**Notes for programming used in ET &IoT**

1. **Basic experimentation using LEDs**

Blinking LED : Turns on an LED on for one second, then off for one second, repeatedly.

int LED=13;

void setup() {

  pinMode(LED, OUTPUT);

}

void loop() {

  digitalWrite(LED, HIGH);

  delay(1000);

  digitalWrite(LED, LOW);

  delay(1000);

1. **Interfacing DC Motor with Arduino** (**By connecting an L298 bridge IC to an Arduino, you can control a DC motor.)**

To control the direction of the spin of DC motor, without changing the way that the leads are connected, you can use a circuit called an H-Bridge. An H bridge is an electronic circuit that can drive the motor in both directions. H-bridges are used in many different applications, one of the most common being to control motors in robots. It is called an H-bridge because it uses four transistors connected in such a way that the schematic diagram looks like an "H."

You can use discrete transistors to make this circuit, but for this tutorial, we will be using the L298 H-Bridge IC. The L298 can control the speed and direction of DC motors and stepper motors and can control two motors simultaneously. Its current rating is 2A for each motor. At these currents, however, you will need to use heat sinks.

The pinouts for the L298 are shown below. You can find a datasheet the L298 at <http://www.tech.dmu.ac.uk/~mgongora/Resources/L298N.pdf>.

int pwm = 2 ; //initializing pin 2 as pwm

int in\_1 = 8 ;

int in\_2 = 9 ;

//For providing logic to L298 IC to choose the direction of the DC motor

void setup()

{

pinMode(pwm,OUTPUT) ; //we have to set PWM pin as output

pinMode(in\_1,OUTPUT) ; //Logic pins are also set as output

pinMode(in\_2,OUTPUT) ;

}

void loop()

{

//For Clock wise motion , in\_1 = High , in\_2 = Low

digitalWrite(in\_1,HIGH) ;

digitalWrite(in\_2,LOW) ;

analogWrite(pwm,255) ;

/\*setting pwm of the motor to 255

we can change the speed of rotaion

by chaning pwm input but we are only

using arduino so we are using higest

value to driver the motor \*/

//Clockwise for 3 secs

delay(3000) ;

//For brake

digitalWrite(in\_1,HIGH) ;

digitalWrite(in\_2,HIGH) ;

delay(1000) ;

//For Anti Clock-wise motion - IN\_1 = LOW , IN\_2 = HIGH

digitalWrite(in\_1,LOW) ;

digitalWrite(in\_2,HIGH) ;

delay(3000) ;

//For brake

digitalWrite(in\_1,HIGH) ;

digitalWrite(in\_2,HIGH) ;

delay(1000) ;

1. **Design of a simple home automation system (Use of nested if)**

int ledmom=5;

int sensorveg=11;

int ledwife=3;

int sensormilk=8;

int alarm=2;

int leddadi=7;

int swit =4;

void setup() {

pinMode(ledmom,OUTPUT);

pinMode(ledwife,OUTPUT);

pinMode(sensorveg,INPUT);

pinMode(sensormilk,INPUT);

pinMode(swit,INPUT);

pinMode(alarm,OUTPUT);

pinMode(leddadi,OUTPUT);

// put your setup code here, to run once:

}

void loop()

{

int neeraj= digitalRead(sensorveg);

int satyam = digitalRead(sensormilk);

if(neeraj == 1)

{

digitalWrite(ledmom,LOW);

digitalWrite(ledwife,HIGH);

digitalWrite(leddadi,LOW);

digitalWrite(alarm, HIGH);

}

else if(satyam==1)

{

digitalWrite(ledmom,HIGH);

digitalWrite(ledwife,LOW);

digitalWrite(leddadi,HIGH);

digitalWrite(alarm,LOW);

}

else

{

digitalWrite(ledmom,LOW);

digitalWrite(ledwife,LOW);

digitalWrite(leddadi,LOW);

digitalWrite(alarm,LOW);

}

}

1. **Design of a Traffic Light Controller**

int LEDRED=2;

void setup() {

  // configure the output pins

  pinMode(2,OUTPUT);

  pinMode(3,OUTPUT);

  pinMode(4,OUTPUT);

  pinMode(5,OUTPUT);

  pinMode(6,OUTPUT);

  pinMode(7,OUTPUT);

  pinMode(8,OUTPUT);

  pinMode(9,OUTPUT);

  pinMode(10,OUTPUT);

}

void loop()

{

  digitalWrite(2,1); //enables the 1st set of signals

  digitalWrite(7,1);

  digitalWrite(10,1);

  digitalWrite(4,0);

  digitalWrite(3,0);

  digitalWrite(6,0);

  digitalWrite(8,0);

  digitalWrite(9,0);

  digitalWrite(5,0);

  delay(5000);

  digitalWrite(3,1); //enables the yellow lights

  digitalWrite(6,1);

  digitalWrite(2,0);

  digitalWrite(7,0);

  delay(1000);

  digitalWrite(4,1); //enables the 2nd set of signals

  digitalWrite(5,1);

  digitalWrite(10,1);

  digitalWrite(2,0);

  digitalWrite(3,0);

  digitalWrite(6,0);

  digitalWrite(8,0);

  digitalWrite(9,0);

  digitalWrite(7,0);

  delay(5000);

  digitalWrite(9,1); //enables the yellow lights

  digitalWrite(6,1);

  digitalWrite(10,0);

  digitalWrite(5,0);

  digitalWrite(4,0);

  delay(1000);

  digitalWrite(8,1); //enables the 3rd set of signals

  digitalWrite(4,1);

  digitalWrite(7,1);

  digitalWrite(2,0);

  digitalWrite(3,0);

  digitalWrite(5,0);

  digitalWrite(6,0);

  digitalWrite(9,0);

  digitalWrite(10,0);

  delay(5000);

  digitalWrite(9,1); //enables the yellow lights

  digitalWrite(3,1);

  digitalWrite(7,0);

  digitalWrite(8,0);

  digitalWrite(4,0);

  delay(1000);

}

1. **Design of Obstacle Detector using IR and LDR sensors**

int IRsensor=6;

int LDRsensor=5;

int LEDW=3;

int LEDG=9;

void setup() {

PinMode(IRsensor,INPUT);

pinMode(LDRsensor,INPUT);

pinMode(LEDG,OUTPUT);

pinMode(LEDW,OUTPUT);

}

void loop() {

int deep = digitalRead(IRsensor);

int adi = digitalRead(LDRsensor);

if (deep == 1 && adi == 1)//if both sensors are high

{

digitalWrite(LEDG,HIGH);

digitalWrite(LEDW,HIGH);

}

else

{

  digitalWrite(LEDG,LOW);

  digitalWrite(LEDW,LOW);

}

}

1. **Design of Obstacle Detector using Ultrasonic sensors**

int alaram = 3;

int ledred = 2;

int trrigger = 9;

int echo =5;

void setup(){

  pinMode(ledred,OUTPUT);

  pinMode(alaram,OUTPUT);

  pinMode(trrigger,OUTPUT);

  pinMode(echo,INPUT);

}

void loop()

{

  digitalWrite(trrigger,HIGH);

  delayMicroseconds(10);

  digitalWrite(trrigger,LOW);

  long duration=pulseIn(echo,HIGH);

  int distance=0.034\*duration/2;

  if(distance < 10)

  {

    digitalWrite(alaram,HIGH);

    digitalWrite(ledred,LOW);

  }

  else

  {

    digitalWrite(alaram,LOW);

    digitalWrite(ledred,HIGH);

  }

}

**7.Fading**

Demonstrates the use of analog output (PWM) to fade an LED.

Circuit

An LED connected to digital pin 9.

Code

int value = 0; // variable to keep the actual value

int ledpin = 9; // light connected to digital pin 9

void setup()

{

// nothing for setup

}

void loop()

{

for(value = 0 ; value <= 255; value+=5) // fade in (from min to max)

{

analogWrite(ledpin, value); // sets the value (range from 0 to 255)

delay(30); // waits for 30 milli seconds to see the dimming effect

}

for(value = 255; value >=0; value-=5) // fade out (from max to min)

{

analogWrite(ledpin, value);

delay(30);

}

}