United International University
QUEST FOR EXCELLENCE

# Project Update 3

Electronics Laboratory

**Group 3**

**Md. Rafiqul Islam – 011 191 047**

**Saima Rahaman Eyana – 011 191 252**

**Mahmudul Hasan- 011 191 210**

**Date of Submission**: 19-Jun-2021

## Components

- Servo Motor – sg90
- Solar panel
- Arduino Uno
- Light Dependent Resistor (2 piece)
- Resistors (2 piece, 10k)
- 12V Battery

## Working Principle of Components

**Solar Panel:** Solar panels will always follow the sunlight will always face the sun to get charge all the time and can provide the supply the maximum power.

**Servo Motor:** Servo Motor is used to rotate the solar panel.

The servo will move the solar panel towards the LDR whose resistance will be low, mean towards the LDR on which light is falling, that way it will keep following the light. And if there is some amount of light falling on both the LDR, then the servo will not rotate.

The servo will try to move the solar panel in the position where both LDR's will have the same resistance means where the same amount of light will fall on both the resistors and if the resistance of one of the LDR will change then it rotates towards lower resistance LDR.

**Arduino Uno:** In this Arduino Solar Panel Tracker, Arduino is powered by the 9V battery and all the other parts are powered by the Arduino.

**LDR:** Light Dependent Resistor also known as photo resistor is the light sensitive device. Its resistance decreases when the light falls on it. That's why it is frequently used in Dark or Light Detector Circuit. These are used in this project to detect the difference of sunlight received in the two side of the solar panel.

**Resistors:** These 10k resistors are used to control the current flow in the LDR, so LDR doesn't get damaged due to high current flow.

**12V Battery:** This is used to power up the Arduino Uno.

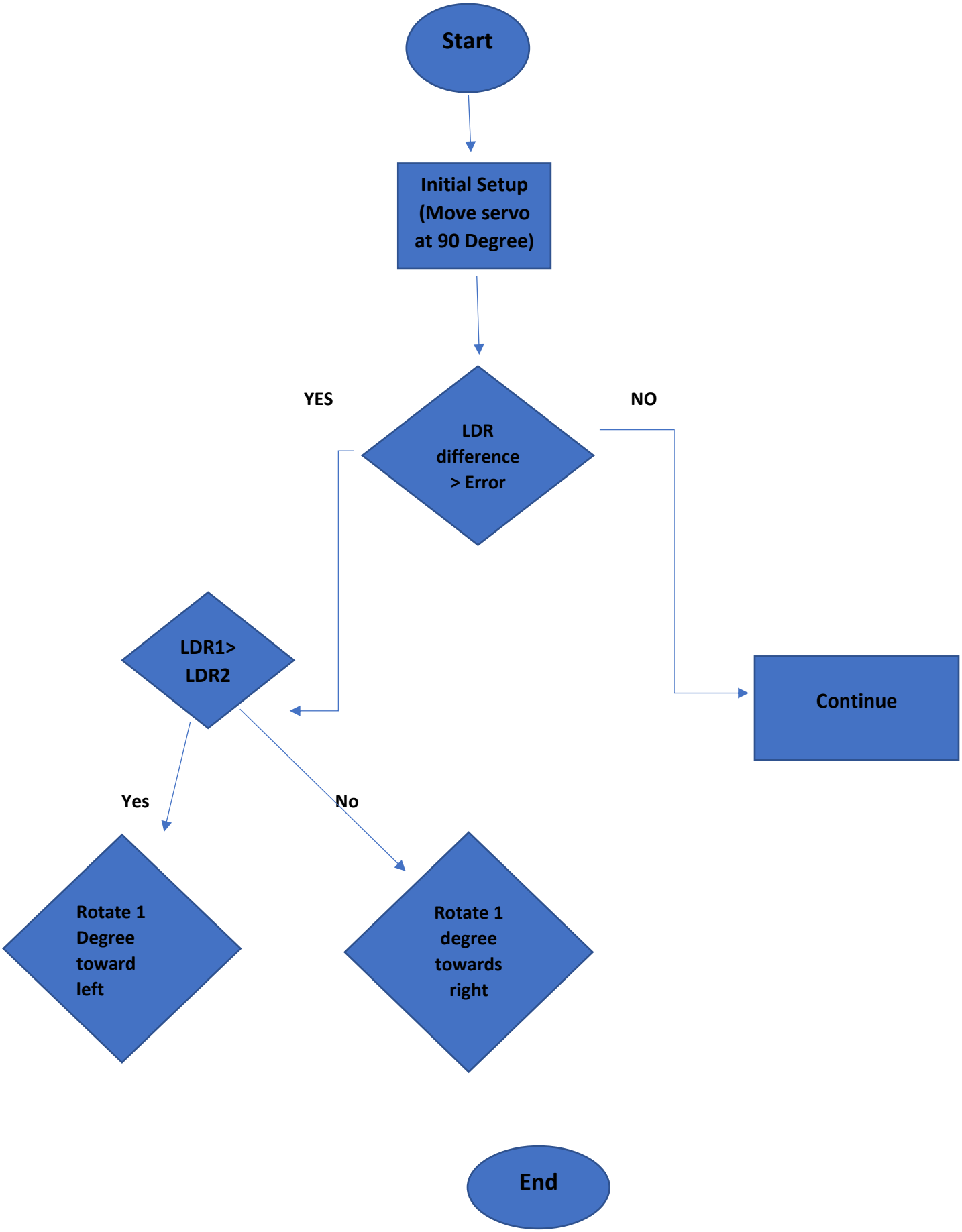
# Project Overview

Sun Tracking Solar Panel using Arduino, in which we will use two LDRs (Light-dependent resistor) to sense the light and a servo motor to automatically rotate the solar panel in the direction of the sunlight. The advantage of this project is that the Solar panels will always follow the sunlight will always face the sun to get charge all the time and can provide the supply the maximum power.

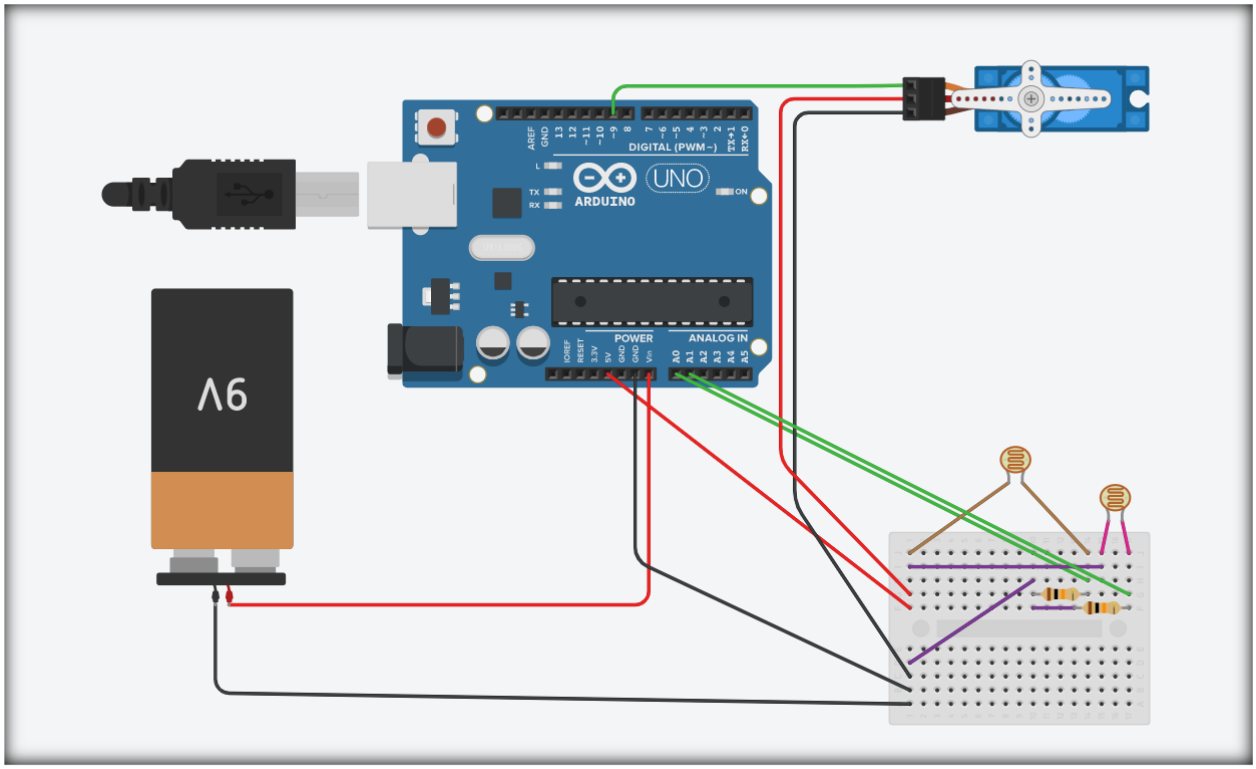
***Features***:

1. *Live sun tracking with LDR:* Tracking the sun automatically using 2 LDR is one of the features this project has. We achieve this by calculating the difference between two LDR, and comparing the difference with an error threshold of 5.
2. *Adjust solar panel to face towards the sunlight:* After tracking, another feature of our project is to adjust the solar pane to face towards the sun for maximum power output.

## Features flowchart:



# Tinker Cade circuit



# Code

```
#include <Servo.h>                    //including the library of servo motor

Servo sg90;                           //initializing a variable for servo
int initial_position = 90;            //Declaring the initial position at 90
int LDR1 = A0;                        //Pin at which LDR is connected
int LDR2 = A1;                        //Pin at which LDR is connected
int error = 5;                        //initializing variable for error
int servopin=9;
void setup()
{

  sg90.attach(servopin);              // attaches the servo on pin 9
  pinMode(LDR1, INPUT);               //Making the LDR pin as input
  pinMode(LDR2, INPUT);
  sg90.write(initial_position);       //Move servo at 90 degree
  delay(2000);                        // giving a delay of 2 seconds
}

void loop()
{
  int R1 = analogRead(LDR1);         // reading value from LDR 1
  int R2 = analogRead(LDR2);         // reading value from LDR 2
  int diff1= abs(R1 - R2);           // Calculating difference between LDR's
  int diff2= abs(R2 - R1);

  if((diff1 <= error) || (diff2 <= error)) {
    //if the difference is under the error then do nothing
  } else {
    if(R1 > R2)
    {
      initial_position = --initial_position;    //Move the servo towards 0
degree
    }
    if(R1 < R2)
    {
      initial_position = ++initial_position;    //Move the servo towards 180
degree
    }
  }
  sg90.write(initial_position);                 // write the position to
servo
  delay(100);
}
```