



DIY TEAM PROJECT

TEMPERATURE BASED FAN SPEED CONTROLLER AND ADAPTIVE LIGHT SYSTEM

TEAM 11

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OBJECTIVE AND SCOPE

Objective

- To build a fan speed controller that changes its speed according to the surrounding temperature.
- To build an Adaptive light system that changes brightness according to the surrounding brightness.

Scope

- Power conservation
- Comfort
- Affordable

CURRENTLY AVAILABLE SOLUTIONS

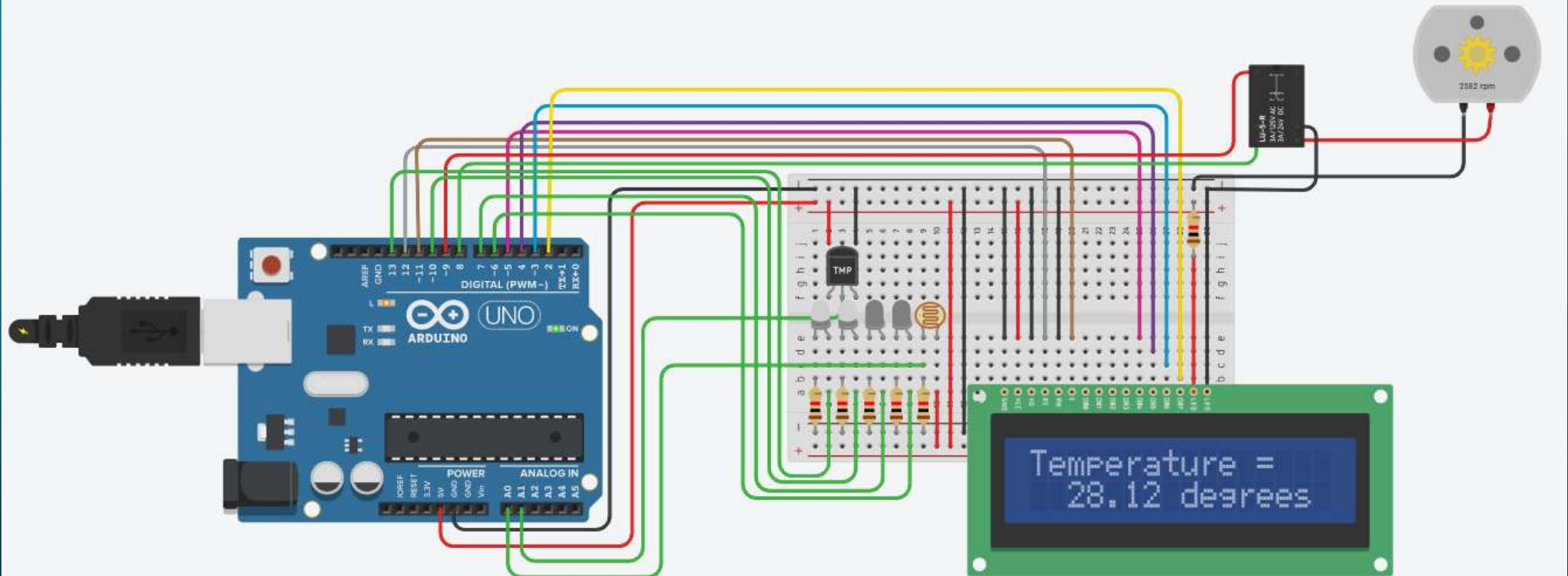
- Automatic fan controller in Air Conditioners
- Smart homes



OUR SOLUTION

- Our project, Temperature Based Fan Speed Control and Adaptive light system can be done by using an Arduino UNO board with some simple electronics materials.
- The output obtained from the operation is given through the o/p port of an Arduino UNO board to the LCD display that connected with the board.
- This generates the PWM pulses from the board which is further given to the driver circuit to get the expected output to the fan.
- The Adaptive Light system changes the number of lights switched on based on the surrounding brightness.

CIRCUIT DESIGN: (MADE IN TINKERCAD)



BILL OF MATERIALS (ESTIMATE)

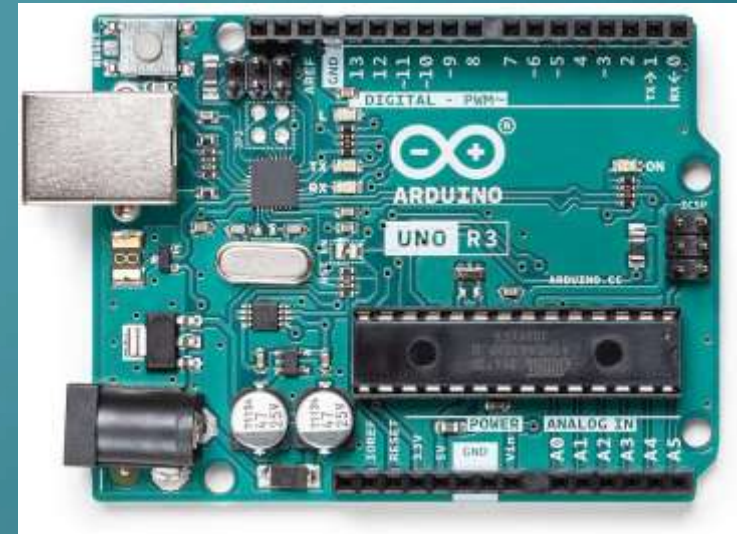
S.No.	Part Name	Quantity required	Unit price(Rs)	Cost (Rs)
1	Arduino Uno R3 + Adapter	1	720	720
2	DC fan	1	94	94
3	Bread Board	1	65	65
4	LCD 16*2	1	250	250
5	LM35 Temperature sensor	1	109	109
6	Relay SPDT	1	59	59
7	Photoresistor	1	22.5	22.5
8	Resistors (1k Ω)	6	0.4	2.4
9	Jumper cables	40	1.8	72
10	White LEDs	4	1.5	6
			TOTAL	1399.9

ARDUINO UNO R3

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

It is-

- Inexpensive
- Cross-platform
- Simple, clear programming environment
- Open source and extensible software
- Open source and extensible hardware



Specifications:

1. Microcontroller- ATmega328
2. Operating Voltage- 5V
3. Input Voltage – 6 to 20V
4. Digital I/O Pins- 14
5. Analog Input Pins:6
6. DC Current for the 3.3V Pin- 50 mA
7. Flash Memory- 32 KB SRAM:2 KB
8. EEPROM- 1 KB
9. Clock Speed- 16 MHz

DC FAN

It is an electronic appliance used to flow the air around its environment. We all know that fan contains blades, they act on the air. The Impeller, rotor, or runner is the rotating assembly of blades.

Specifications:

1. Power connector type – 2-pin JST
2. Voltage – 12V (DC)



LCD 16*2

The LCD is a dot matrix liquid crystal display that displays alphanumeric characters and symbols. 16X2 LCD digital display has been used in the system to show the room temperature and light brightness. Liquid Crystal Display screen is an electronic display module and find a wide range of applications.

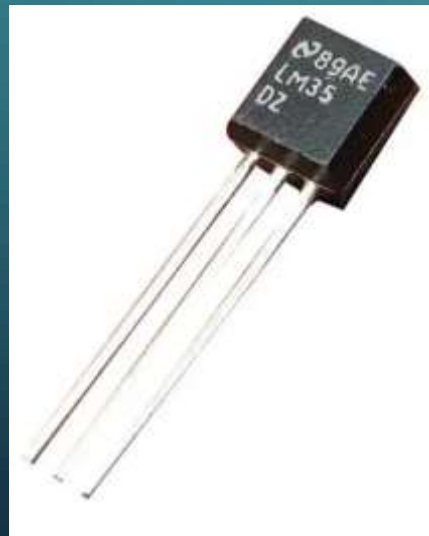
A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.



Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V - 5.3V)	V _{CC}
3	Contrast adjustment; through a variable resistor	V _{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V _{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

LM35 TEMPERATURE SENSOR

Temperature sensor senses the room temperature. This electronic device converts the data that sensed in the surrounding into the electronic data for recording purpose. There are many different types of temperature sensors. Here in this project we are using LM 35 temperature sensor. The LM35 temperature sensor is graded to work from -55° Centigrade to 150° Centigrade with a undeviating scale factor of $+10\text{mv}/^{\circ}\text{C}$. It is a tiny and low cost IC which can be used to measure temperature anywhere in the surrounding between -55°C to 150°C .



Specifications:

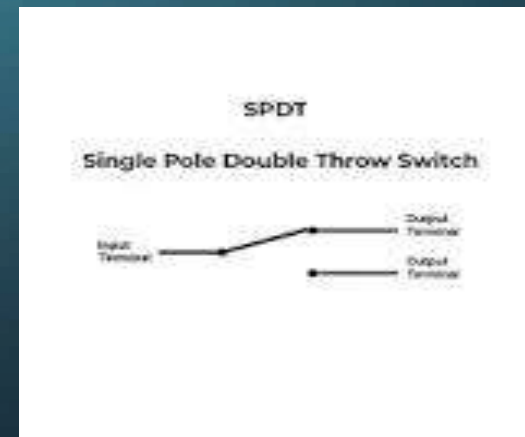
- Measures directly in degree Celsius (centigrade) Linear $+10.0\text{ mV}/^{\circ}\text{C}$
- 0.5° degree Celsius accuracy (at $+25^{\circ}\text{C}$)
- Rated between -55 to $+150$ degrees Celsius range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Less than 60 Micro ampere current drains
- Low self-heating, 0.08° degree Celsius and Nonlinearity only $\pm 1/4^{\circ}$ degree Celsius

RELAY SPDT

It is a switch which controls (open and close) circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF. It is mainly used to control a high powered circuit using a low power signal.

Specifications:

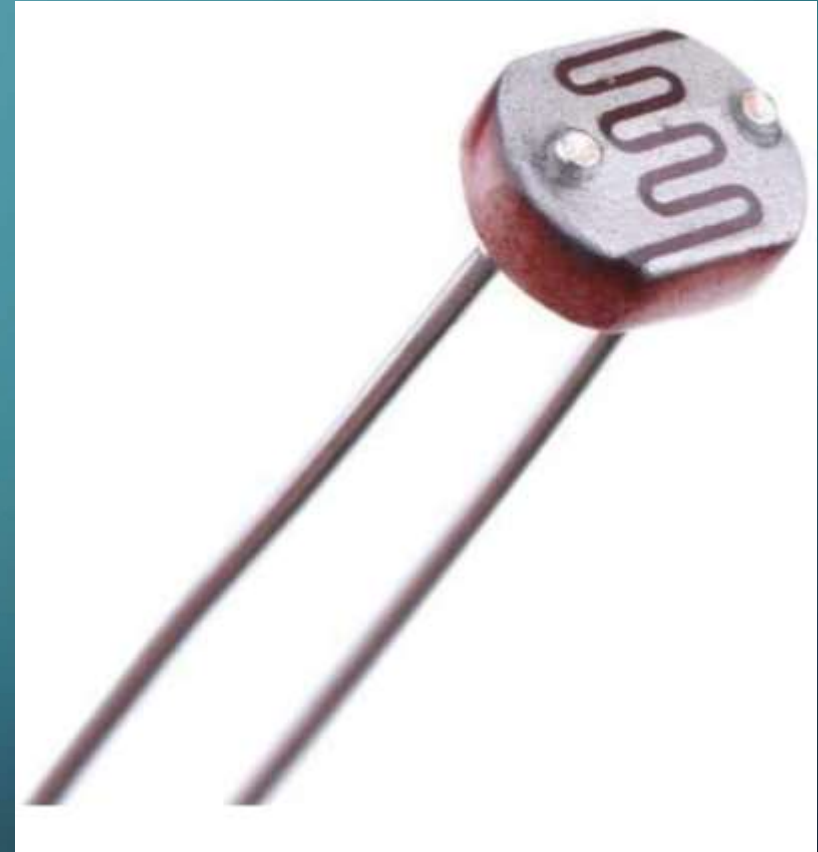
- Type: SPDT
- Coil Voltage Rating: 5V
- Current: 10A
- Contact capacity: 10A@250VAC, 10A@125VAC, 10A@30VDC, 10A@28VDC
- Pin counts: 5



PHOTORESISTOR

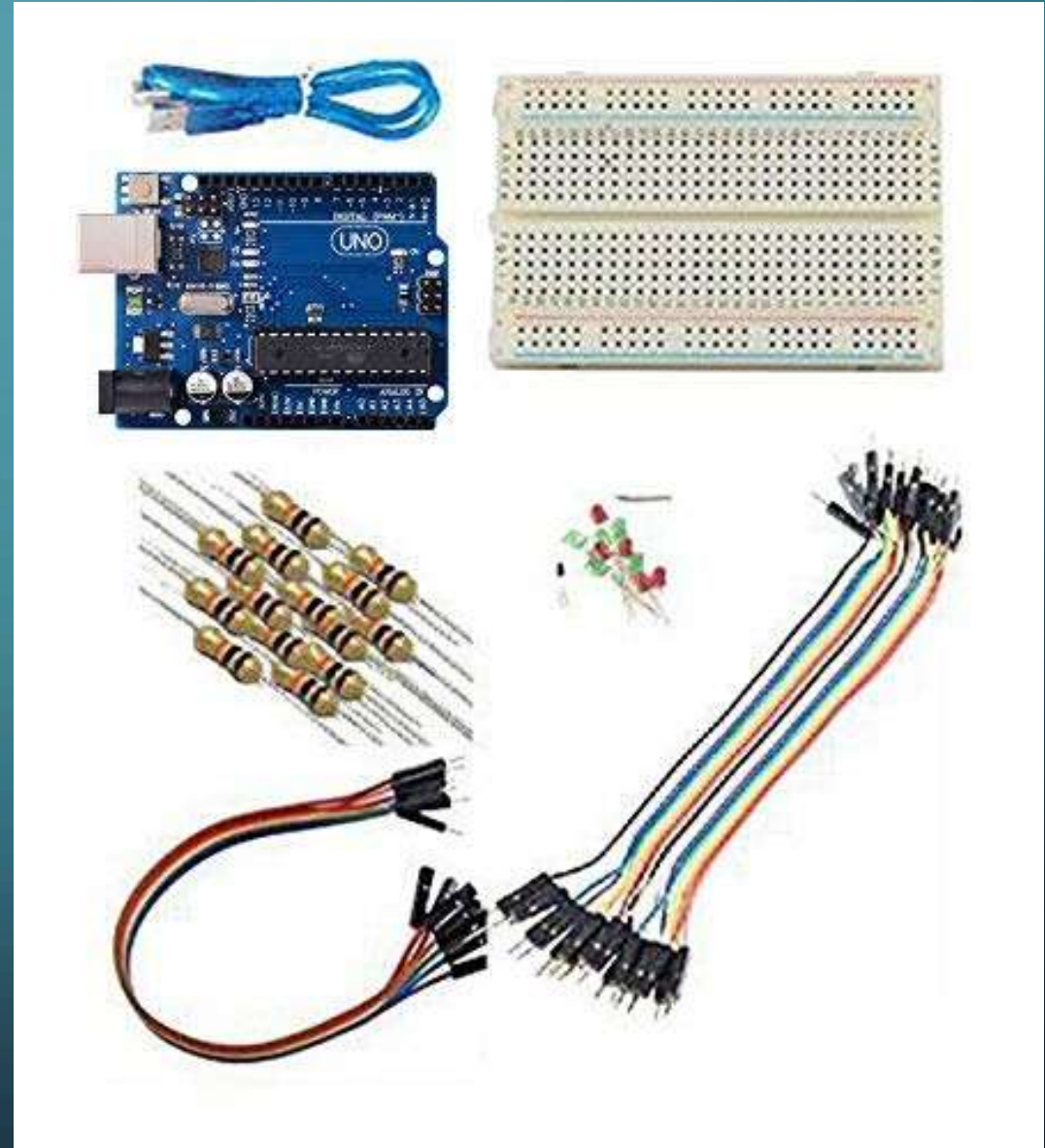
Photoresistors, also known as LDR (light-dependent resistors), are components made of semiconductors. A photoresistor is sensitive to light. Its resistance decreases when lighting increases.

Photoresistors have multiple uses, for example, automatic door opening.



OTHER COMPONENTS

- Bread board
- Resistors (1K Ω)
- Jumper cables
- White LEDs



SOFTWARE USED

TINKERCAD:

- TinkerCAD is a free, easy-to-use web app that equips the next generation of designers and engineers with the foundational skills for innovation: 3D design, electronics, and coding!
- TinkerCAD Circuits allows anyone to virtually create and program Arduino projects without the need for physical hardware.

ARDUINO IDE:

- Arduino is an open-source electronic prototyping platform that also sells microcontrollers.
- The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

WORK PLAN AND ASSOCIATED TIMELINE

WEEK 1

- Identifying problem statement
- Research on currently available solutions
- Circuit design - First draft on TinkerCAD
- Components survey and purchase

WEEK 2

- Circuit design - Final draft
- Building the physical model

WEEK 3

- Solving the challenges faced or errors occurred in the physical model
- Testing – Final model

WEEK 4

- Making presentation video
- Making project report



ROLES:

1. RESEARCH AND COLLECTING INFORMATION - SAI VARSHITH VALUGULA
2. HARDWARE PURCHASE AND ARRANGEMENT - VANKADARA JAYADITHYA SREEKAR
3. DESIGNING CIRCUIT ON TINKERCAD AND CODING - GOLLAPALLI DHEERAJ
4. PRESENTATION AND VIDEO MAKING - VICTOR JOHN CLEMENT BEERA



CREDITS:

1. RESEARCH ON CURRENTLY AVAILABLE SOLUTIONS - SAI VARSHITH VALUGULA
2. COMPONENTS SURVEY AND PURCHASE - VANKADARA JAYADITHYA SREEKAR
3. DESIGNING CIRCUIT ON TINKERCAD -GOLLAPALLI DHEERAJ
4. PRESENTATION MAKING - VICTOR JOHN CLEMENT BEERA

THANK YOU 😊