



Dalkey Dojo

Night Rider Project

Project description:

Using 6 LEDs and resistors (~220R) this code sweeps the LEDs from left to right then from right to left with a small delay between each step. It also creates a trailing effect by dimming the 2 LEDs behind the lead one using `analogWrite()` / PWM.

Concepts introduced:

`#define` , variable `V` constant , `FOR` loops , `IF` statement and `analogWrite()` / PWM.

What you will need:

- Arduino.
- USB 2.0 Cable Type A-B.
- Laptop with Arduino IDE and drivers installed.
- Breadboard.
- Jumper Leads X 7.
- 220 Ohm Resistor X 6.
- LED's (any colour) X 6.

Build instructions:

1. Place 6 LED's on Breadboard in a line close to each other with LED CATHODE ('-' or flat edge on led) in the GND rail and LED ANODE ('+') on a Junction strip.
2. Place 6 X 220 Ohm Resistors from LED ANODE's to junction strip on other half of Breadboard.
3. Connect Jumper Lead from GND RAIL on Breadboard to GND PIN on Arduino.
4. Connect Jumper Leads from each Resistor (left to right) to PWM PIN's 3 , 5 , 6 , 9 , 10 and 11 on Arduino.
5. Enter Arduino Code below into Arduino IDE. Verify code and debug code if necessary. Upload code to Arduino.

Arduino code:

```
// Arduino IDE v1.0.1 - Arduino Uno R2
// Source code : LedScan.
// David Thomas 27/9/14.
// Using 6 LEDs and resistors (~330R) this code sweeps the LEDs from left to right
// then from right to left with a small delay between each step.
// It also creates a trailing effect by dimming the 2 LEDs behind the lead one
// using analogWrite() / PWM.
// It introduces the concepts of :
// #define , variable V constant , FOR loops , IF statement also analogWrite() / PWM.
// For those old enough to remember think of NIGHT RIDER? The HOFF!

// ARDUINO PIN 3 -vvvv- LED 0 ----- GND
// ARDUINO PIN 5 -vvvv- LED 1 ----- GND
// ARDUINO PIN 6 -vvvv- LED 2 ----- GND
// ARDUINO PIN 9 -vvvv- LED 3 ----- GND
// ARDUINO PIN 10 -vvvv- LED 4 ----- GND
// ARDUINO PIN 11 -vvvv- LED 5 ----- GND

#define LedPin0 3      /* Led 0 is pin 3 on arduino. */
#define LedPin1 5      /* Led 1 is pin 5 on arduino. */
#define LedPin2 6      /* Led 2 is pin 6 on arduino. */
#define LedPin3 9      /* Led 3 is pin 9 on arduino. */
#define LedPin4 10     /* Led 4 is pin 10 on arduino. */
#define LedPin5 11     /* Led 5 is pin 11 on arduino. */

int LedStep;           // Variable - holds step number in led sweep.
const int LedMax = 255; // Constant - holds full brightness value for led.
const int LedMid = 60;  // Constant - holds half brightness value for led.
const int LedMin = 10;  // Constant - holds low brightness value for led.
const int LedOff = 0;   // Constant - zero brightness OR led off.

void setup ()
{
    pinMode(LedPin0 , OUTPUT); // Sets all 6 led pins to outputs.
    pinMode(LedPin1 , OUTPUT);
    pinMode(LedPin2 , OUTPUT); //N.B. May not be needed with analogWrite().
    pinMode(LedPin3 , OUTPUT);
    pinMode(LedPin4 , OUTPUT);
    pinMode(LedPin5 , OUTPUT);
}

void loop ()
{
    // Counts through the 6 steps as leds sweep from left to right (0 to 5).
    for (LedStep = 0 ; LedStep < 6 ; LedStep ++ )
    {
        // if step is 0 then turn leds to MAX , MID , MIN or OFF brightness.
        if(LedStep==0)
        {
            analogWrite(LedPin0 , LedMid);
            analogWrite(LedPin1 , LedMax);
            analogWrite(LedPin2 , LedOff);
            analogWrite(LedPin3 , LedOff);
            analogWrite(LedPin4 , LedOff);
            analogWrite(LedPin5 , LedOff);
        }

        // If step is 1 then turn leds to MAX , MID , MIN or OFF brightness.
        if(LedStep==1)
        {
            analogWrite(LedPin0 , LedMin);
            analogWrite(LedPin1 , LedMid);
            analogWrite(LedPin2 , LedMax);
            analogWrite(LedPin3 , LedOff);
            analogWrite(LedPin4 , LedOff);
            analogWrite(LedPin5 , LedOff);
        }

        // If step is 2 then turn leds to MAX , MID , MIN or OFF brightness.
        if(LedStep==2)
```

```

        {
            analogWrite(LedPin0 , LedOff);
            analogWrite(LedPin1 , LedMin);
            analogWrite(LedPin2 , LedMid);
            analogWrite(LedPin3 , LedMax);
            analogWrite(LedPin4 , LedOff);
            analogWrite(LedPin5 , LedOff);
        }

// If step is 3 then turn leds to MAX , MID , MIN or OFF brightness.
if(LedStep==3)
{
    analogWrite(LedPin0 , LedOff);
    analogWrite(LedPin1 , LedOff);
    analogWrite(LedPin2 , LedMin);
    analogWrite(LedPin3 , LedMid);
    analogWrite(LedPin4 , LedMax);
    analogWrite(LedPin5 , LedOff);
}

// If step is 4 then turn leds to MAX , MID , MIN or OFF brightness.
if(LedStep==4)
{
    analogWrite(LedPin0 , LedOff);
    analogWrite(LedPin1 , LedOff);
    analogWrite(LedPin2 , LedOff);
    analogWrite(LedPin3 , LedMin);
    analogWrite(LedPin4 , LedMid);
    analogWrite(LedPin5 , LedMax);
}

// If step is 5 then turn leds to MAX , MID , MIN or OFF brightness.
if(LedStep==5)
{
    analogWrite(LedPin0 , LedOff);
    analogWrite(LedPin1 , LedOff);
    analogWrite(LedPin2 , LedOff);
    analogWrite(LedPin3 , LedOff);
    analogWrite(LedPin4 , LedMin);
    analogWrite(LedPin5 , LedMax);
}

// wait for 150 mS before next step.
delay(150);

//End of left to right FOR loop.
}

// Counts through the 6 steps as leds sweep from right to left (0 to 5).
for (LedStep = 0 ; LedStep < 6 ; LedStep ++ )
{
    // If step is 0 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==0)
    {
        analogWrite(LedPin0 , LedOff);
        analogWrite(LedPin1 , LedOff);
        analogWrite(LedPin2 , LedOff);
        analogWrite(LedPin3 , LedOff);
        analogWrite(LedPin4 , LedMax);
        analogWrite(LedPin5 , LedMid);
    }

    // If step is 1 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==1)
    {
        analogWrite(LedPin0 , LedOff);
        analogWrite(LedPin1 , LedOff);
        analogWrite(LedPin2 , LedOff);
        analogWrite(LedPin3 , LedMax);
        analogWrite(LedPin4 , LedMid);
        analogWrite(LedPin5 , LedMin);
    }
}

```

```

    }

    // If step is 2 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==2)
    {
        analogWrite(LedPin0 , LedOff);
        analogWrite(LedPin1 , LedOff);
        analogWrite(LedPin2 , LedMax);
        analogWrite(LedPin3 , LedMid);
        analogWrite(LedPin4 , LedMin);
        analogWrite(LedPin5 , LedOff);
    }

    // If step is 3 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==3)
    {
        analogWrite(LedPin0 , LedOff);
        analogWrite(LedPin1 , LedMax);
        analogWrite(LedPin2 , LedMid);
        analogWrite(LedPin3 , LedMin);
        analogWrite(LedPin4 , LedOff);
        analogWrite(LedPin5 , LedOff);
    }

    // If step is 4 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==4)
    {
        analogWrite(LedPin0 , LedMax);
        analogWrite(LedPin1 , LedMid);
        analogWrite(LedPin2 , LedMin);
        analogWrite(LedPin3 , LedOff);
        analogWrite(LedPin4 , LedOff);
        analogWrite(LedPin5 , LedOff);
    }

    // If step is 5 then turn leds to MAX , MID , MIN or OFF brightness.
    if(LedStep==5)
    {
        analogWrite(LedPin0 , LedMax);
        analogWrite(LedPin1 , LedMin);
        analogWrite(LedPin2 , LedOff);
        analogWrite(LedPin3 , LedOff);
        analogWrite(LedPin4 , LedOff);
        analogWrite(LedPin5 , LedOff);
    }

    // Wait for 200 mS before next step.
    delay(150);

    // End of right to left FOR loop.
}

// End of main LOOP.
}

```