Faculty of Computing

Year 1, Semester 1 (2024)

IT1140 - Fundamentals of Computing Lab Sheet 6

Objectives

- *Getting familiarized with Wokwi and its features*
- *Creating and testing a simple circuit using Wokwi*

Wokwi is an online Electronics simulator. You can use it to simulate Arduino, ESP32, STM32, and many other popular boards, parts, and sensors.

Let's Start

- To get started, visit the website given in the following link.

  https://wokwi.com/

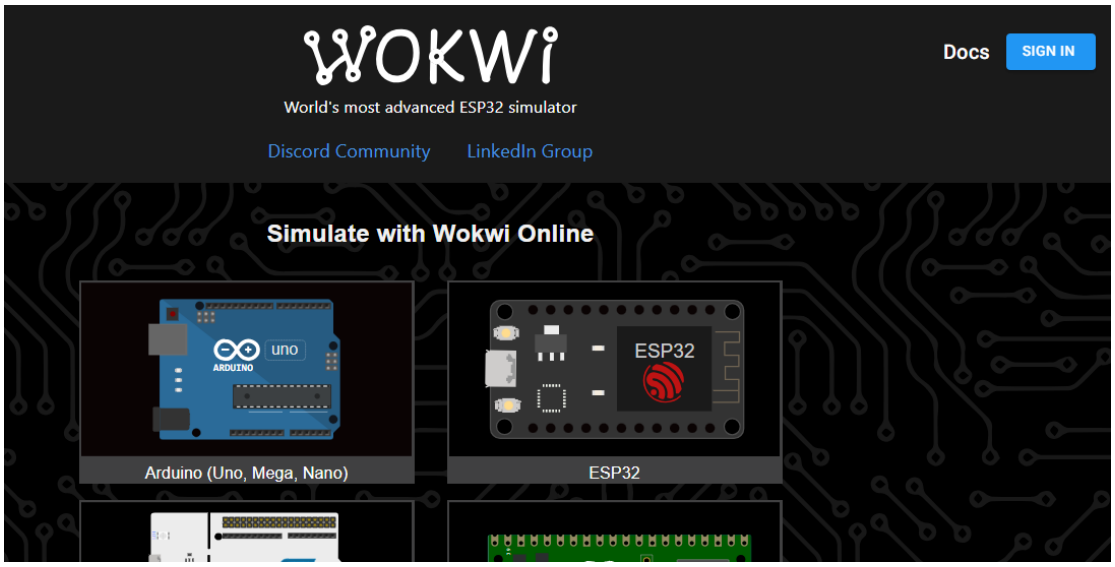

Figure 6.1

- Wokwi supports for different IOT simulations.
- To start, click on Arduino (Uno, Mega, Nano).

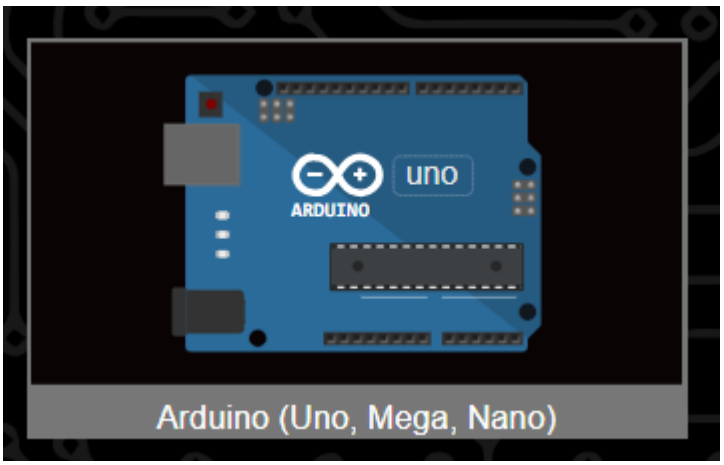

Figure 6.2

- New click on Arduino Uno from the “Start from Scratch” section.

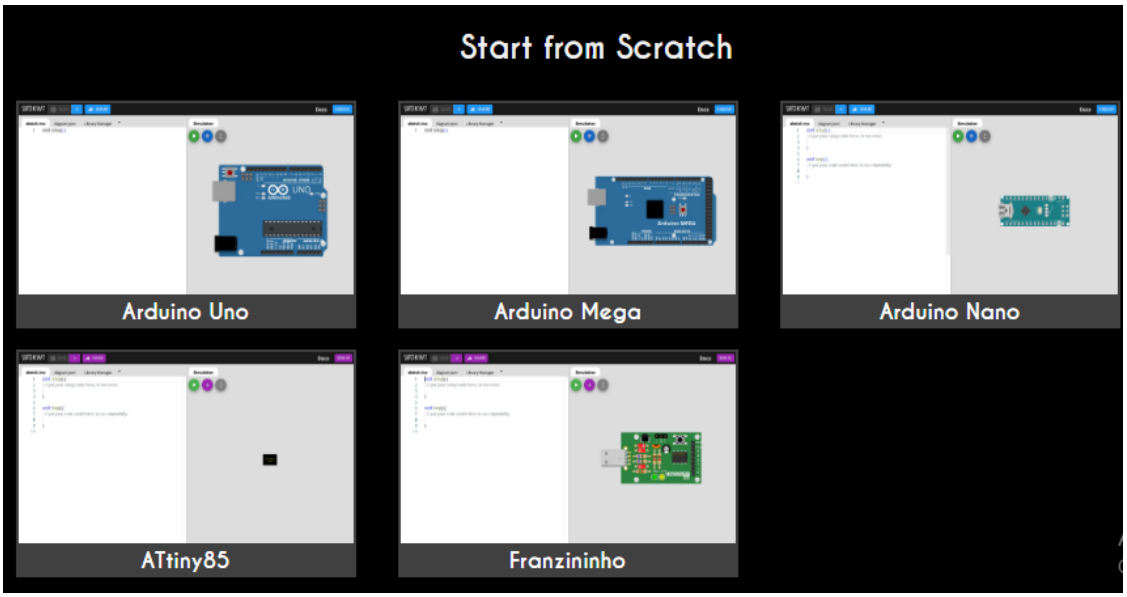

Figure 6.3

- Following is the interface appear to you.

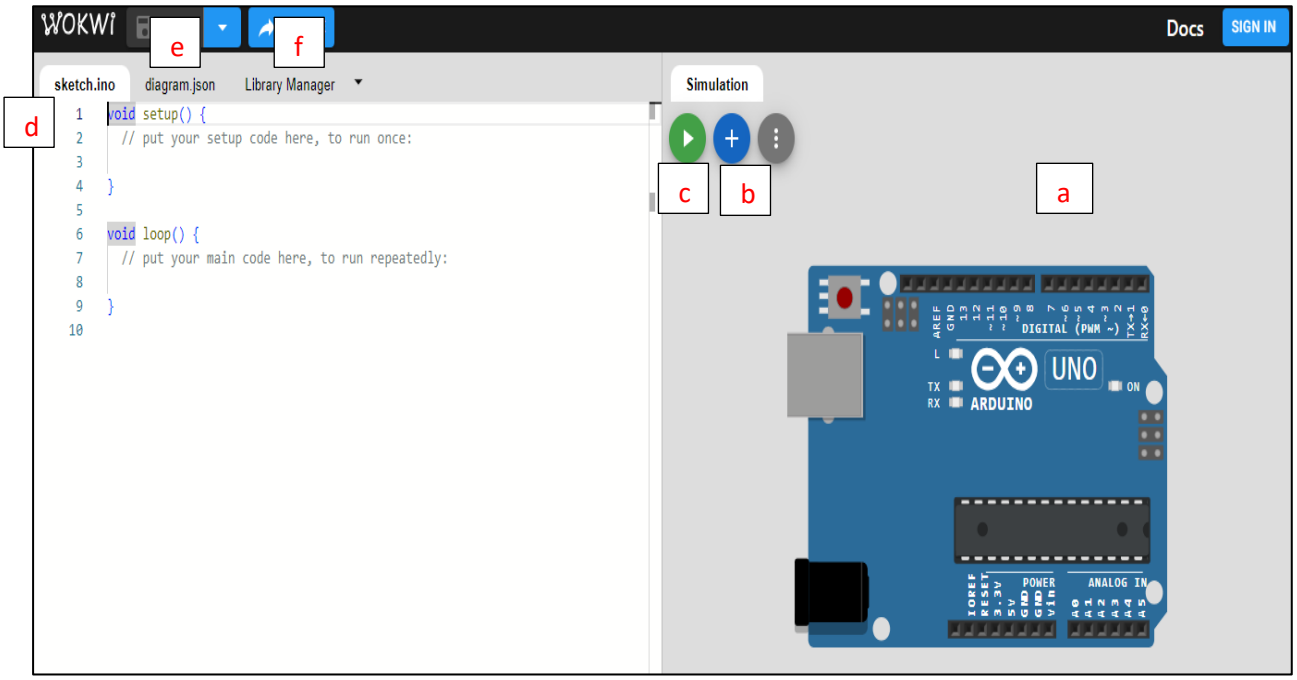

Figure 6.4

Label Name	Feature	Description
a	**Workspace**	This is the space where all the components will be placed. The components can be moved around, edited and wired together.
b	**Components/ tools**	This section holds all the components. Scroll down to access component types.
c	**Start Simulation**	To start real time simulation.
d	**Code area**	The code can be edited from here.
e	**Json code of the drawing**	The Json code of the drawing can be taken from here.
f	**Library manager**	The required libraries can be loaded from here.

Let’s understand the breadboard and its functionality for the design of this circuit.

Breadboard

A breadboard is a tool that is used to prototype and test electronic circuits without soldering. It provides a way to distribute and connect voltage from an external source to the electronic components.

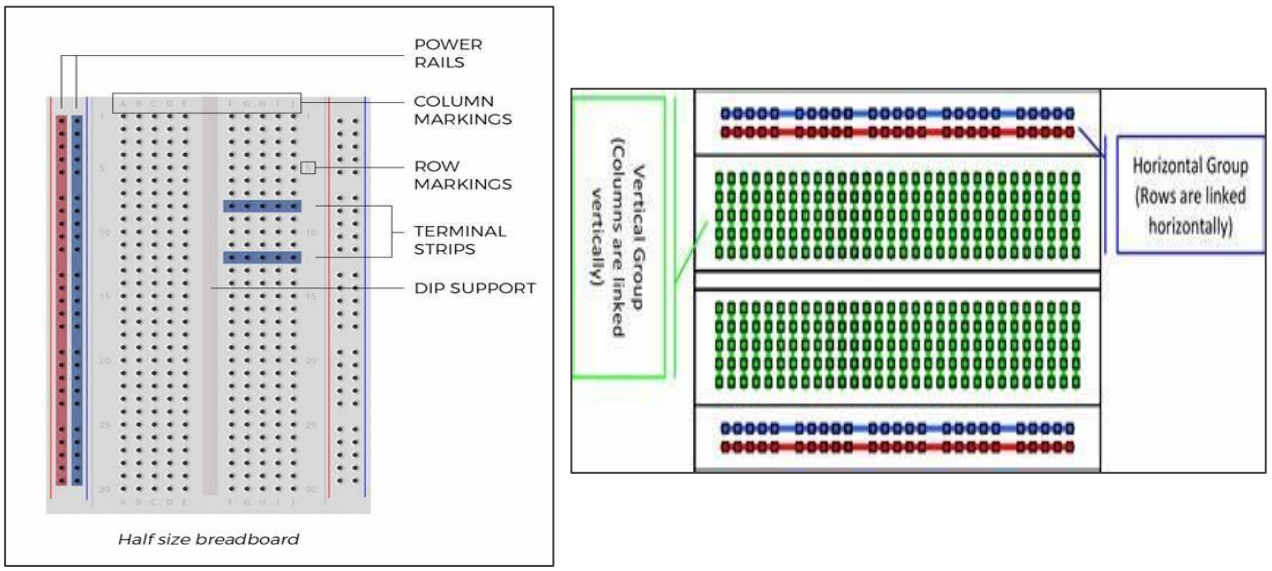

Figure 6.5

There are 2 main components.

1. Rows and Columns

   - Horizontal Rows (Power Rails): Typically run along the top and bottom edges, used to distribute power. They are often marked with **red** (positive) and **blue/black** (negative) lines.

   - Vertical Columns (Terminal Strips): Located in the central area, divided into two halves by a central groove. Each column is electrically connected, allowing components to be connected in a circuit.

2. Central Groove (DIP Support): Separates the terminal strips into two halves, providing a gap for larger integrated circuits (ICs) to sit across without shorting pins.

The internal electrical connection of breadboard can be done in two ways:

1. Within a row or column: All the holes in a row or column are electrically connected with the same voltage. Therefore, connect the components by inserting the same voltage to their legs into neighboring holes within the same row or column.

2. Between rows or columns: connect the components on separate rows or columns to provide separate voltages, or even between the two separate sections of the breadboard.

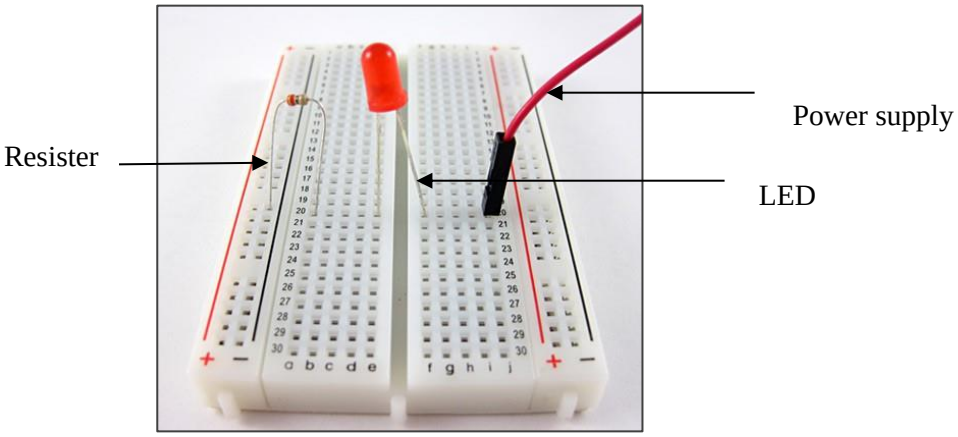

Figure 6.6

Example: (Refer to the figure 6.6)

- The **positive voltage (red wire)** of the power supply would connect to the **red power rail** on the breadboard.

- One leg of the LED (**typically the longer leg, the positive side**) is **inserted into the same row on the breadboard to provide the same positive voltage.**

- The **other leg of the LED is inserted into a different row** on the breadboard to provide different voltage.

- **One leg of the resistor** must be connected to **the negative side of the LED**.

- The **other leg of the resister should be grounded**. So, it must be inserted into a hole in a different row on the breadboard to give a negative voltage.

- The black wire of the power supply would connect to the black ground rail on the breadboard.

Activity

a) Design the circuit diagram given in figure 6.7 in Wokwi using the components listed below.

- Arduino Uno
- Breadboard
- Resistor
- Light Emitting Diode (LED)
- Wires

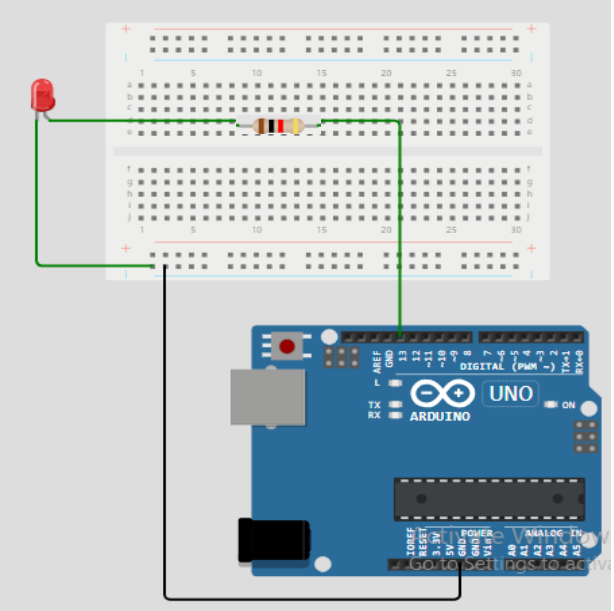

Figure 6.7

b) The following code segment is written in C++. Type the below code.

sketch.ino ● diagram.json ● libraries.txt ● Library Manager

```
1
2   void setup() {
3     // put your setup code here, to run once:
4     pinMode(13,OUTPUT);
5   }
6
7   void loop() {
8     // put your main code here, to run repeatedly:
9     digitalWrite(13, HIGH);
10    delay(1000);
11    digitalWrite(13, LOW);
12    delay(1000);
13  }
14
```

Figure 6.8

c) Click on **“Start the Simulation”** and observe the blinking LED.

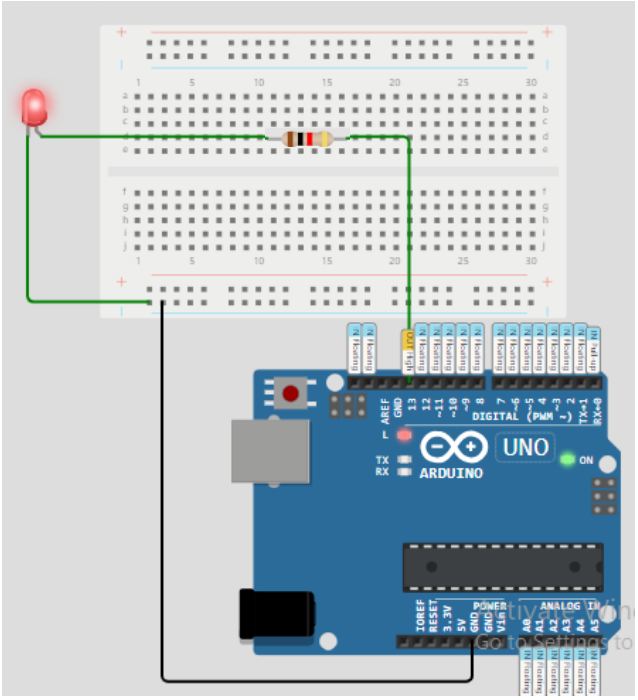

Figure 6.9

Briefly explain the operation of the circuit you designed. Include all your work in the submission file.