Control the position of the Servo motor with the Arduino and the potentiometer.

Servo Motors

These are DC **motors** that allow for precise control of the angular position. They are DC **motors** whose speed is slowly lowered by the gears. The **servo motors** usually have a revolution cut off from 90° to 180°. A few **servo motors** also have a revolution cutoff of 360° or more.
The servo motor is an assembly of four things: a normal DC motor, a gear reduction unit, a position-sensing device, and a control circuit. The DC motor is connected with a gear mechanism that provides feedback to a position sensor which is mostly a potentiometer. From the gearbox, the output of the motor is delivered via servo spline to the servo arm. For standard servo motors, the gear is normally made up of plastic whereas, for high power servos, the gear is made up of metal.

A servo motor consists of three wires- a black wire connected to the ground, a white/yellow wire connected to the control unit, and a red wire connected to the power supply.The function of the servo motor is to receive a control signal that represents a desired output position of the servo shaft and apply power to its DC motor until its shaft turns to that position.It uses the position-sensing device to figure out the rotational position of the shaft, so it knows which way the motor must turn to move the shaft to the instructed position. The shaft commonly does not rotate freely around similar to a DC motor, however rather can just turn 200 degrees.

Servo motors are used in applications requiring rapid variations in speed without the motor getting overheated.

- In Industries they are used in machine tools, packaging, factory automation, material handling, printing converting, assembly lines, and many other demanding applications robotics, CNC machinery, or automated manufacturing.
- They are also used in radio-controlled airplanes to control the positioning and movement of elevators.
- They are used in robots because of their smooth switching on and off and accurate positioning.
- They are also used by the aerospace industry to maintain hydraulic fluid in their hydraulic systems.
- They are used in many radio controlled toys.
- They are used in electronic devices such as DVDs or Blue-ray Disc players to extend or replay the disc trays.
- They are also being used in automobiles to maintain the speed of vehicles.

NB; Potentiometer is basically a variable resistor

```
#include <Servo.h>  // add servo library

Servo myservo;  // create servo object to control a servo

int potpin = 0;  // analog pin used to connect the potentiometer
int val;    // variable to read the value from the analog pin

void setup() {
    myservo.attach(9);  // attaches the servo on pin 9 to the servo object
}

void loop() {
    val = analogRead(potpin);            // reads the value of the potentiometer (value between 0 and 1023)
    val = map(val, 0, 1023, 0, 180);     // scale it to use it with the servo (value between 0 and 180)
    myservo.write(val);                  // sets the servo position according to the scaled value
    delay(15);                           // waits for the servo to get there
}
```

Assignment,

1. Based on the code above write code that will light up 3 LEDs red, blue and green when the servo angle is at the following degrees (60=red, 120=Blue,180=green)
2. State 3 systems in your environment that might use servo motors in its workings