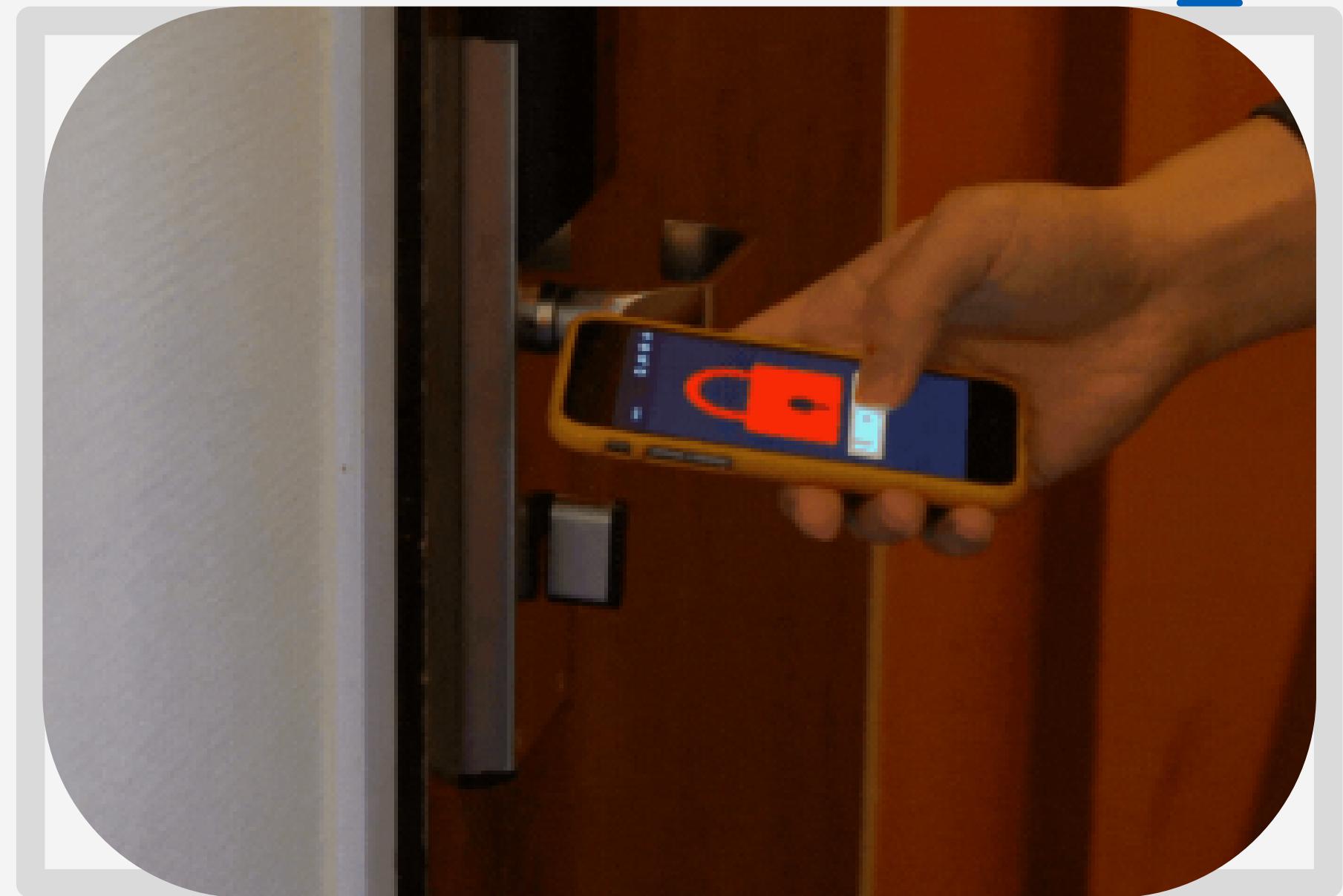


PassionBots



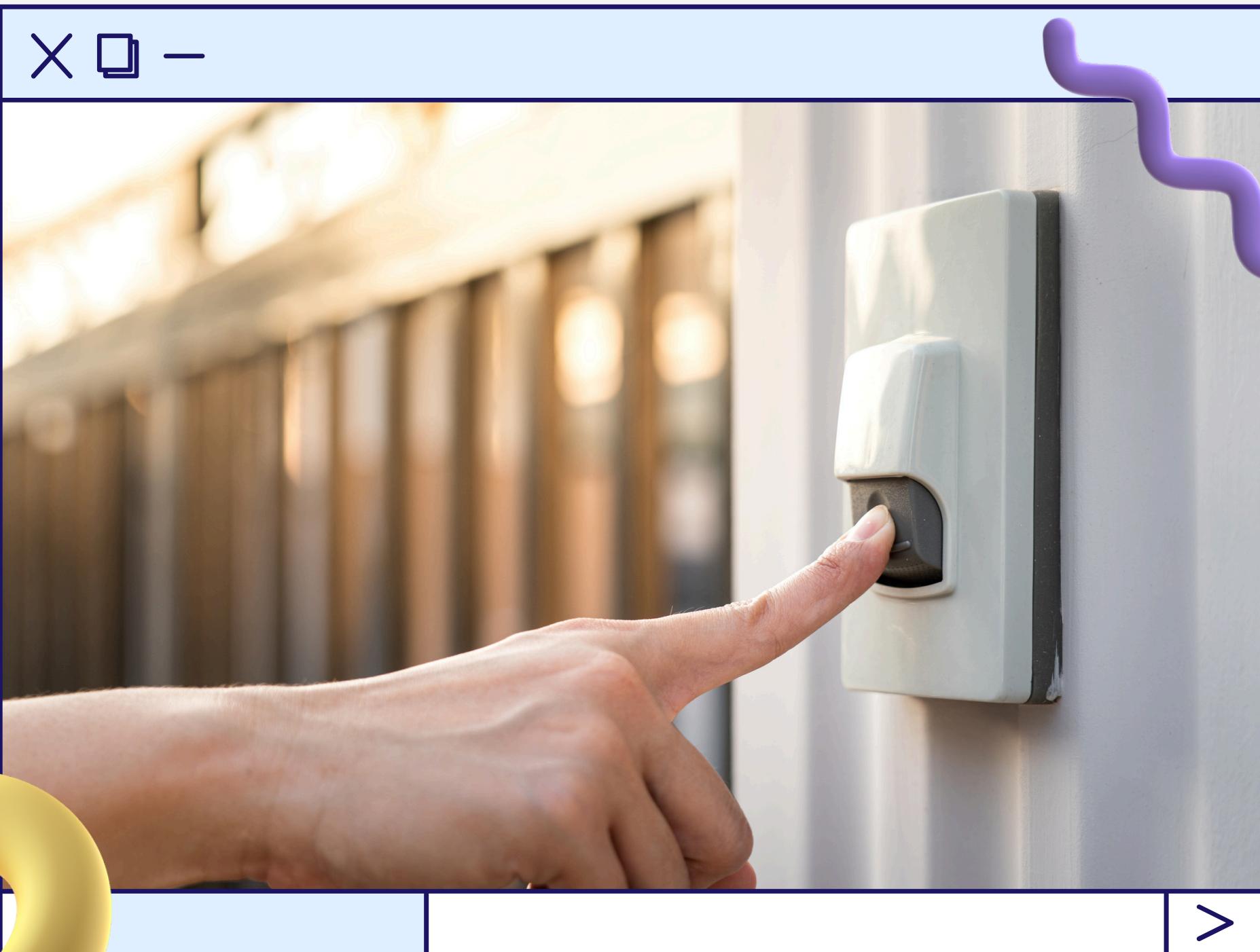
STUDENT'S GUIDE

Ring-a-Ding-Ding



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Ring-a-ding-ding





About The Class

AIM

Design and implement a digital doorbell system using Arduino Uno

Time



120 minutes

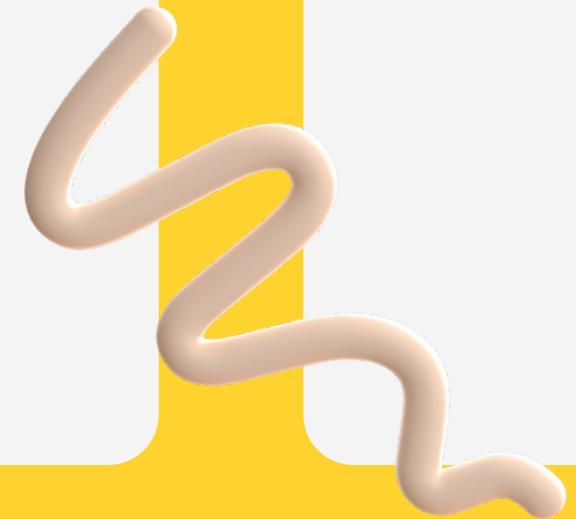
Topics Covered

Interfacing a push button with Arduino Uno, Programming logic for detecting input



Tools Used

 Arduino Uno board



Benefits Of The Project

Practical application
of programming
concepts

Basic understanding
of working of a
Buzzer

Understanding the
functions of a Button

Engaging way to learn
about Arduino Uno



Introduction

What is Ring a ding-ding?

- The Arduino Uno Ring-a-Ding-Ding project provides an engaging opportunity to explore the world of electronics and programming while creating a functional digital **Doorbell System**.
- In this project, we will be making use of a **button** which will be used to trigger the **buzzer** with the help of the Arduino Uno.
- We can further add a creative and personal touch to their doorbell system to **enhance** the project by programming the Arduino Uno to **play different melodies or tones** when the button is pressed.





Components

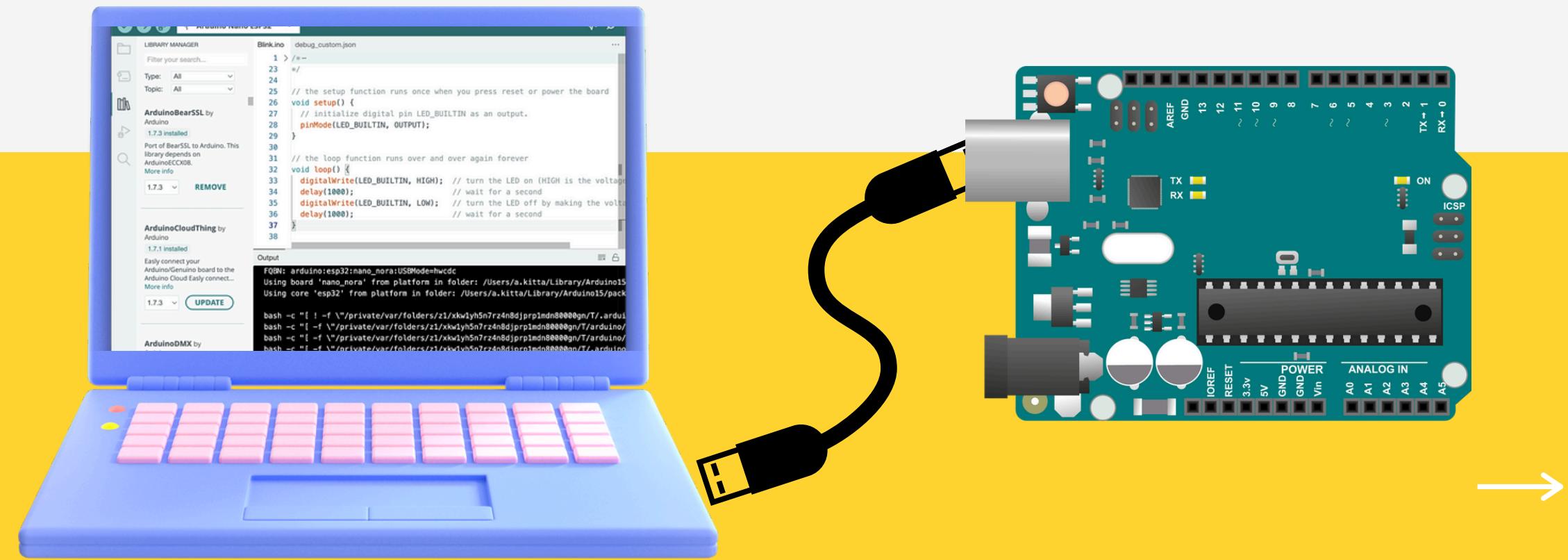
COMPONENT LIST	QUANTITY
Arduino Uno	1
Push button	1
Buzzer	1
Jumper wire	2

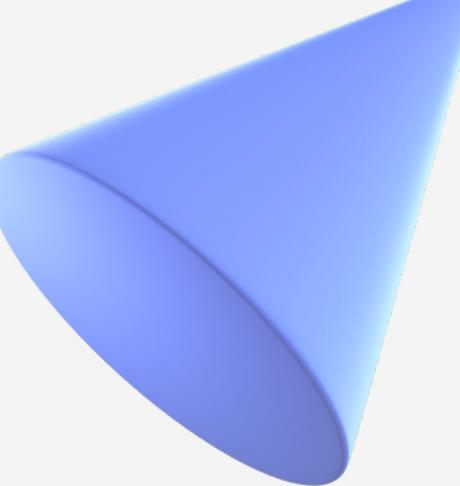


Arduino UNO



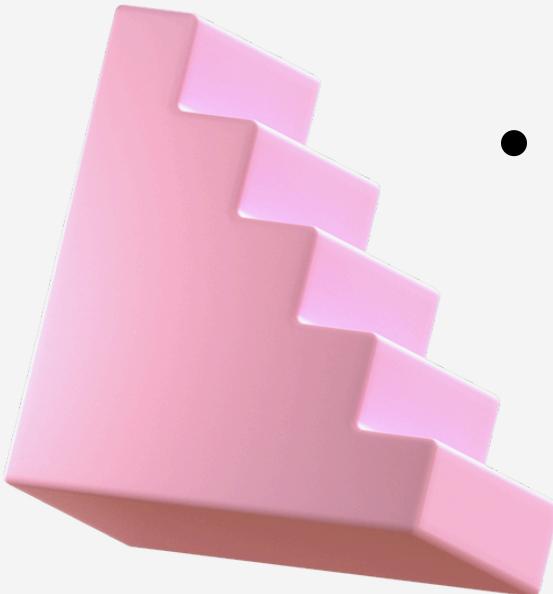
- Think of the Arduino Uno as a smart brain for your projects, helping you easily connect and control different electronic parts.
- It's like being part of a big, friendly club where everyone shares ideas and helps each other - that's the open-source magic of Arduino Uno.
- With its superpowers to understand and communicate with various gadgets, the Arduino Uno turns your ideas into reality, whether it's lighting up LEDs or making robots move.





Push Button

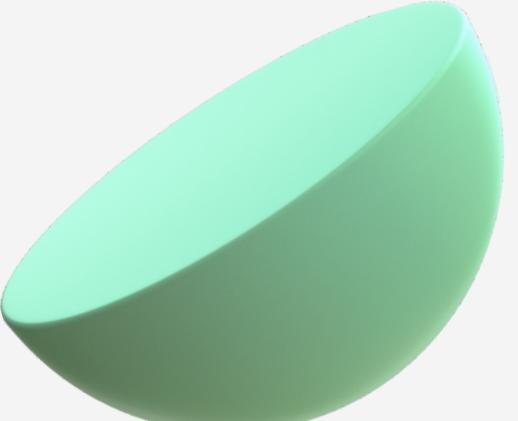
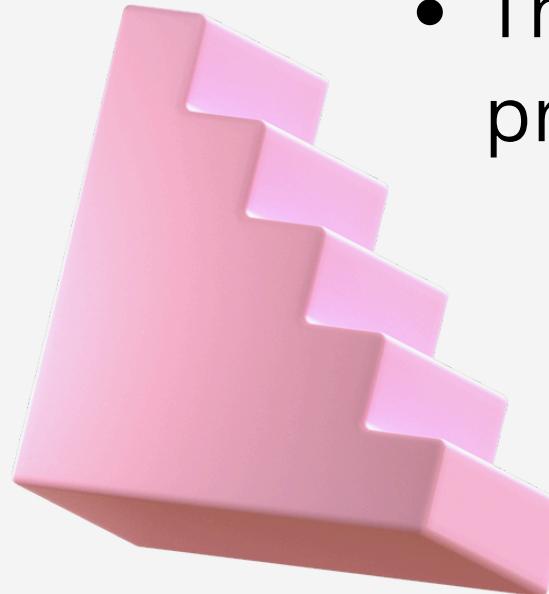
- **User Input Detection:** The push button serves as a tactile input device, detecting physical presses by users to signal doorbell activations.
- **Digital Signal Generation:** When pressed, the pushbutton generates a digital signal, which is detected by the Arduino Uno, triggering programmed actions such as activating the doorbell sound.
- **Debouncing Consideration:** To ensure accurate detection and prevent false triggers, debouncing techniques may be implemented to handle transient fluctuations in the pushbutton signal caused by mechanical contacts.





Buzzer

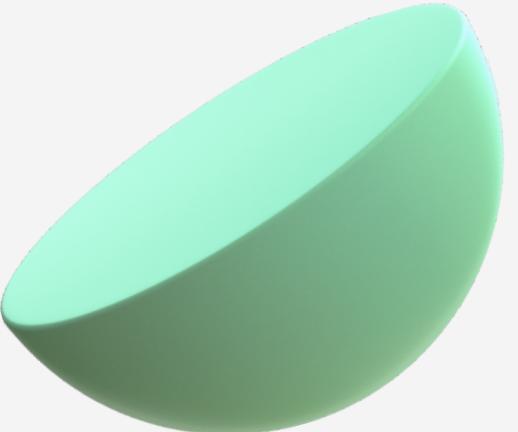
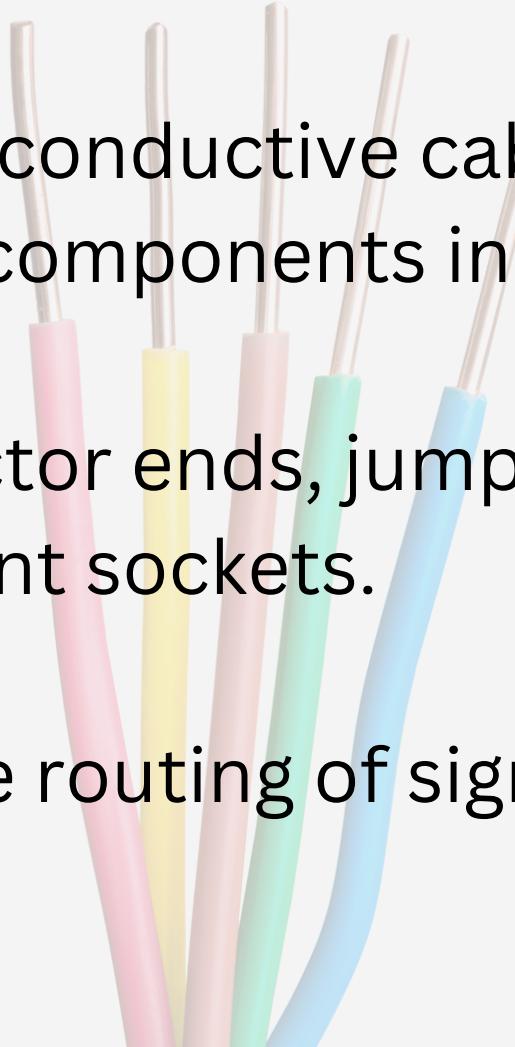
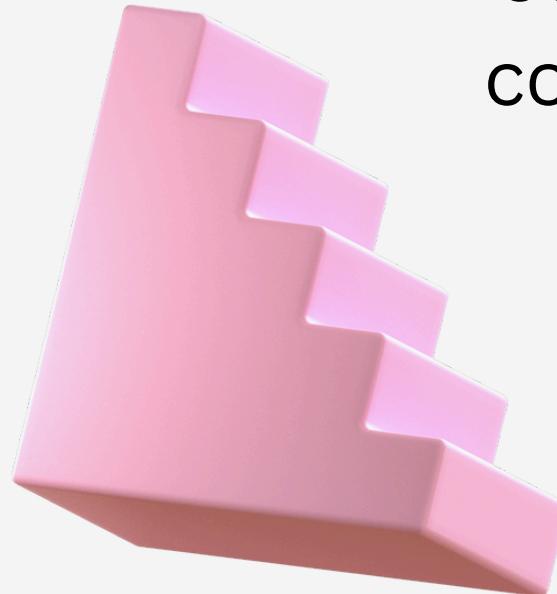
- The buzzer or speaker acts as an output device, generating audible alerts in response to doorbell activations.
- Controlled by the Arduino Uno, the buzzer or speaker produces sound patterns programmed into the system.
- The buzzer or speaker provides feedback to users, confirming that the doorbell press has been registered and prompting them to respond.





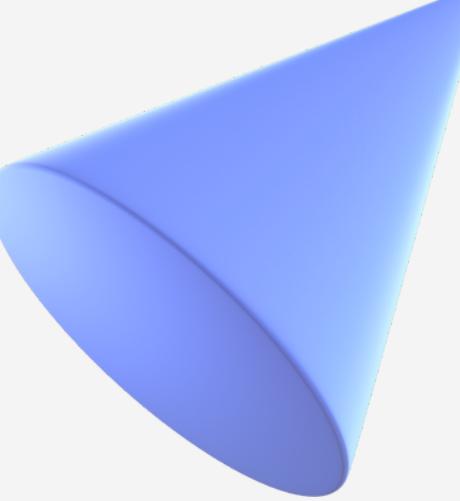
Jumper wire

- Jumper wires serve as flexible conductive cables used to establish electrical connections between various components in the circuit.
- With their male/female connector ends, jumper wires enable easy insertion into breadboard holes or component sockets.
- Jumper wires allow for flexible routing of signals, power, and ground connections within the circuit.

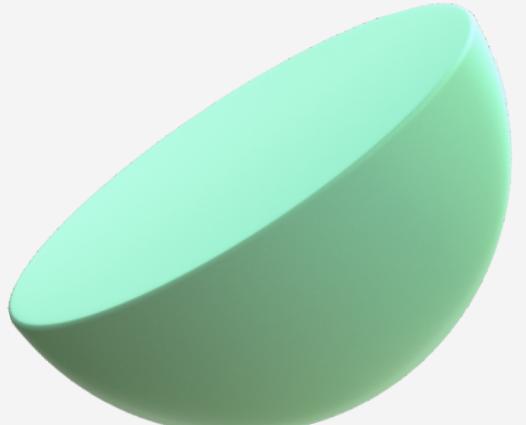




How it Works?



- **Activation Detection:** The system senses doorbell activations via a pushbutton or motion sensor.
- **Logic Execution:** Upon detection, the Arduino processes the signal and triggers the buzzer or speaker.
- **Audible Alert:** The buzzer or speaker emits a sound alert, signaling to occupants that the doorbell has been activated.

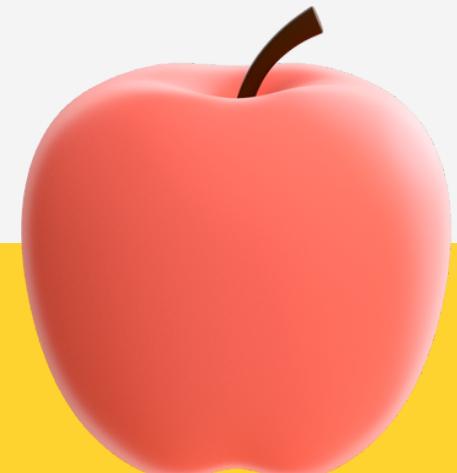




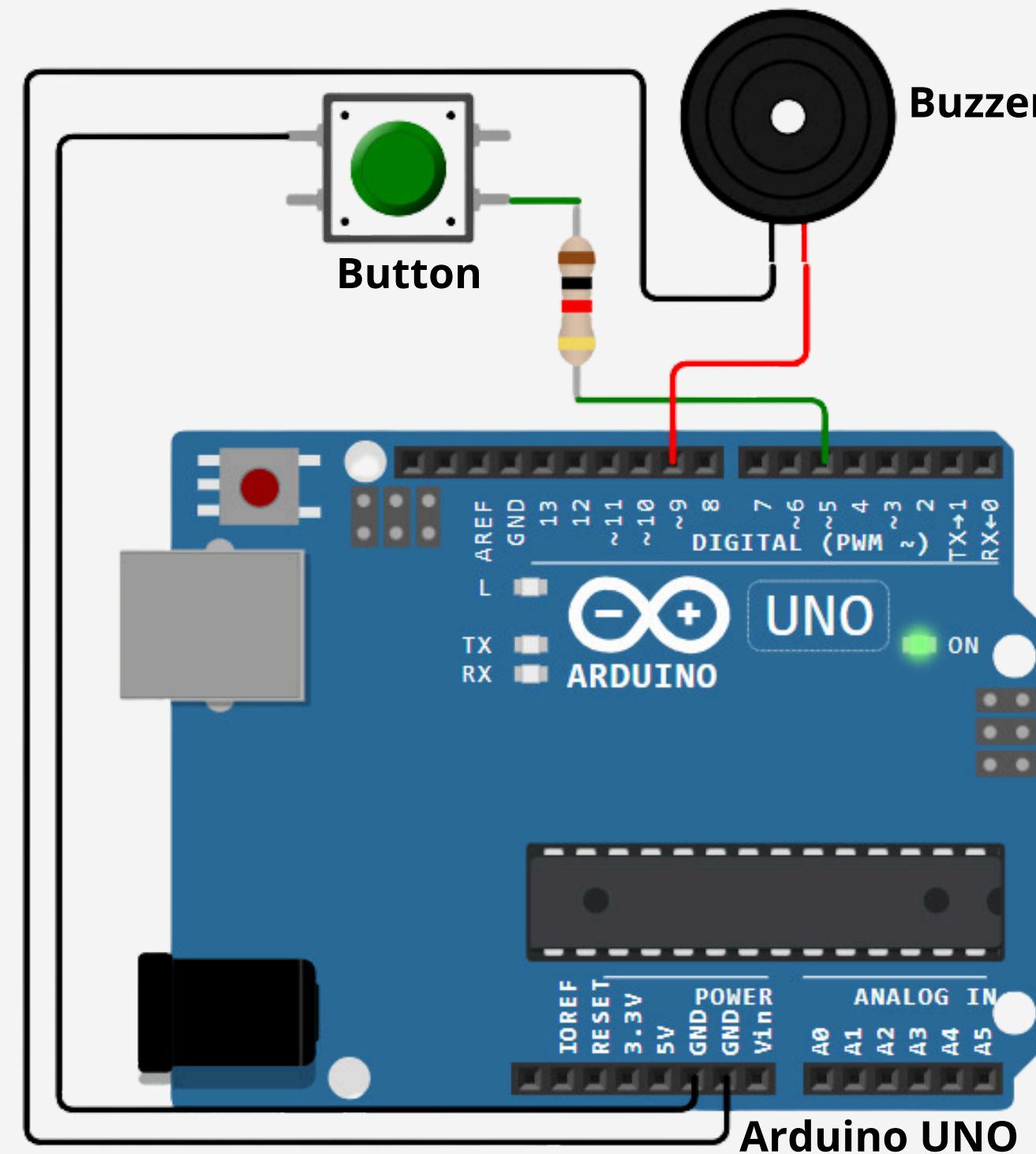
Student Activity Link

Activity reference video

Student Activity

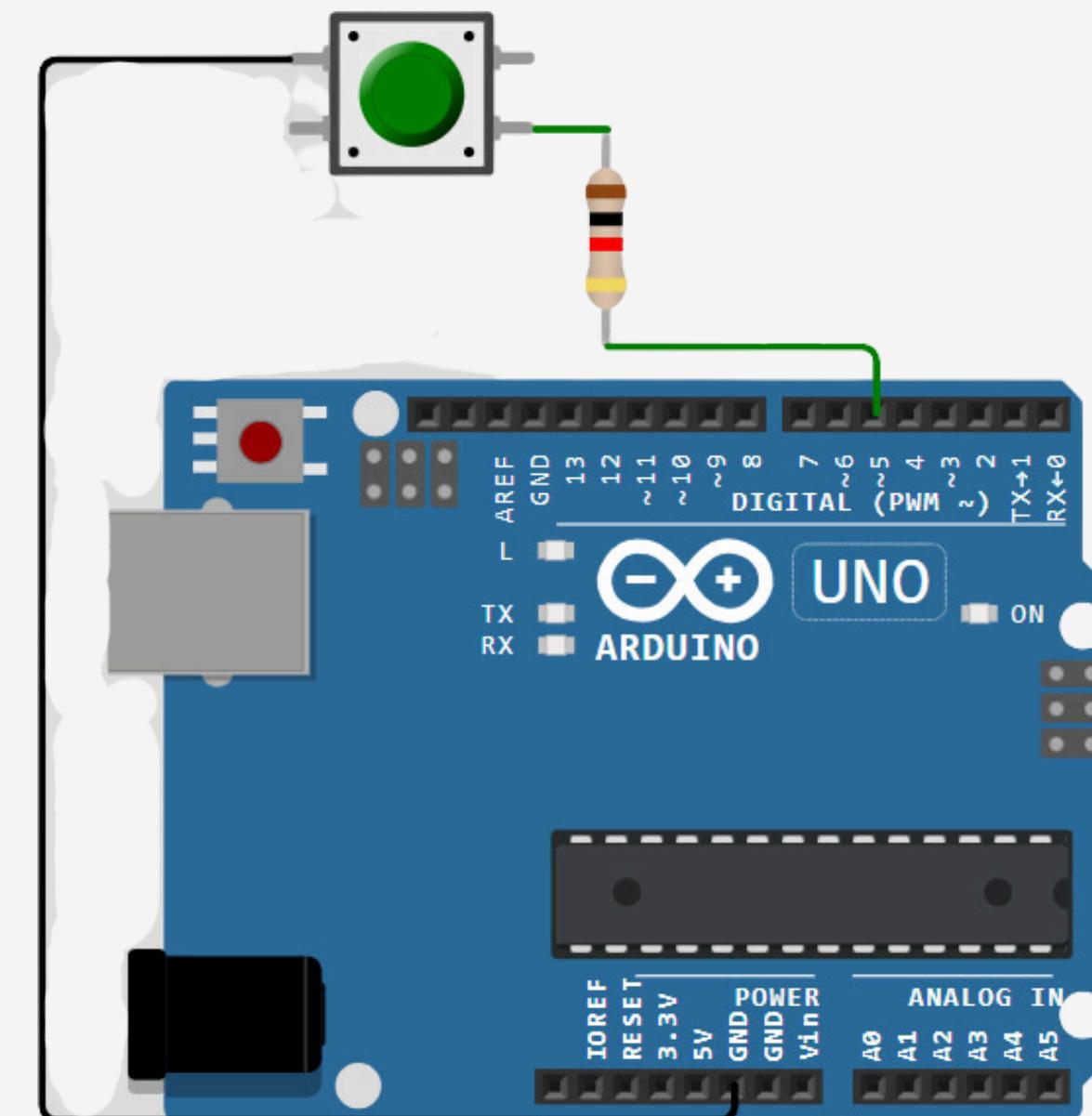


Circuit Connection



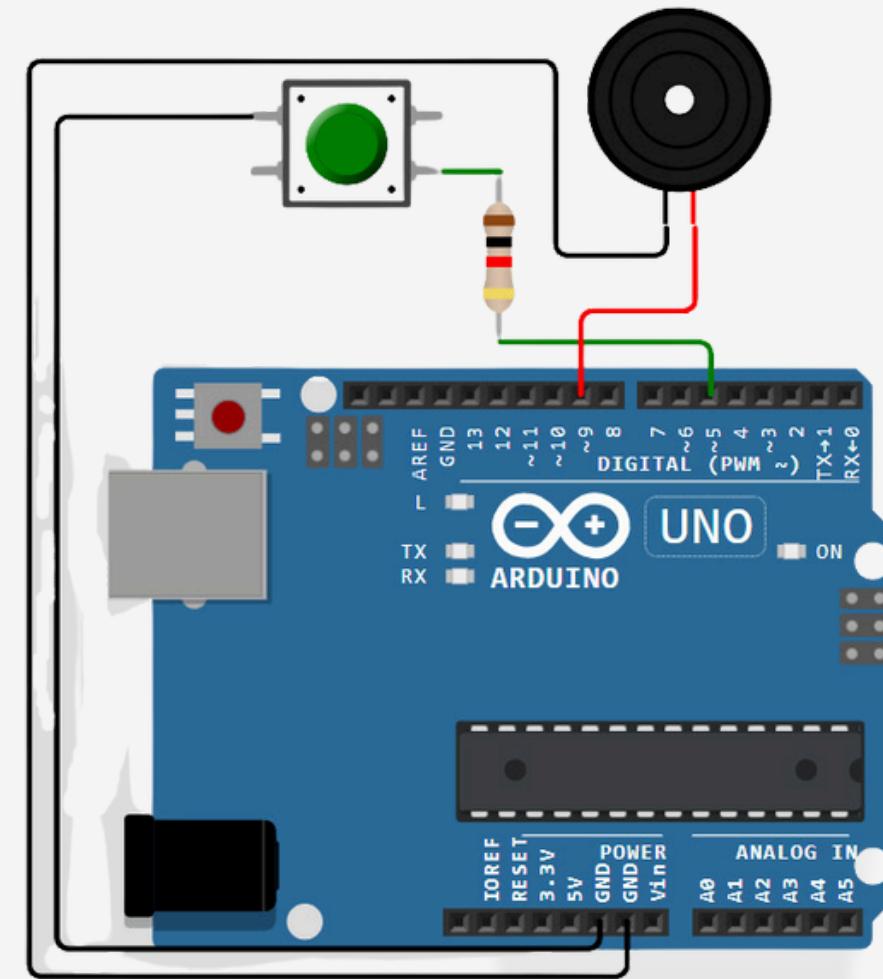
Step 1

- Connect one terminal of the button to digital pin 5 of the Arduino Uno and the other terminal to the GND pin of the Arduino Uno.



Step 2

- Connect the positive end of the Buzzer to pin 6 of the Arduino Uno and the negative end to GND pin of arduino.





Step 3

- Let's write the Code for our System.
- First we will define the BuzzerSocket and buttonSocket pins.
- In the void setup function we tell the buttonSocket pin to act as an input and the buzzerSocket pin to act as an output.
-

```
//If you use any different sockets change them below
#define buttonSocket 5 // <- Socket for button
#define buzzerSocket 6// <- Socket for piezo buzzer

void setup()
{
    pinMode(buttonSocket, INPUT);
    pinMode(buzzerSocket, OUTPUT);
}
```



Step 4

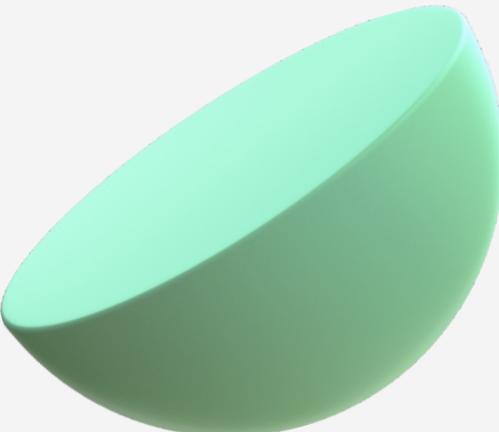
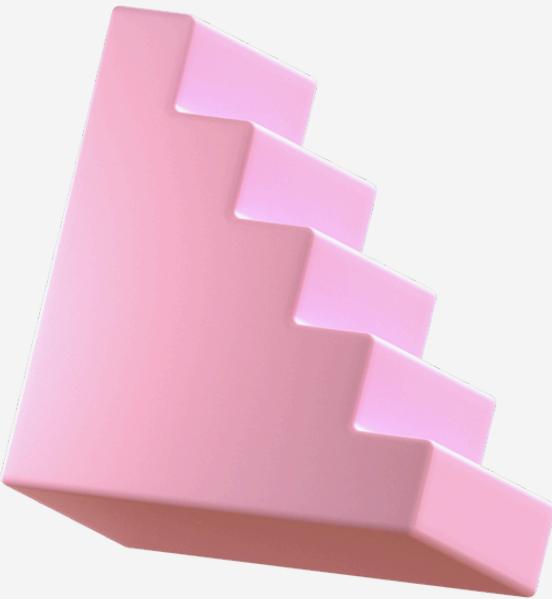
- This loop continuously checks if a button is pressed.
- If the button is pressed it produces a sequence of musical tones using a piezo buzzer.
- The tones played are 196 Hz, 329 Hz, and 261 Hz, with delays of 600 milliseconds between each tone.
- If the button is not pressed, the buzzer is turned off using the `noTone` function.

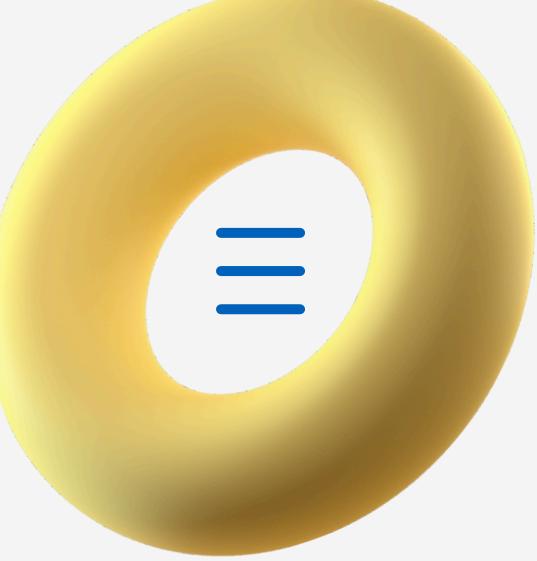
```
void loop()
{
    if (digitalRead(buttonSocket)) {
        tone(buzzerSocket, 196);
        delay(600);
        tone(buzzerSocket, 329);
        delay(600);
        tone(buzzerSocket, 261);
        delay(600);
    } else {
        noTone(buzzerSocket);
    }
}
```



Final OutPut

Link	<u>Output</u>
------	---------------



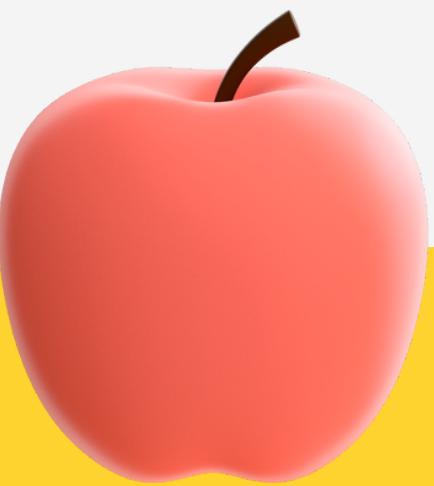


Congratulations

Hurray!

We have completed the

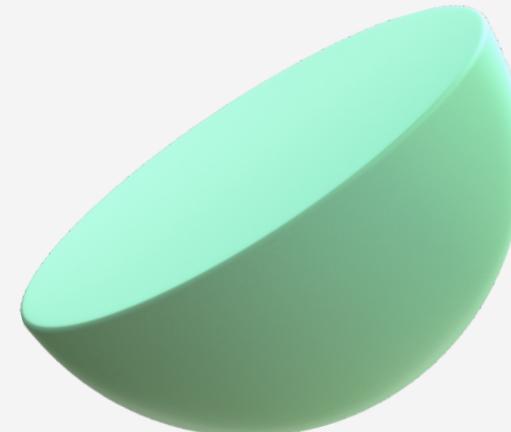
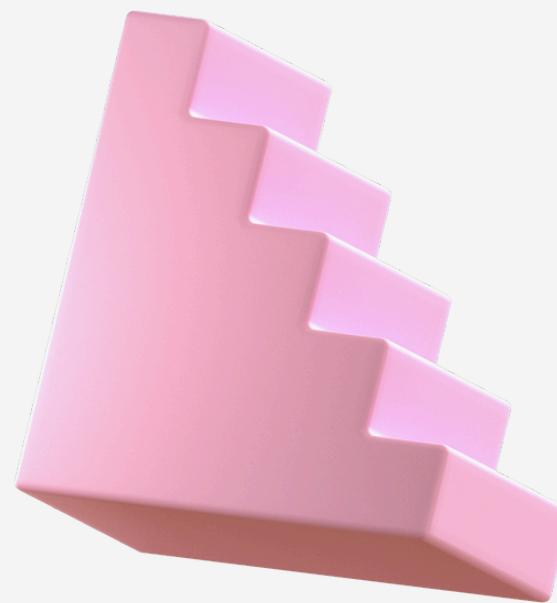
Ring-a-Ding-Ding Project

A central text area featuring the word "Congratulations" in a large, bold black font at the top. Below it, the words "Hurray!" and "We have completed the" are stacked in a slightly smaller bold black font. At the bottom, the project name "Ring-a-Ding-Ding Project" is centered in a bold black font. The text is surrounded by a dynamic, colorful confetti effect consisting of many small, wavy streamers in shades of yellow, pink, blue, and teal.



Learning outcomes

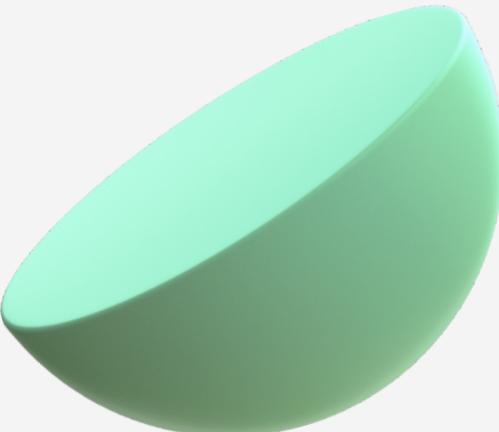
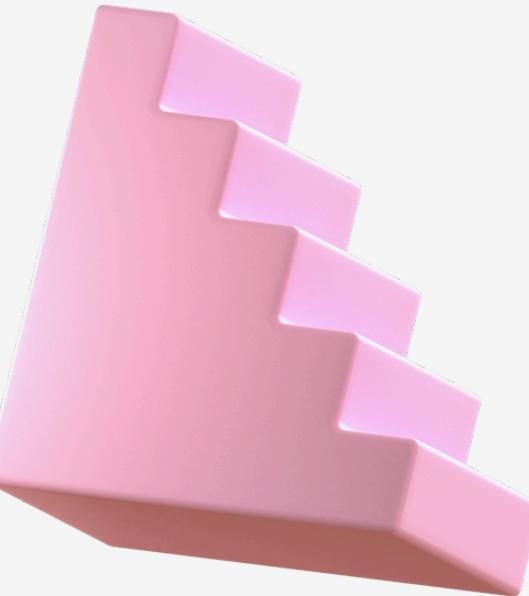
- **Sensor Integration:** Learn to connect and utilize pushbuttons with Arduino Uno, enhancing understanding of digital input operations.
- **Programming Proficiency:** Develop skills in programming logic to process sensor inputs and trigger actions like activating a buzzer.
- **User Feedback Implementation:** Gain experience in implementing feedback mechanisms such as audible alerts.

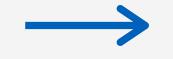




Notes

- Verify all connections with respected teachers.
- Safely use the electronics components.
- Check the Project is working properly.





Thank you!

Do you have any questions for me?

