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CSE 3204

Project On: "IMPLEMENTATION OF PIEZO PIANO USING ARDUINO."

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Objectives:

- To learn about Arduino UNO and its different Pin functions.
- To learn about Piezo and its different functions.
- To make a simple Piano just using arduino.

Introduction:

Interfacing a speaker to an arduino is one of the coolest things that any one can do on the arduino. Most of the best arduino projects around the world sport one of these speaker. These speakers can be used to make sound from the arduino or any sensor connected to it. For example, you can create a simple audio player using speaker and arduino. So, depending on what people want to build, an speaker is a highly useful output device for arduino.

OverView:

In this Project, We are dealing with 8 ohm speaker which is used to make a simple piano . In order to build a simple piezo piano, we used an arduino board and a piezo for playing sound. Our piano is going to have the basic 8 notes : ‘c’ , ‘d’, ‘e’, ‘f’, ‘g’, ‘a’, ‘b’, ‘C’. As there are 8 buttons / notes in a row for ‘c’ , ‘d’, ‘e’, ‘f’, ‘g’, ‘a’, ‘b’, ‘C’ and when anyone press one he is going to hear the sound (within frequency creation) from the speaker. The arduino takes the input from the push buttons and make output to sound into the speaker, from where we hear the music. This is project is very useful for any music lover. He can use this simple project to learn the basic 8 notes.

Apparatus:

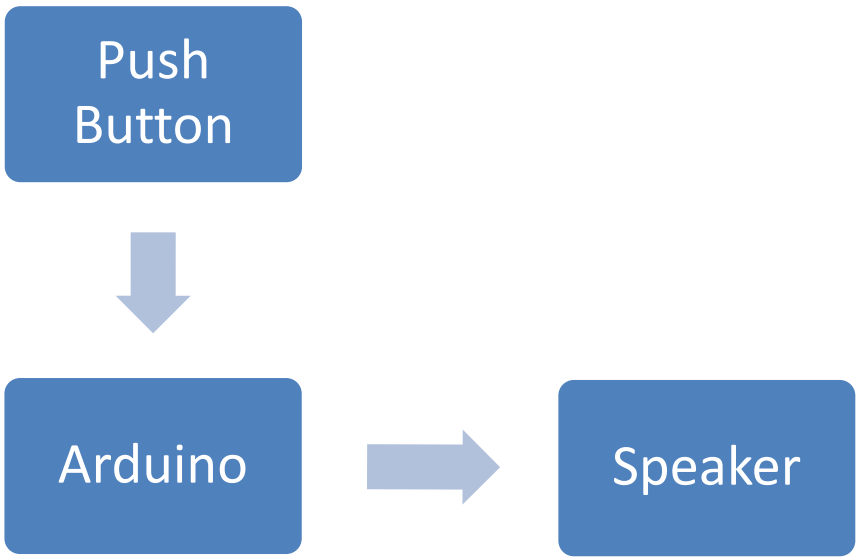
Hardware:

- Arduino UNO
- 8 ohm Speaker
- 8 push buttons
- 8 Resistor
- Connecting Wire

Software:

- Arduino IDE

How does it works:



Features:

- Users can learn the basic 8 notes from this project.
- Anyone can practice these notes with this cheap piano.
- Can be used to make beautiful music.

Circuit Diagram:

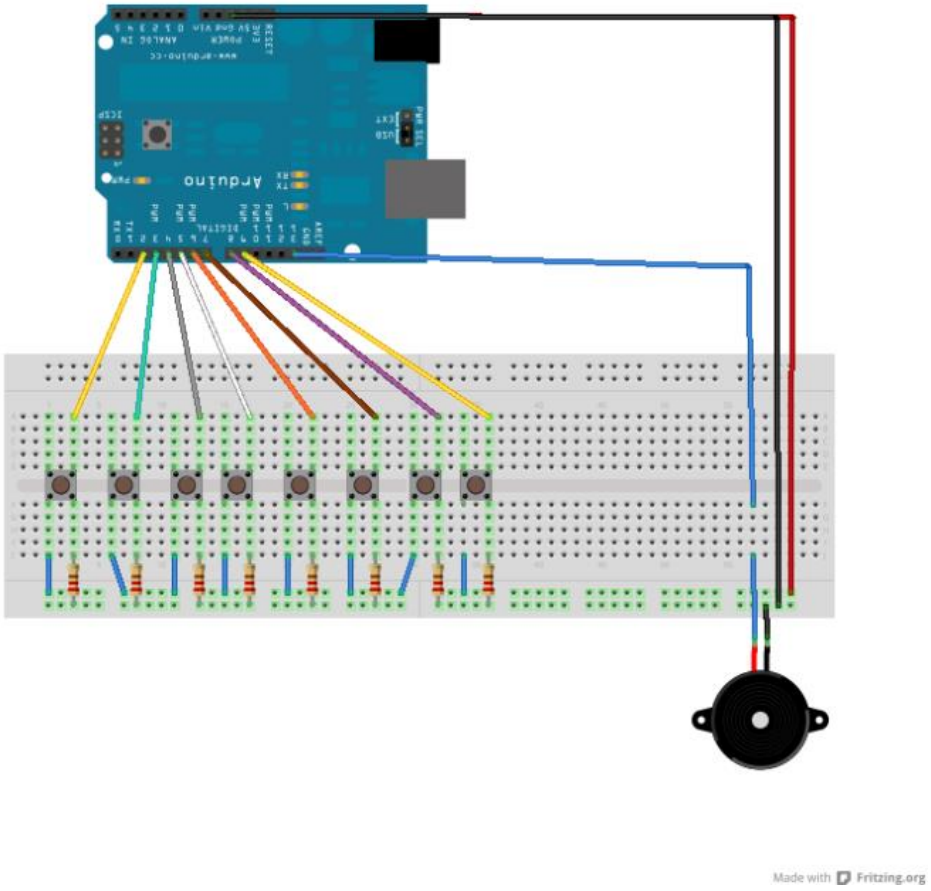


Fig1: Piezo piano with arduino

Code:

```
int button_C = 2;

int button_D = 3;

int button_E = 4;

int button_F = 5;

int button_G = 6;

int button_A = 7;

int button_B = 8;

int button_Cup = 9;


int speaker = 13;


int buttonstate_C = 0;

int buttonstate_D = 0;

int buttonstate_E = 0;

int buttonstate_F = 0;

int buttonstate_G = 0;

int buttonstate_A = 0;

int buttonstate_B = 0;

int buttonstate_Cup = 0;


//NOTES       'c'  , 'd',  'e',  'f',  'g', 'a',  'b',  'C'

int tones[] = { 1915, 1700, 1590, 1432, 1275, 1236, 1060, 956 }; //freq
```

```
int Cur_tone = 0;

void setup()
{
  pinMode(button_C, INPUT);
  pinMode(button_D, INPUT);
  pinMode(button_E, INPUT);
  pinMode(button_F, INPUT);
  pinMode(button_G, INPUT);
  pinMode(button_A, INPUT);
  pinMode(button_B, INPUT);
  pinMode(button_Cup, INPUT);

  pinMode(speaker, OUTPUT);
}

void loop()
{
        buttonstate_C = digitalRead(button_C);
        buttonstate_D = digitalRead(button_D);
        buttonstate_E = digitalRead(button_E);
        buttonstate_F = digitalRead(button_F);
        buttonstate_G = digitalRead(button_G);
        buttonstate_A = digitalRead(button_A);
        buttonstate_B = digitalRead(button_B);
```

```
buttonstate_Cup = digitalRead(button_Cup);


if((buttonstate_C == HIGH) || (buttonstate_E == HIGH) ||
        (buttonstate_G == HIGH) || (buttonstate_D == HIGH) ||
        (buttonstate_F == HIGH) || (buttonstate_A == HIGH) ||
        (buttonstate_B == HIGH) || (buttonstate_Cup == HIGH) )
{
        if (buttonstate_C == HIGH)
        {
                Cur_tone = tones[0];
        }
        if (buttonstate_E == HIGH)
        {
                Cur_tone = tones[1];
        }
        if (buttonstate_G == HIGH)
        {
                Cur_tone = tones[2];
        }
        if (buttonstate_D == HIGH)
        {
                Cur_tone = tones[3];
        }
        if (buttonstate_F == HIGH)
        {
```

```
                Cur_tone = tones[4];
            }
            if (buttonstate_A == HIGH)
            {
                Cur_tone = tones[5];
            }
            if (buttonstate_B == HIGH)
            {
                Cur_tone = tones[6];
            }
            if (buttonstate_Cup == HIGH)
            {
                Cur_tone = tones[7];
            }

            digitalWrite(speaker, HIGH);
            delayMicroseconds(Cur_tone);
            digitalWrite(speaker, LOW);
            delayMicroseconds(Cur_tone);
        }
        else //in case no button is pressed , close the piezo
        {
            digitalWrite(speaker, LOW);
        }
}
```

Discussion:

From this project we have learnt how to work with arduino, speaker and push buttons combinedly. That was a great journey. Finally, we are successfully completed our project. It can make sounds according to the input notes. But there arose some problem while implementing. It was making some noise but at last we were able to solve this problem.