

GoldSTEM_Lesson_6_Four_LED_Sequencing

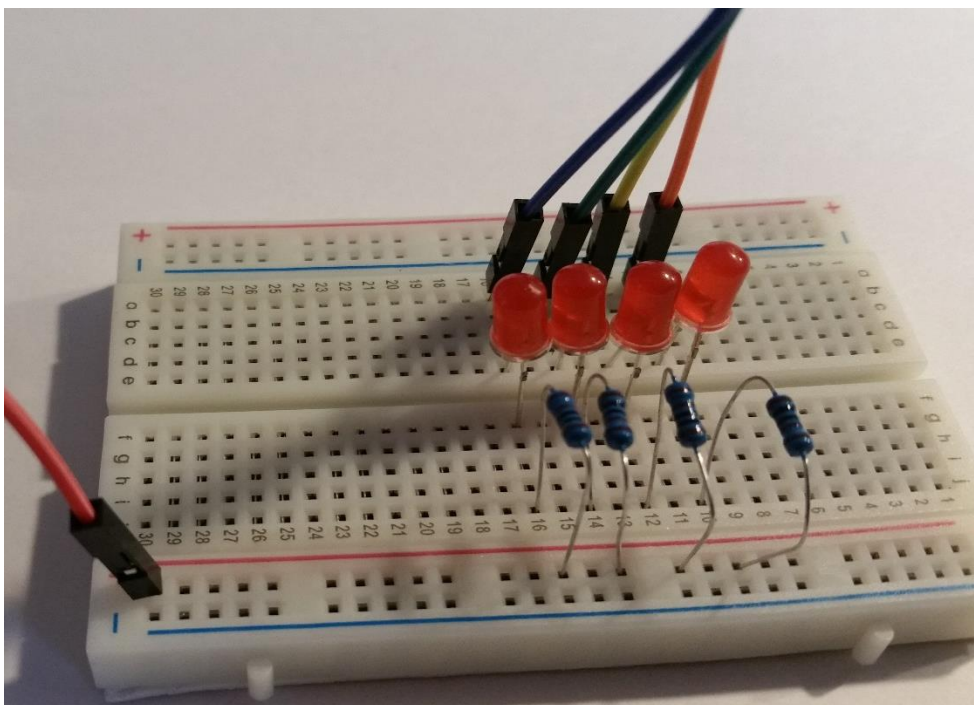
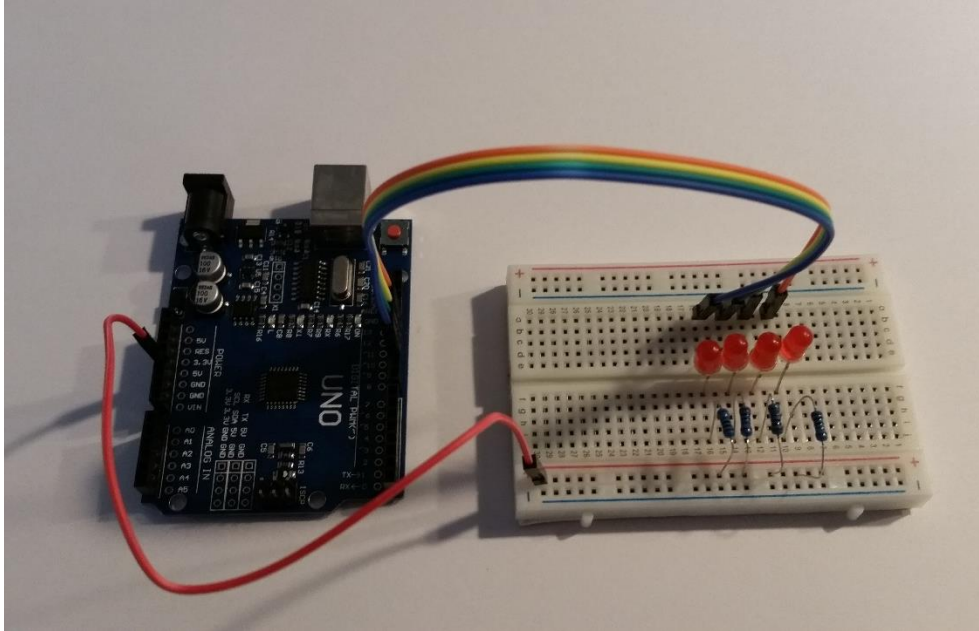
tm 3-19-16

This experiment uses the same components we are familiar with.

Four red LED's

Four 1K resistors

Jumper wires



Wiring the circuit

Red LED 1 Anode long lead f10

Red LED 1 Cathode short lead e10

Red LED 2 Anode long lead f12

Red LED 2 Cathode short lead e12

Red LED 3 Anode long lead f14

Red LED 3 Cathode short lead e14

Red LED 4 Anode long lead f16

Red LED 4 Cathode short lead e16

R1 Resistor 1K, j10 to + rail

R2 Resistor 1K, j12 to + rail

R2 Resistor 1K, j14 to + rail

R2 Resistor 1K, j15 to + rail

Red jumper + rail to UNO POWER +5, 5th pin from top

Orange jumper a10 to UNO DIGITAL 13

Yellow jumper a12 to UNO DIGITAL 12

Green jumper a14 to UNO DIGITAL 11

Blue jumper a16 to UNO DIGITAL 10

Loading the code

GoldSTEM_Lesson_6_Four_LED_Sequencing

```
/*
```

```
GoldSTEM_Lesson_6_Four_LED_Sequencing GoldSTEM tm 2-23-2016
```

```
Sequence four LED's
```

```
*/
```

```
void setup() {
```

```
// initialize digital pin 13 as an output.
```

```
pinMode(13, OUTPUT);
```

```
pinMode(12, OUTPUT);
```

```
pinMode(11, OUTPUT);
```

```
pinMode(10, OUTPUT);
```

```

digitalWrite(13, HIGH);
digitalWrite(12, HIGH);
digitalWrite(11, HIGH);
digitalWrite(10, HIGH);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(13, LOW); // turn the LED on (Low is on)
  delay(1000);          // wait for a second
  digitalWrite(12, LOW);
  delay(1000);
  digitalWrite(11, LOW);
  delay(1000);
  digitalWrite(10, LOW);
  delay(1000);
  digitalWrite(10, HIGH); // turn the LED off (High is off)
  delay(1000);
  digitalWrite(11, HIGH);
  delay(1000);
  digitalWrite(12, HIGH);
  delay(1000);
  digitalWrite(13, HIGH);
  delay(1000);
}

```

Ok If we have done everything correctly we should have the four LED's sequencing up and down.

Explaining the program

Defines digital pins 10-13 as outputs

Sets pins high

Sequences.

Question 3

In the last program we set the pin HIGH to turn the led ON in this program we set the pin HIGH to turn the led OFF.

Do you know the reason why?

STEP 2

Modify the program as we had in the first program to sequence the LED's every half second. In the first program we had to change 1000ms to 500ms in two places. In this program we have to change it in 8 places.

Modify the program and see what happens.

Question 3

Is there some easier way?

Give it a try then see below for a solution.

Add this line of code above the loop comment

```
int sdelay = 500; //sequence delay = 500ms or 1/2 Second
```

```
// the loop function runs over and over again forever
```

Change all the `delay(1000);` (in 8 places) to `delay(sdelay)` except for the last `delay(1000);`

See how that goes

STEP 3

How can we modify the program to change the delays by itself?

Add the following line of code after the last delay

```
delay(1000);
```

```
sdelay = sdelay - 100;
```

```
}
```

If things went wrong you can load the sketch:

GoldSTEM_Lesson_6_Four_LED_Sequencing_Delay

Watch very carefully the sequence gets faster and faster then stops.

If you press the reset button on the UNO the program will start again.