EXPERIMENT - 1.4

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Semester: 6^{TH} **Subject Code:** 20CSP-358
Subject Name: Internet of Things Lab

Aim: Program to interface the Arduino/Raspberry Pi with LED and blinking application.

Objectives:

1. Learn about interfacing.
2. Learn about IoT programming.

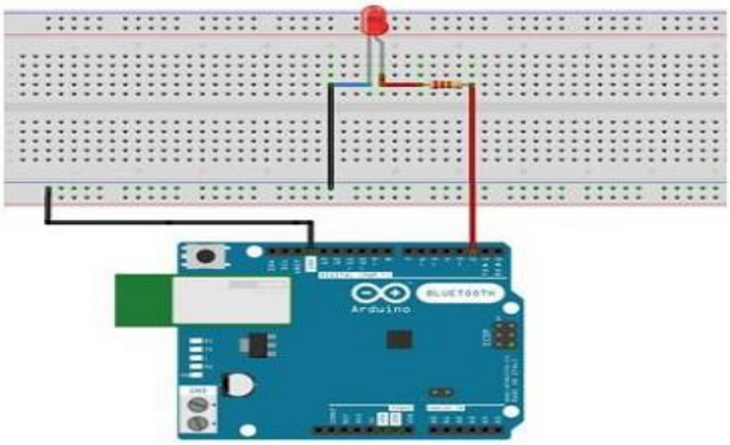
Components Required:

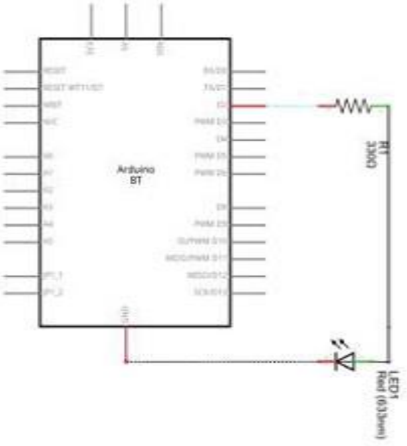
- 1 × Breadboard
- 1 × Arduino Uno R3
- 1 × LED
- 1 × 330Ω Resistor
- 2 × Jumper

Procedure

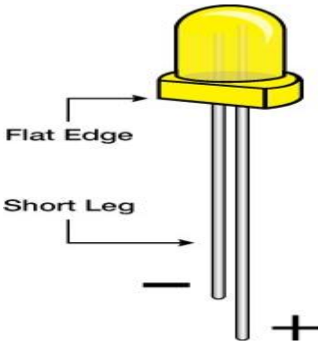
LEDs are small, powerful lights that are used in many different applications. To start, we will work on blinking an LED, the Hello World of microcontrollers. It is as simple as turning a light on and off. Establishing this important baseline will give you a solid foundation as we work towards experiments that are more complex.

Follow the circuit diagram and hook up the components on the breadboard as shown in the image given below.

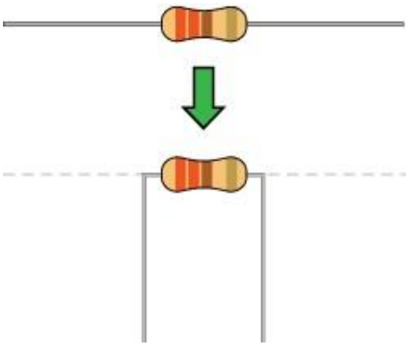




Note − To find out the polarity of an LED, look at it closely. The shorter of the two legs, towards the flat edge of the bulb indicates the negative terminal.

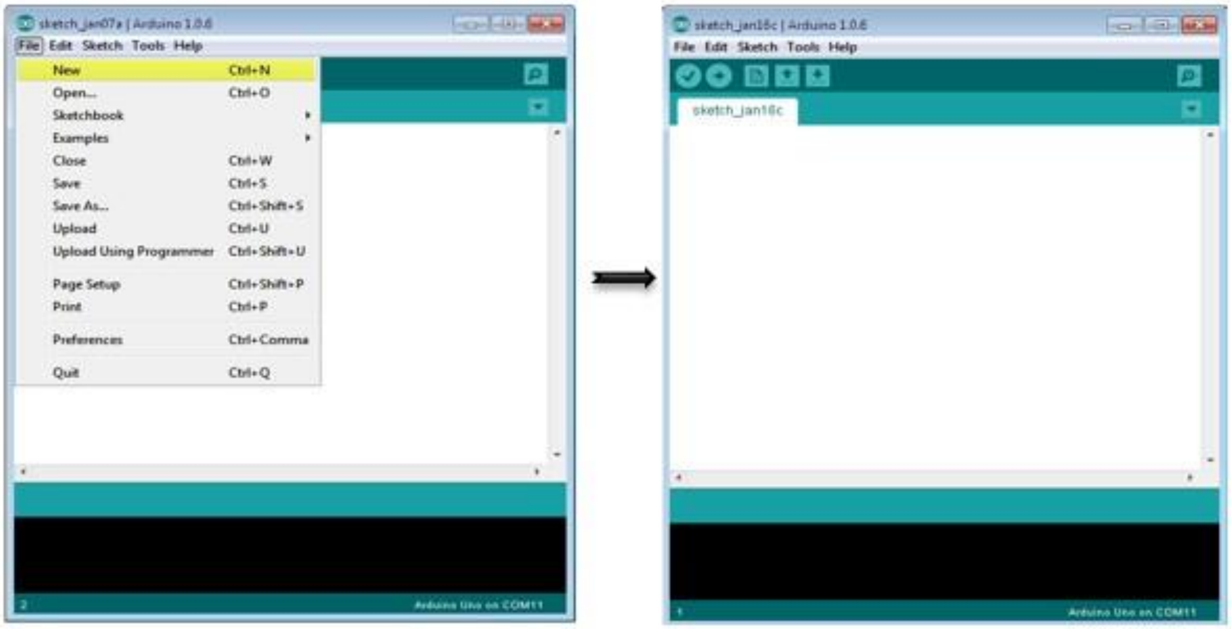


Components like resistors need to have their terminals bent into 90° angles in order to fit the breadboard sockets properly. You can also cut the terminals shorter.



Sketch

Open the Arduino IDE software on your computer. Coding in the Arduino language will control your circuit. Open the new sketch File by clicking New.

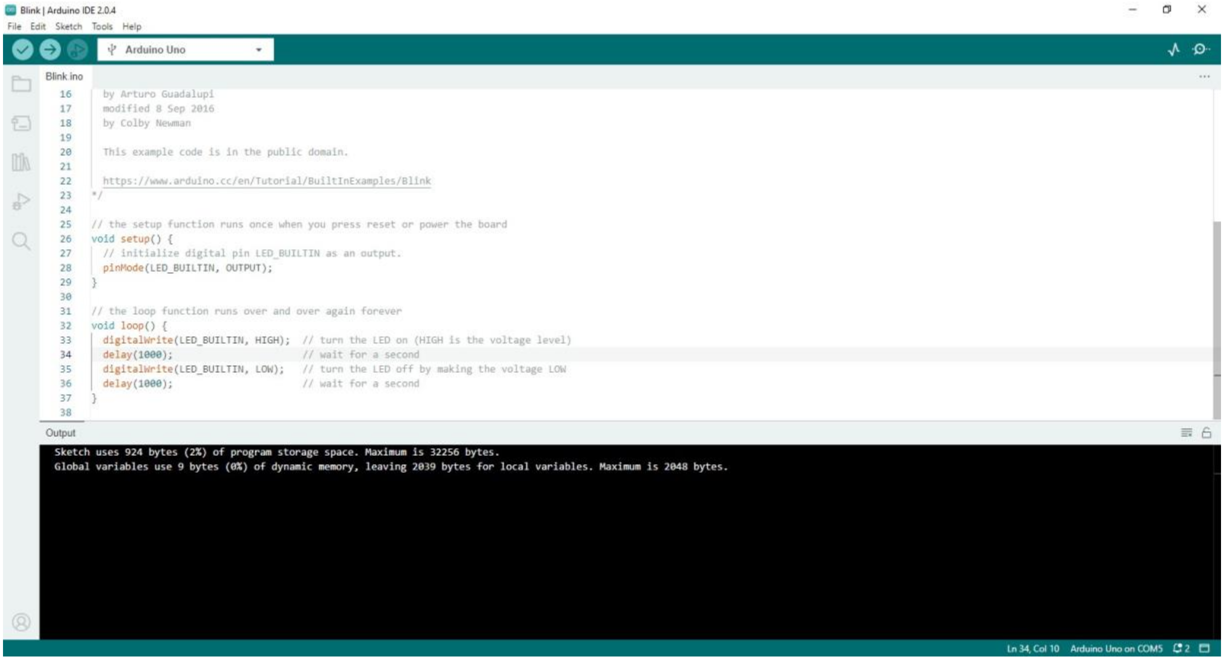


Arduino Code

```
/*

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

*/

// the setup function runs once when you press reset
or power the board   void setup() {  // initialize
digital pin 13 as an output.     pinMode(2,
OUTPUT);
}

// the loop function runs over and over
again forever   void loop() {
```

digitalWrite(2, HIGH); // turn the LED on (HIGH is the voltage level) delay(1000); // wait for a second

digitalWrite(2, LOW); // turn the LED off by making the voltage LOW delay(1000); // wait for a second }


Blink | Arduino IDE 2.0.4
File Edit Sketch Tools Help
Arduino Uno
Blink.ino
Output
Ln 34, Col 10 Arduino Uno on COM5 2

```
  by Arturo Guadalupi
  modified 8 Sep 2016
  by Colby Newman

  This example code is in the public domain.

  https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
*/

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(1000);                      // wait for a second
  digitalWrite(LED_BUILTIN, LOW);   // turn the LED off by making the voltage LOW
  delay(1000);                      // wait for a second
}
```

```
Sketch uses 924 bytes (2%) of program storage space. Maximum is 32256 bytes.
Global variables use 9 bytes (0%) of dynamic memory, leaving 2039 bytes for local variables. Maximum is 2048 bytes.
```

Code to Note

pinMode(2, OUTPUT) − Before you can use one of Arduino's pins, you need to tell Arduino Uno R3 whether it is an INPUT or OUTPUT. We use a built-in "function" called pinMode() to do this.

digitalWrite(2, HIGH) − When you are using a pin as an OUTPUT, you can command it to be HIGH (output 5 volts), or LOW (output 0 volts).

Result

You should see your LED turn on and off. If the required output is not seen, make sure you have assembled the circuit correctly, and verified and uploaded the code to your board.