**4×4×4 LED CUBE BLINKING**

**CODE:**

int cledpin[16] = {0,1,2,3,4,5,6,7,8,9,10,11,12,13,A0,A1}

//Initialise column pins

Int rledpin[4]={A2,A3,A4,A5}//initialise row layer pins

void setup()

{

for(int i = 0; i<=15; i++)

{

pinMode(cledpin[i], OUTPUT);// set column pins as output

}

for(int i = 0; i<=3; i++)

{

pinMode(rledpin[i], OUTPUT);// set row pins as output

}

oid loop()

{for(i=1;I<=3;i++)

{

turnon();//function call to turn all the LEDs on

turnoff ();//function call to turn all the LEDs off

}

rowlayerwiseflickering();//function call to flicker the LEDs, row layer wise serially

columnlayerwiseflickering();//function call to flicker the LEDs, column layer wise

propellerpatternflickering ();//function call to flicker the LEDs in propeller pattern

}

void turnon()

{

for(int i=0;i<=3;i++)// 4 times this Loop repeats cause there are 4 row LED pins

digitalWrite(rledpin[i],HIGH);// turn on the row LED pins (voltage level is high)

}

void turnoff()

{

for(int i=0;i<=3;i++)

{

digitalWrite(rledpin[i],LOW);// turn off the row led pins ( voltage level is low)

}

void rowlayerwiseflickering()

{

for(int i=1;i<=3;i++)

{

for(int i=0;i<=3;i++)

{

digitalWrite(rledpin[i],HIGH);

delay(100);// stop the program for 100 milliseconds

}

for(int i=3;i>=0;i--)

{

digitalWrite(rledpin[i],LOW);

delay(100);

}

}

}

void columnwiselayerflickering()

{

turnoff();

for(int i=1;i<=2;i++)

{

for(int i=0;i<=3;i++)

{

digitalWrite(cledpin [i],HIGH);//turn on the column pins (voltage level is high)

delay(100);

}

for(int i=4;i<=7;i++)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=8;i<=11;i++)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=12;i<=15;i++)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=0;i<=3;i++)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=4;i<=7;i++)

{

digitalWrite(cledpin[i], LOW);

delay(100);

}

for(int i=8;i<=11;i++)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=12;i<=15;i++)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=15;i>=12;i--)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=11;i>=8;i--)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=7;i>=4;i--)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=3;i>=0;i--)

{

digitalWrite(cledpin[i],HIGH);

delay(100);

}

for(int i=15;i>=12;i--)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=11;i>=8;i--)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=7;i>=4;i--)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

for(int i=3;i>=0;i--)

{

digitalWrite(cledpin[i],LOW);

delay(100);

}

}

}

void propellerpatternflickering ()

{

turnoff();

for(int i=1;i<=3;i++)

{

digitalWrite(cledpin[0],HIGH);

digitalWrite(cledpin[5],HIGH);

digitalWrite(cledpin[10],HIGH);

digitalWrite(cledpin[15],HIGH);

delay(100);

digitalWrite(cledpin[1],HIGH);

digitalWrite(cledpin[5],HIGH);

digitalWrite(cledpin[10],HIGH);

digitalWrite(cledpin[14],HIGH);

delay(100);

digitalWrite(cledpin[2],HIGH);

digitalWrite(cledpin[6],HIGH);

digitalWrite(cledpin[9],HIGH);

digitalWrite(cledpin[13],HIGH);

delay(100);

digitalWrite(cledpin[3],HIGH);

digitalWrite(cledpin[6],HIGH);

digitalWrite(cledpin[9],HIGH);

digitalWrite(cledpin[12],HIGH);

delay(100);

digitalWrite(cledpin[7],HIGH);

digitalWrite(cledpin[6],HIGH);

digitalWrite(cledpin[9],HIGH);

digitalWrite(cledpin[8],HIGH);

delay(100);

digitalWrite(cledpin[11],HIGH);

digitalWrite(cledpin[10],HIGH);

digitalWrite(cledpin[5],HIGH);

digitalWrite(cledpin[4],HIGH);

delay(100);

digitalWrite(cledpin[15],HIGH);

digitalWrite(cledpin[10],HIGH);

digitalWrite(cledpin[5],HIGH);

digitalWrite(cledpin[0],HIGH);

delay(100);

}

}

**EXPLANATION OF CODE:**

* First we initialised the column LED pins and the row layer LED pins.In the setup function, we set each column pin and row pin as output pin.
* In loop ,we call all the functions required and this function continues endlessly i.e restarts after reaching the end of program.In this program the functions of this LED cube are as follows:

1. Turn on all the LEDs at a time and then turn off all.
2. Flicker the LEDs row layer wise.
3. Flicker the LEDs column layer wise.
4. Flicker the LEDs in propeller pattern.

* In the turnon() func,the rledpins are given high voltage and turn on and in turnoff() func ,the rledpins are given low voltage and turn off. These two functions are repeated three times .So that at the very first ,the whole LED cube will blink for three times .
* After that in rowlayerwiseflickering() function,the LEDs light up serially from first row layer to the fourth row layer serially with a delay of 100ms in between two successive row layers and switches off in the reverse order. This process repeats for three iterations.
* In columnlayerwiseflickering(), first the LEDcube completely turns off. The LEDs light up serially in a row and then have a delay of 100 ms and after that second column layer LEDs turn on and serially it goes upto fourth layer .
* Afterthat the LEDs turnoff serially from first column layer to fourth layer. Then again turns on the LEDs from fourth layer to first layer and turns off the LEDs from fourth column layer to first column layer with 100 ms delay.This iteration repeats for two times.
* In propellerpatternflickering() function,first turns off the LED cube completely.and then turns on the LED columns by giving high voltage to the corresponding LEDcloumn pins such that it look like a rotating propeller from the top view . This repeats for three times.

In this way a 4×4×4 LED cube is blinked in different ways.