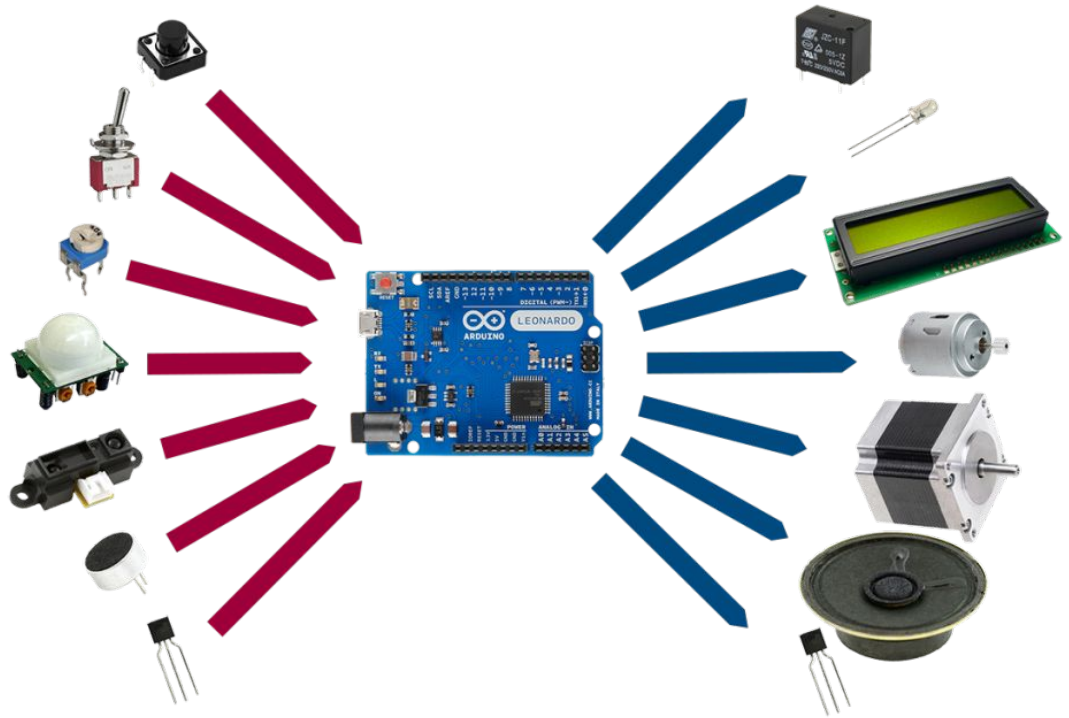


Electronics **Outputs**

Outputs

Outputs is a broad term for any load that we connect and control using the code.

This can create sound, motion, light, colour, display information etc.

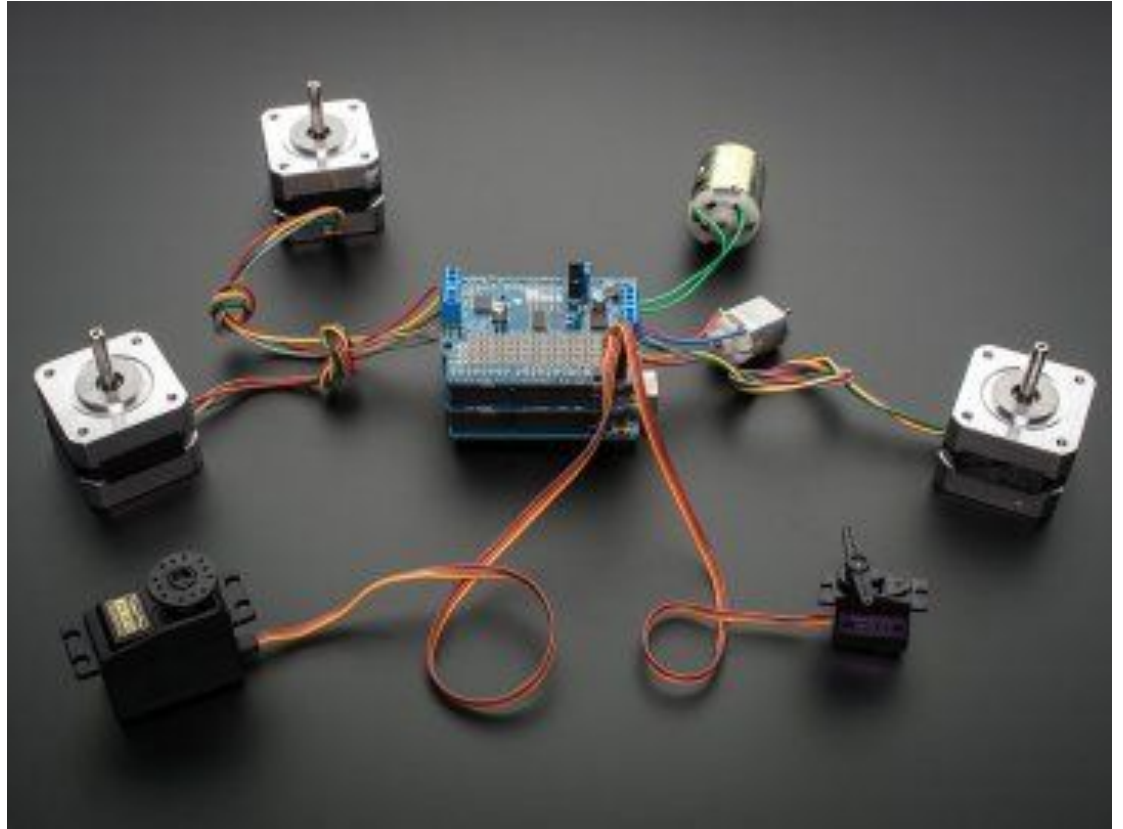


Outputs >> Motors

Motors are one of the most common outputs used in Arduino projects.

We can use motors to create a range of different movements.

At times we'll want to dictate the speed of the motor, or its specific position.



A collection of various servomotors and actuators, including Hitec HS-422, Corbin, and other models, connected by wires. The servos are of different sizes and colors (black, blue, white), and the wires are color-coded (red, yellow, black).

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A collection of various servomotors and actuators, including Hitec HS-422, Corbin, and other models, connected by wires. The components are arranged on a white background, showing different sizes and colors (black, blue, white). Wires of various colors (red, orange, yellow, black) are connected to the servos, some ending in standard servo connectors.

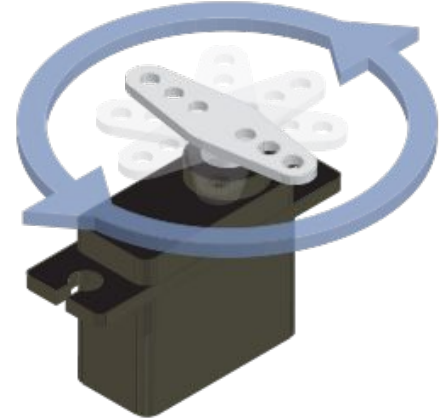
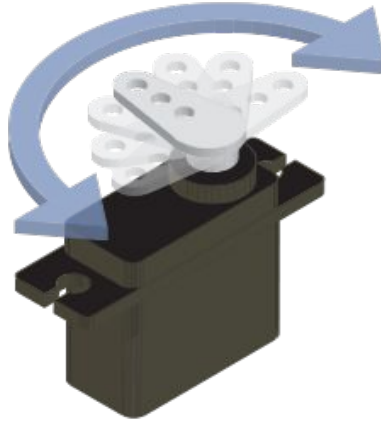
Outputs >> Motors >> Servo >> Continuous vs regular

Servo motors can be split into two groups:

Regular and continuous

Regular servo motors have a 180 angle, and we can set the motor to a specific angle within the range (somewhere between 0 and 180).

Continuous servos have full rotation capabilities, and we can set their speed and direction of rotation using the same range of values (90 being still, 0 full speed rotation to one direction and 180 full speed rotation to the next).



Outputs >> Motors >> Stepper

Stepper motors are control using the motor's steps. Which is a predetermined angle within the circle= step.

Because of their precise positioning, they are often used for CNC and 3D printers.

Stepper motors require drivers, which are used to supply the motor with the correct electricity. For stronger motors this will be above the 5V that the arduino can supply.



Outputs >> Motors >> Movement

Rotary to linear:

<https://www.youtube.com/watch?v=ve9M8d6KfdI>

https://www.youtube.com/playlist?list=PL_6VEfozyAFfN1L6HgAeYErpjqd4n8VXr

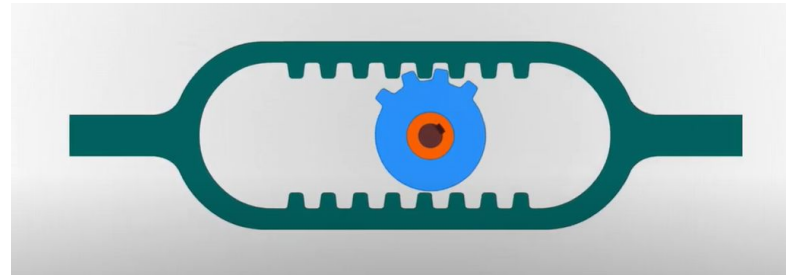
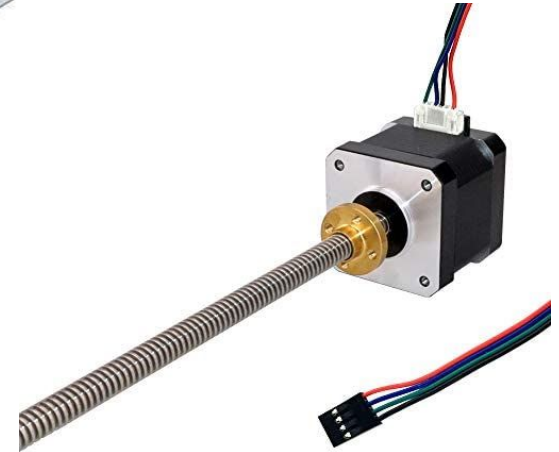
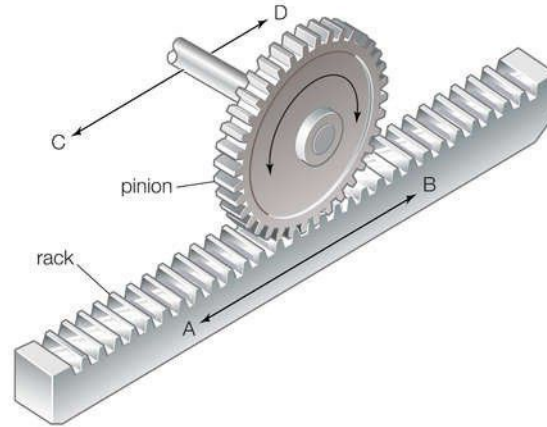
Rotary to reciprocating:

<https://www.youtube.com/watch?v=0c0yB5zF7sq>

Thingiverse ideas:

<https://www.thingiverse.com/thing:3170748>

<https://www.thingiverse.com/thing:715525>



Outputs >> Buzzer

A piezo buzzer has a ceramic disk that can create different tones depending on the electrical current output to it. It is connected using a digital pin, and it doesn't need an PWM pin.

In order to use it, we use the function:

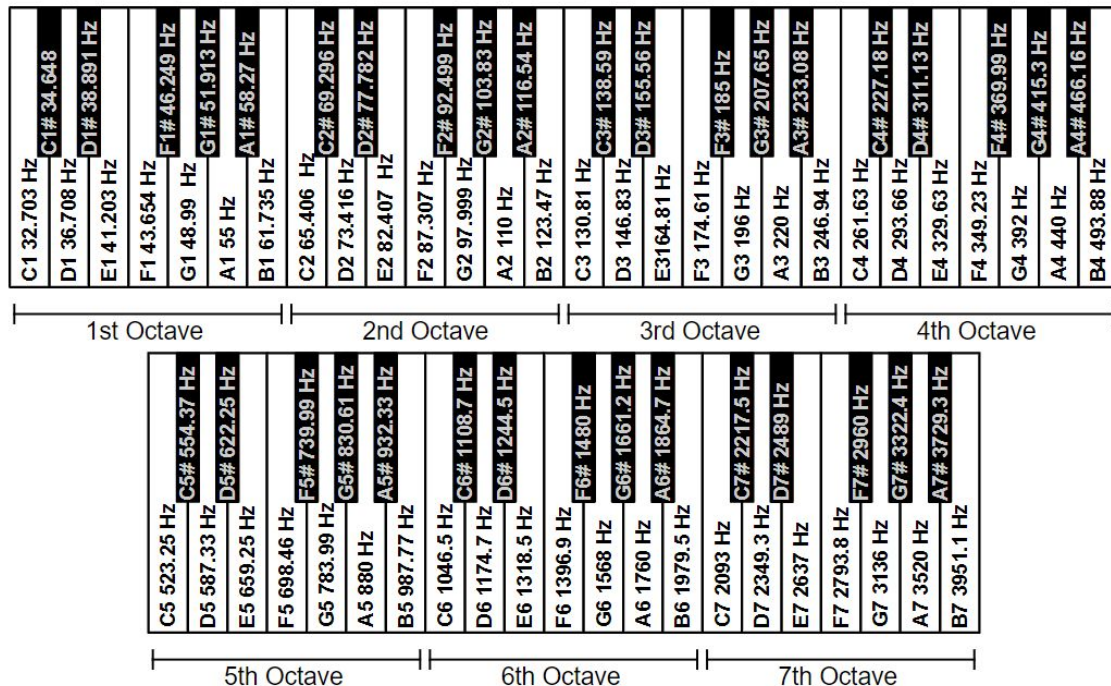
`tone(pin, frequency, duration)`

It can typically generate a tone between 2 to 6 kHz.



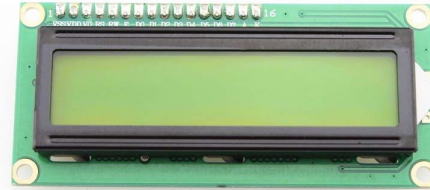
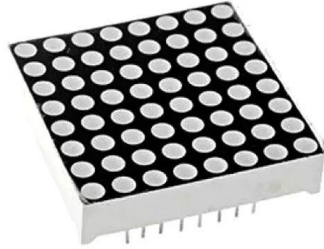
Outputs >> Buzzer

The frequency in Hz can be used inside the `note()` function to play specific notes.



Sensors >> Display

Different modules can be used to display information or even graphics to a user.

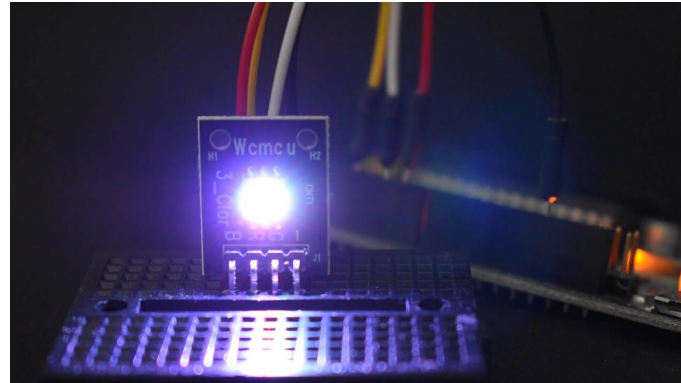


Sensors >> RGB

An RGB LED light can be used to produce a colour from the RGB scale.

This allows greater flexibility and control of the design.

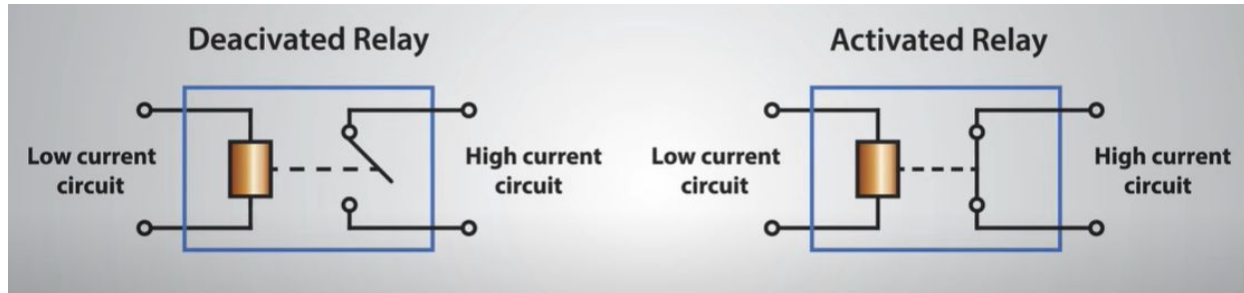
The shade is controlled by outputting a value to three different pins, each attached to one of the Red Green and Blue pins.



Sensors >> Relay

Relays are used to control higher voltage loads using a lower voltage. The higher voltage is activated and deactivated using a switch controlled by the lower voltage.

NO and NC on the relay signify if the circuit should be normally open or normally closed. We'll choose how through which to connect depending on the use.



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