

```
1  /* blink_w_delay.c
2  * Repeatedly toggle an LED on and off, with DELAY_TIME milliseconds
3  * between each change.
4  * Based on v 12.0 Blink.c by Jack Black, July 4, 2006;
5  * modified by Eric B. Wertz 27JAN2011;
6  * modified by Buff Furman 29NOV2011
7  */
8
9  #define DELAY_TIME 1000 // # of milliseconds between LED toggles
10
11  const byte theLED = 13;
12
13  void setup()
14  {
15      pinMode(theLED, OUTPUT);
16  }
17
18  void loop()
19  {
20      digitalWrite(theLED, HIGH);
21      delay(DELAY_TIME);
22
23      digitalWrite(theLED, LOW);
24      delay(DELAY_TIME);
25  }
26
```

```
1  /* Blink_no_delay_BJF.c
2
3  Turns on and off a light emitting diode(LED) without using the delay() function.
4
5  The circuit:
6  * LED attached from pin 13 to ground. On most Arduinos, pin 13 is attached to an LED
  on the PCB, so no extra hardware is needed.
7
8  Adapted from: http://www.arduino.cc/en/Tutorial/BlinkWithoutDelay
9  created 2005 by David A. Mellis
10 modified 8 Feb 2010 by Paul Stoffregen
11 modified 2016-03-14 by BJ Furman
12 */
13
14 #define ON HIGH
15 #define OFF LOW
16
17 // Define the pin number as a constant, since it won't change.
18 const int ledPin = 13; // the number of the LED pin
19
20 // Define variables that will change:
21 int ledState = OFF; // ledState stores the state of the LED. Start with LED OFF
22 unsigned long previousMillis = 0UL; // Stores last time LED state was changed
23 unsigned long interval = 1000UL; // Interval at which to blink (milliseconds)
24
25 void setup()
26 {
27     // Set the digital pin as an OUTPUT:
28     pinMode(ledPin, OUTPUT);
29 }
30
31 void loop()
32 {
33     // Check if it's time to blink: compare the difference between the current time and
34     // the last time you blinked with the interval at which you want to blink the LED.
35
36     unsigned long currentMillis = millis(); // Capture the current time
37
38     if(currentMillis - previousMillis > interval) // True if it is time to blink
39     {
40         // We get here if it is time to blink.
41         previousMillis = currentMillis; // Update the time of last state change
42
43         // If the LED is off turn it on and vice-versa:
44         if (ledState == OFF)
45             ledState = ON;
46         else
47             ledState = OFF;
48
49         // Set the LED with the new state of the LED:
50         digitalWrite(ledPin, ledState);
51     }
52 }
```