Electronics Lesson 5 - Doorbell

Overview

In this lesson we learn the programming and wiring for a button and a buzzer. Students will then create a doorbell using a button, a buzzer and a led.

Plan

1. How does a button/doorbell work?
2. Learn digitalRead
3. Learn if statements
4. Learn tone & noTone
5. Doorbell Coding Activity
6. Learn button & +5 voltage
7. Learn buzzer
8. Doorbell Wiring Activity

Concept 1: How does a button/doorbell work?

A simple way to think of a button is that it switches between an open or close circuit. This can be done by just closing or opening a wire in the circuit. *If we want to do more complex task in CODE we have to READ the value of the button then do the action.* ie. if we press right arrow then the cursor should move right, if press the power button then my computer/tv should turn on.

Concept 1.1: What does a doorbell have?

A light and a buzzer.

Concept 2: digitalRead

digitalRead Reference

digitalRead is a function that reads a pin and return HIGH or LOW

code:

```
buttonState = digitalRead(buttonPin);
```

students:

if there is electricity at this hole in the breadboard then what should digitalRead return? If there is no electricity?

Concept 3: if statements

if statement reference

If statements allow you do actions base on a valid condition. ie. If I put a quarter into the vending machine then I get a cookie. If I get a 100 on an exam then I get bubble tea else do push ups.

code:

```
if(100 on exam) {
getBubbleTea();
} else {
doPushUps();
}
```

students:

can anyone give me examples of if statements in real life? Act out an example: if lights off then close eyes else open eyes.

Concept 4: tone & noTone

tone reference

In doorbell there's a buzzer. To create sound use `tone` and stop the sound use `noTone`.

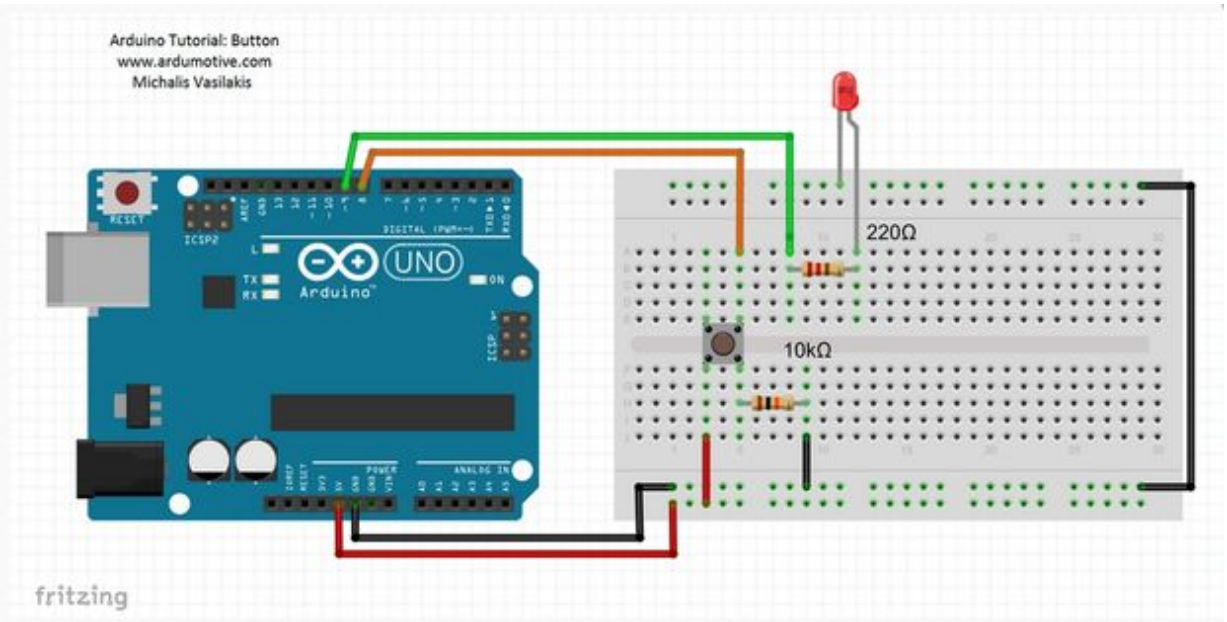
Activity 1: Doorbell Code

Students will work on a fill in the blank worksheet. Assistants/Instructor will help out if needed.

```
// constants won't change. They're used here to
// set pin numbers:
const int buttonPin = 2;     // the number of the pushbutton pin
const int ledPin =  8;      // the number of the LED pin
const int buzzerPin = 9;

// variables will change:
int buttonState = 0;         // variable for reading the pushbutton status

void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);

  // initialize the pushbutton pin as an input:
  pinMode(buttonPin, INPUT);
}

void loop() {
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);

  // check if the pushbutton is pressed.
  // if it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(ledPin, HIGH);
    tone(buzzerPin, 3000);
  } else {
    // turn LED off:
    digitalWrite(ledPin, LOW);
    noTone(buzzerPin);
  }
}
```

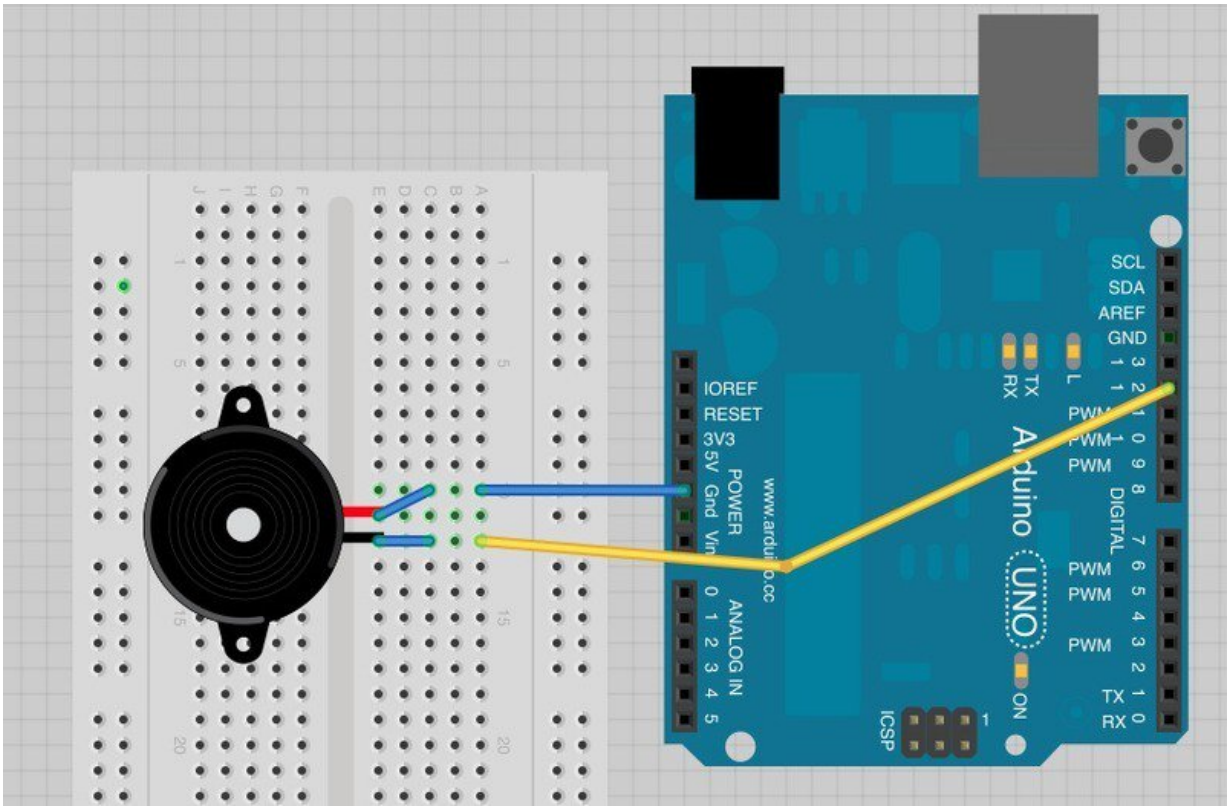
Concept 5: Button Wiring

Button Code & Wiring Reference



Concept 5: Buzzer Wiring

Buzzer Code & Wiring Reference



Activity 2: Doorbell Wiring

Button Youtube Tutorial <- Very Good!!!

There are many ways to wire a doorbell, here's one of them.