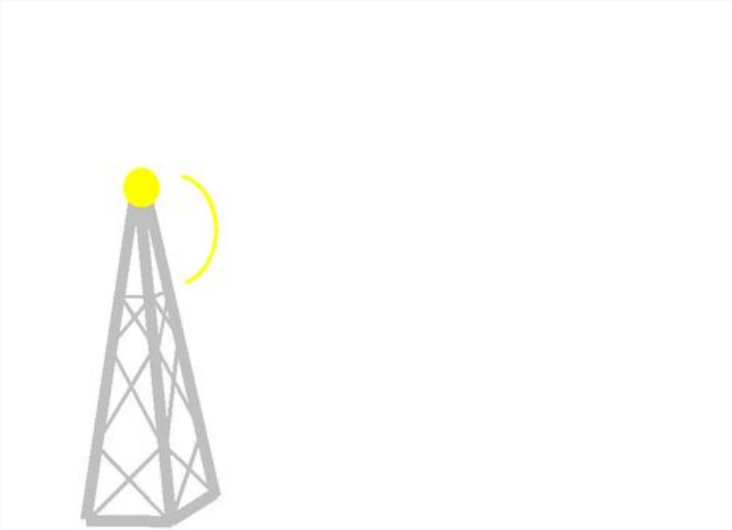


Digital: **14**
Analog: **6**

Digital and Analog Signals

What is Signal?
Something that carries information about a phenomenon.

For example: Signal from a mobile tower.



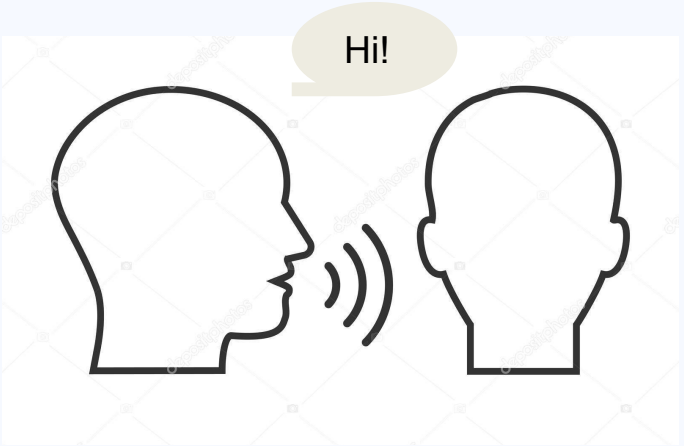
Digital and Analog Signals

What is Signal?
Something that carries information about a phenomenon.

For example: Signal from a mobile tower.

It could be a sound, light, temperature, pressure etc.

For example: When we speak, sound carries information about what we are saying.



Digital and Analog Signals

What is an electric signal?
Electronic circuits and gadgets use electric signal. Electric signal is usually in the form of voltage or current.

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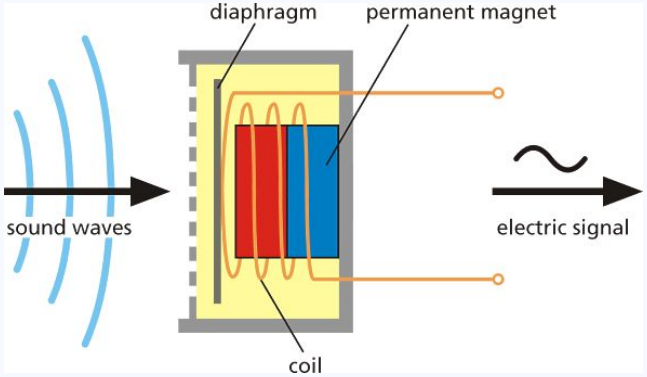
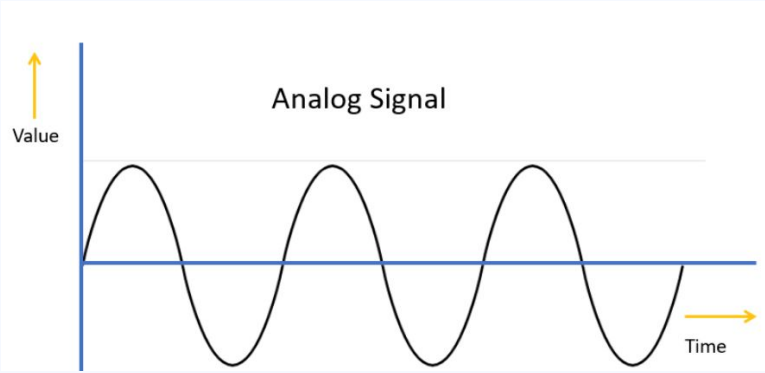


Digital and Analog Signals

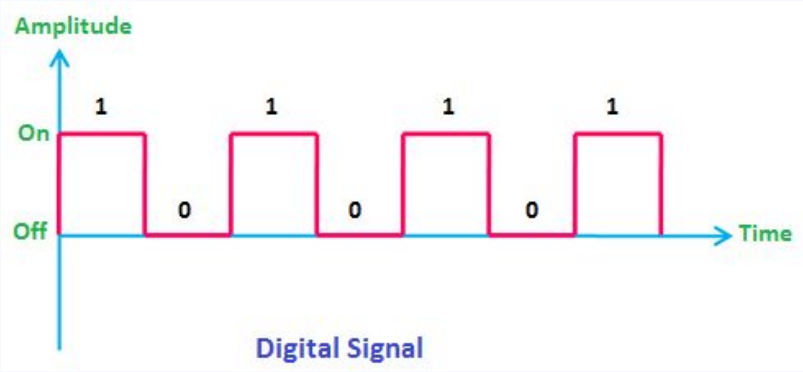
Analog Signal

➔ They can take any value.



Digital Signal

➔ They can take only 2 values.



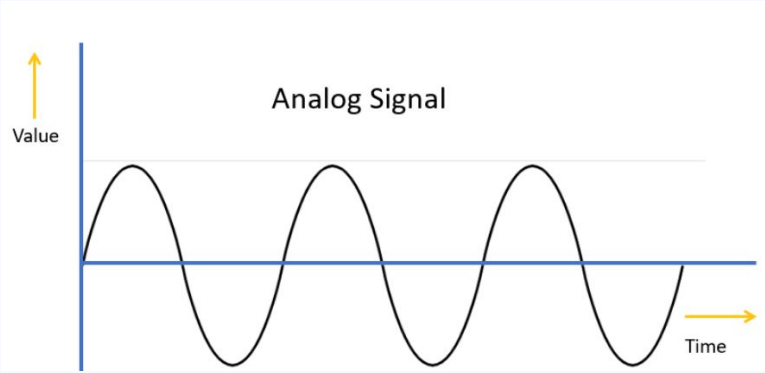
Digital and Analog Signals

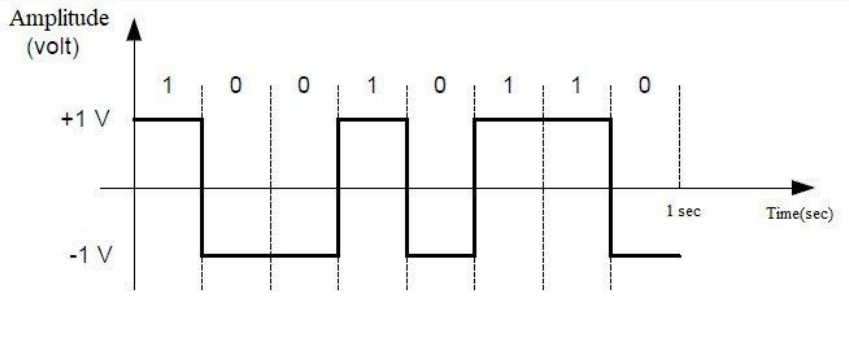
Analog Signal

➔ They can take any value.

Digital Signal

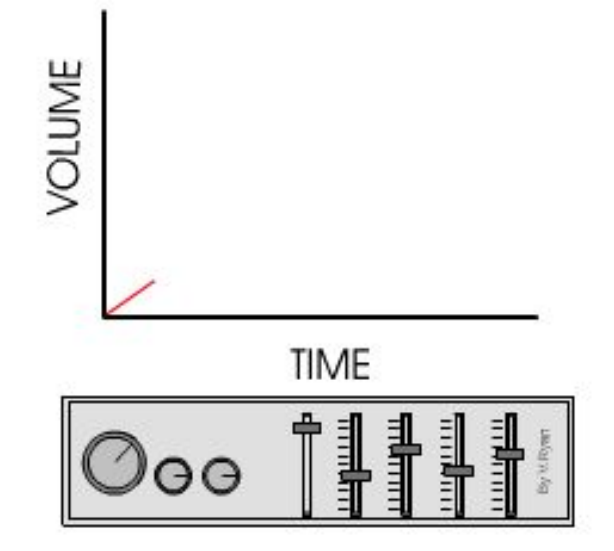
➔ They can take only 2 values.





Digital and Analog Signals

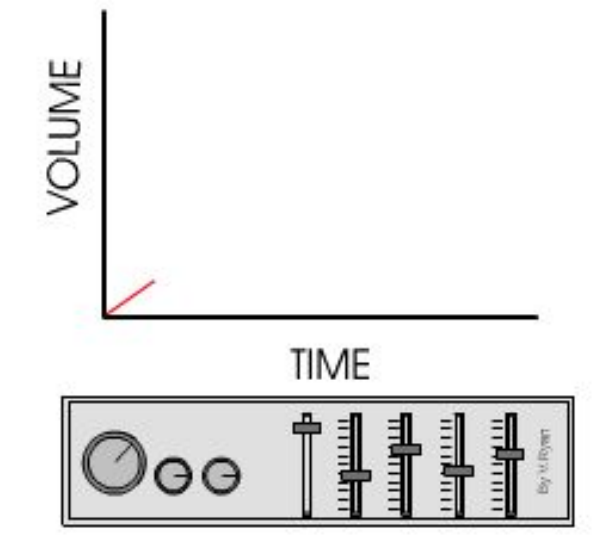
Analog Signal



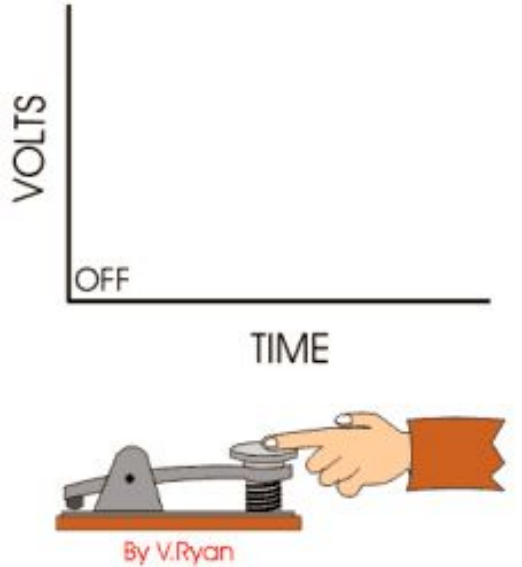
Digital Signal

Digital and Analog Signals

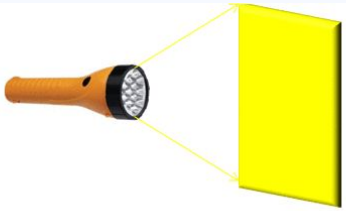
Analog Signal



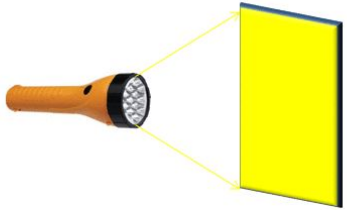
Digital Signal



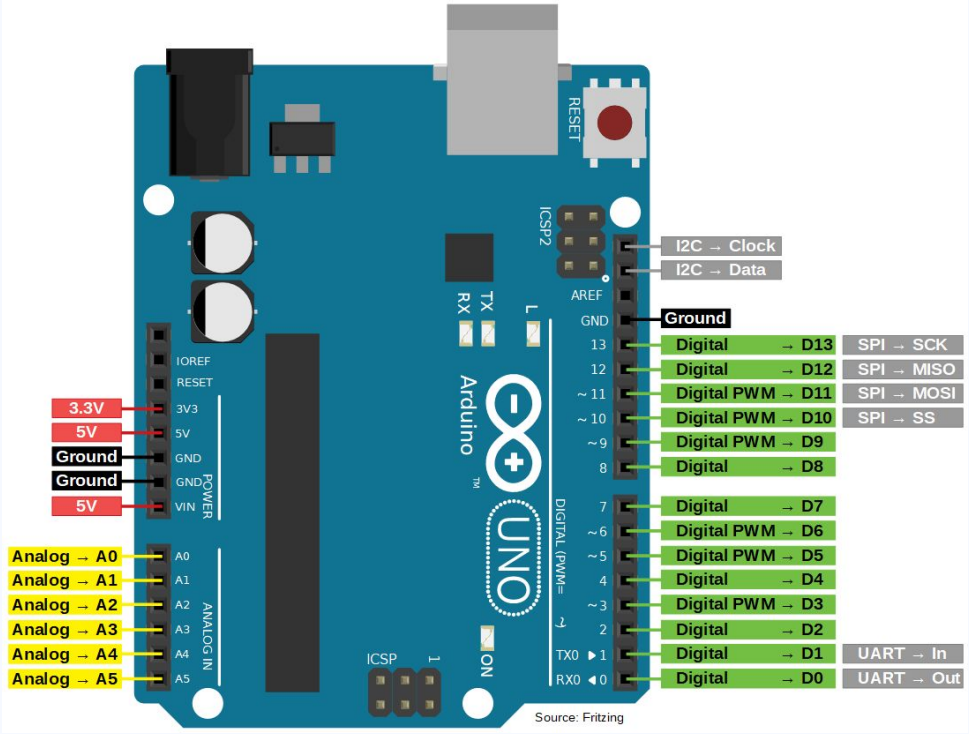
Digital and Analog Signals



Analog



Digital



Pins

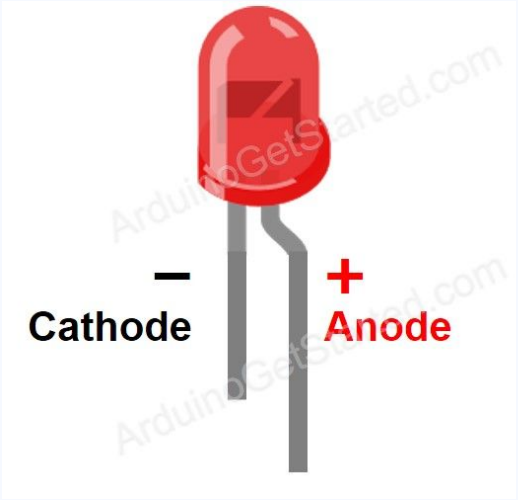
- Analog
  - ➔ Input
- Digital
  - ➔ Input
  - ➔ Output

Experiments

- Blinking LED experiment
- Light controlled LED experiment

Blinking LED

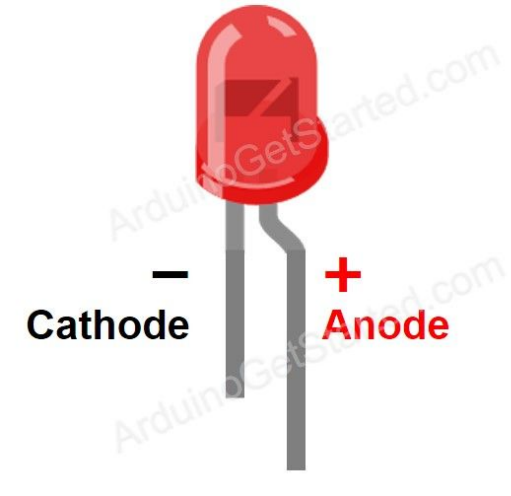
Objective: To blink the LED i.e turn it on and off every second.

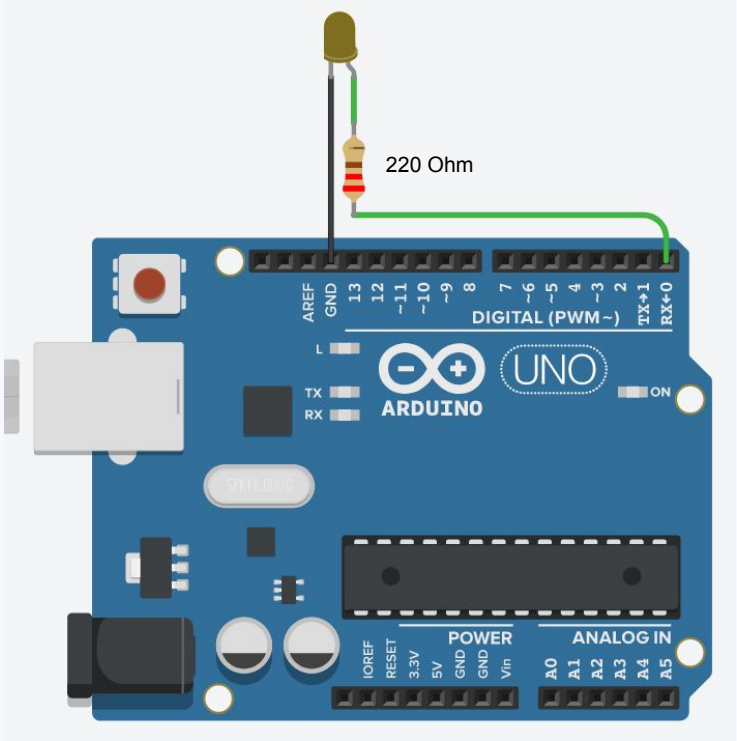


Light Emitting Diode (LED)

Blinking LED

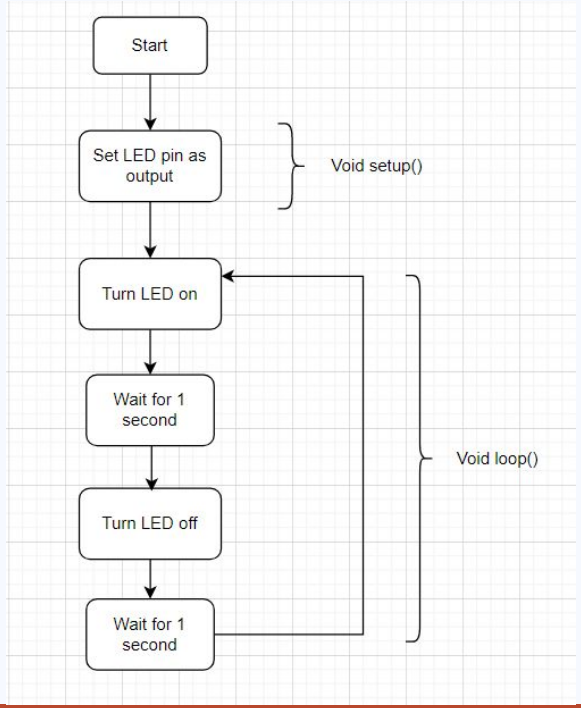
Light Emitting Diode (LED)



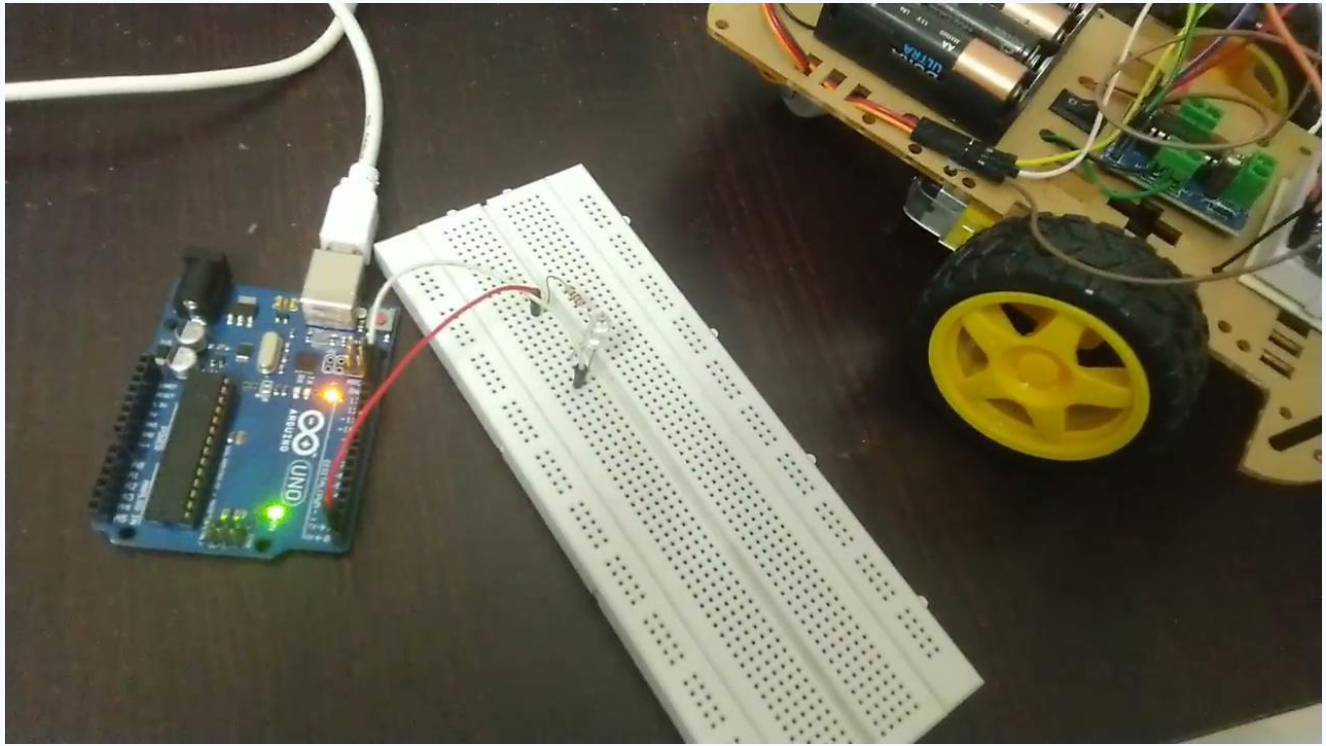


Blinking LED

Flowchart



Blinking LED



Light Controlled LED

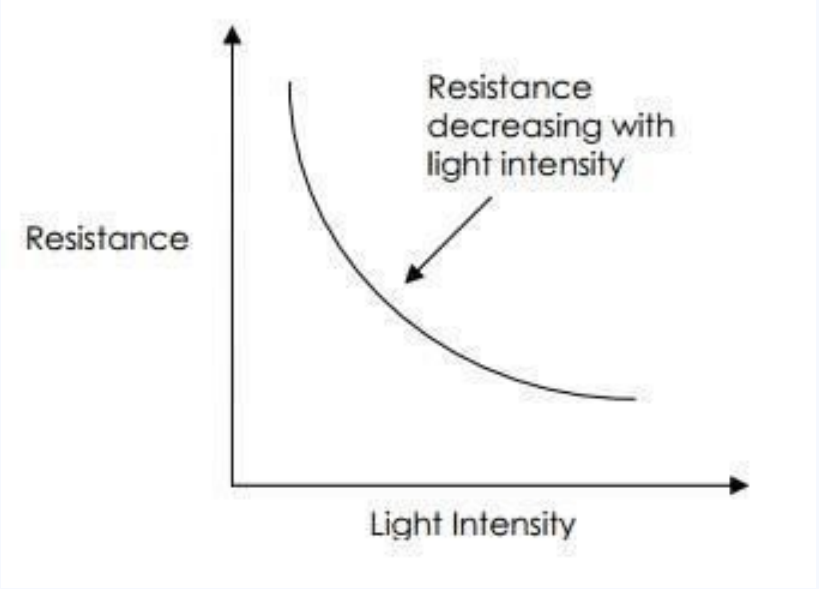
Objective: To turn the LED on and off based on the brightness in the room i.e turn the LED on if the room is dark and turn the LED off if the room is bright.

To achieve this, we need to know the brightness in the room or the light intensity in the room.

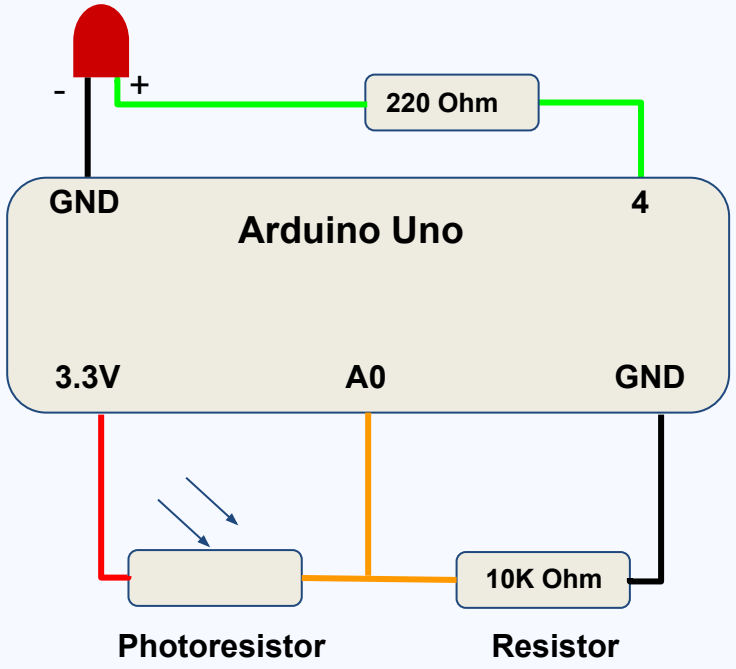
A photoresistor can the detect light intensity falling on it. It is a type of resistor which can change its resistance based on the light intensity falling on its surface. It is also called LDR (Light Dependent Resistor).

Output of photoresistor is analog in nature.

Light Controlled LED



Light Controlled LED



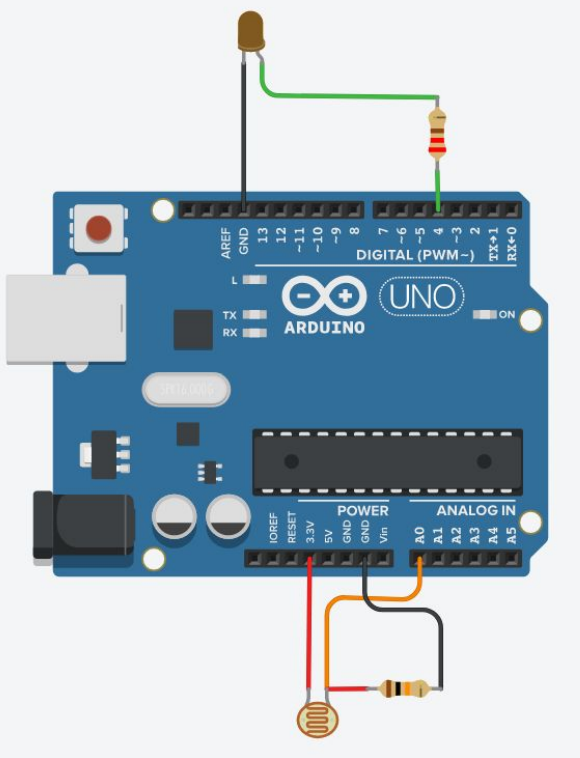
Circuit Diagram

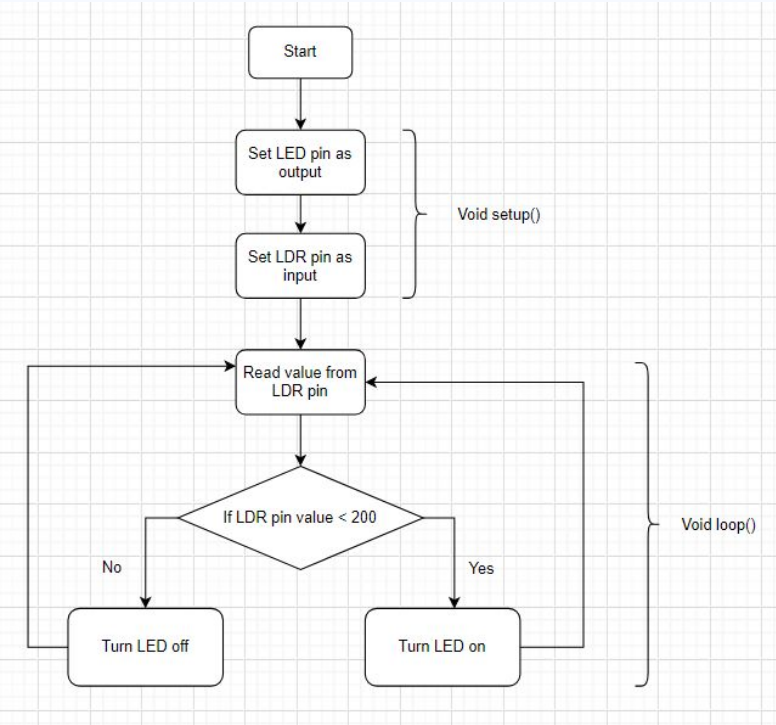
Output from Photoresistor: 0 to 3.3V

Input in A0: 0 to 1023

So,
If A0 ----> 0 ----> Room is very dark
If A0 ----> 1023 ----> Room is very bright

Light Controlled LED





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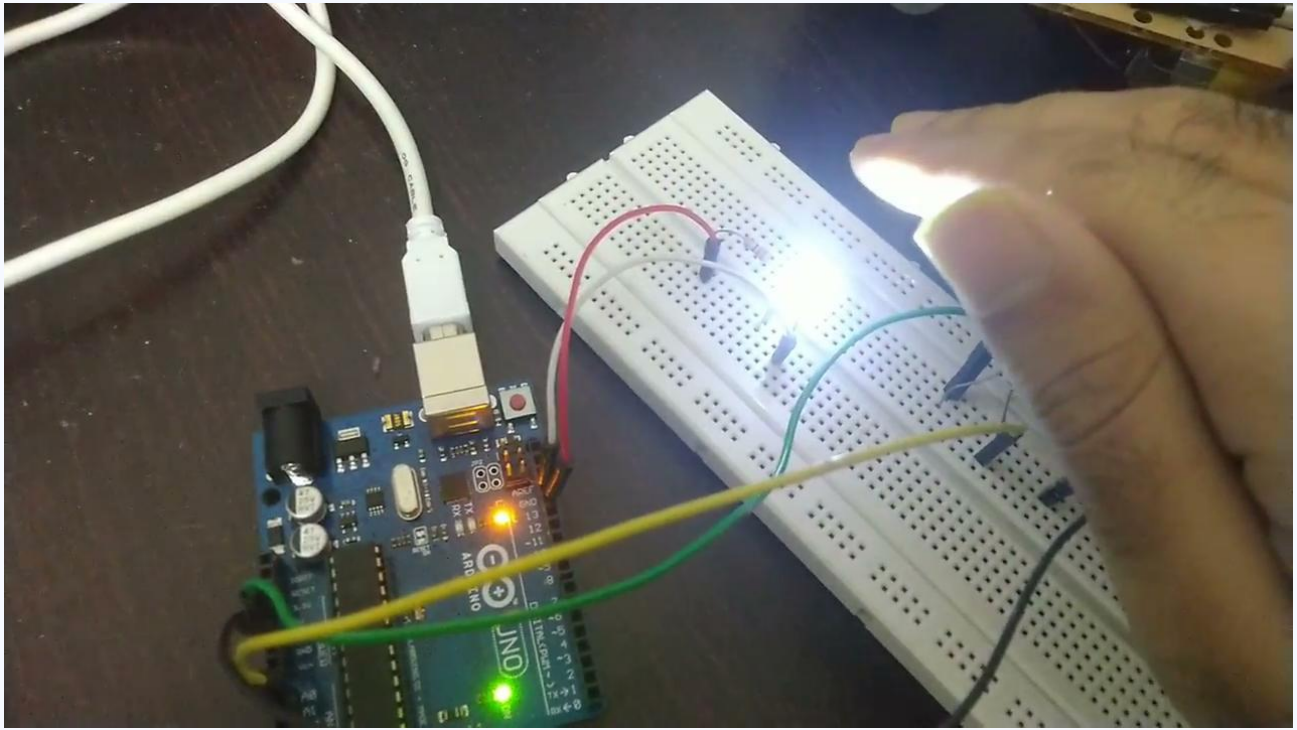

THANK YOU