TUTORIAL / PRACTICAL NO.

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Objective :- Interfacing the RGB LED with the Arduino

Introduction :- There are actually two types of RGB LED's : the common cathode one and common anode one. In the common cathode RGB LED, the cathode of all LED's is common and we give PWM signals to anode of LED's while in the common anode RGB LED, the anode of all LED's is common and we give PWM signal to cathode of LED's.

Hardware Required :-

Component Name	Quantity
Arduino UNO	1
RGB LED	1
220Ω register	3
USB Cable	1
Bread board	1
Jumper wires	Several

Working :-

1) Insert RGB LED into your bread board and ~~connect~~ connect its cathode pin to the GND of Arduino.

2) Insert LED into breadboard. Attack Red pin to pin 8, Green pin to pin 9 & blue pin to pin 10 of arduino via 220Ω register and negative leg to GND.

3) upload code as given below

4) Observe Changes in Color of RGB LED.

Code :-

```
void setup()
{ pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);
}

void loop()
{ digitalWrite(8, HIGH);
  digitalWrite(10, LOW);
  delay(1000);
  digitalWrite(9, HIGH);
  digitalWrite(8, LOW);
  delay(1000);
  digitalWrite(10, HIGH);
  digitalWrite(9, LOW);
  delay(1000);
}
```

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Objective:- Controlling LED blink rate with potentiometer interfacing with Arduino.

Introduction:- A potentiometer is a variable resistor with knob that allows altering the resistance of potentiometer. The potentiometer manipulates continuous analog signal, which represent physical measurements.

Hardware Required :-

Component	Quantity
Arduino UNO	1
Bread Board	1
220 Ω resistor	1
5 mm LED	1
10 kΩ potentiometer	1
Jumper wires	Several
Supporting USB Cable	1.

Working :-

1) Insert potentiometer into your breadboard and connect its outer pin to the analog pin A2 and remaining pin to GND of breadboard.
2) Insert LED into breadboard. Attach positive leg to pin 13 of arduino via 220 Ω resistor & negative leg to GND.
3) Upload the code.
4) Turn the potentiometer to control brightness and move position of pin 2 by ~~to~~ rotating the knob.

6) Observe the changes in the blinking rate.

Sketch :-

This sketch works by setting pin A2 as for the potentiometer and pin 9 as an OUTPUT to power the LED.
After that run a loop that continuously reads the value from potentiometer and sends the value as voltage to the LED.

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Objective :- Detection of light using photo resistor.

Introduction :- A photoresistor is a light-controlled value resistor made of a high resistance semiconductor. The resistance of photo resistor decreases with increasing incident light intensity. A photo resistor can be applied in light-sensitive detector circuits and light and dark activated switching circuits.

Hardware Required :-

Component	Quantity
Arduino UNO	1
LED	1
Photo Resistor	1
10KΩ Resistor	1.
220Ω Resistor	1
USB Cable	1
Bread Board	1
Jumper Wires	Several.

Working :-

1) Insert photo resistor into your breadboard and connects its pin to analog pin A0 and remaining pin to supply on the breadboard.
2) Insert LED into breadboard. Attach positive leg to pin 9 of Arduino via 220Ω resistor.
3) Insert 10 KΩ resistor
4) Upload the Code.

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5) Turn the photo resistor to ON.
6) Observe the changes in state of LED.

Code :-

```
void setup()
{ pinMode (ledPin, OUTPUT);
  lightCal = analogRead (sensorPin);
}
void loop()
{ lightVal = analogRead (sensorPin);
if ( lightVal < lightCal - 50)
{ digitalWrite (9, HIGH);
else
    { digital (9, LOW);
    }
}
```

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Objective:- Interfacing of temperature sensor LM35 with Arduino.

Introduction:- The LM35 Series are precision integrated-circuit temperature devices with an output voltage linearly proportion to the Centigrade temperature.

LM35 is three terminal linear temperature sensors from National semiconductors.

Hardware Required:-

Component Name	Quantity.
Arduino UNO	1
LM35	1
USB Cable	1
Bread board	1
Jumper wires	Several.

Working:-

1) Insert temperature sensor into breadboard and connect it's pin 1 to supply.
2) Connect its center pin to analog pin A0 and remaining pin 3 to GND on breadboard
3) Update the code as given below
4) Vary the temperature and read the voltage changes
5) Open the Arduino IDE's serial monitor to see results.

Code :-

```
void setup()
{
  Serial.begin(9600);
}
void loop()
{ int val;
int data;
val = analogRead(LM35 Pin);
data = (val * 5) / 10;
Serial.print("Temp:");
Serial.println("C");
delay(500);
}
```

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Objective:- Creating a wireless sensor network

Steps:-

1) Obtain the required hardware and software
2) Create a model of the network using default names.
3) Configure all the devices in the network.
4) Send configuration string files to the datalogger.
5) Program the datalogger to communicate with CWB100.
6) Connect the CWB100 to the datalogger.
7) Apply power to wireless sensors & initiate auto-discovery
8) Verify that data is being transmitted.

Hardware & Software Requirements:-

1) A205 CWS to PC interface ⇒
It is used to communicate between wireless sensors and a computer via USB cable.

2) Required Cables ⇒
A data cable, CSI part number, ships with A205. The cable has USB type A male connector on one end & type B male connector on the other end.

3) Configuration CD ⇒
CD has software & files needed to configure including:
   → Wireless Sensor Planner
   → Device Configuration Utility

→ Device deivers for CWB100 radio.

→ WSN Manual.

Configuration Software ⇒

Wireless Sensor Planner is typically used to configure wireless sensor network. Wireless sensor planner is similar to network planner, a component of loggerNet 4.1 & higher.

Deiver Installation :-

If no CWB100 or A205 have been previously ~~the~~ plugged into your computer, it will be necessary to install device deivers to enable communication with this device.