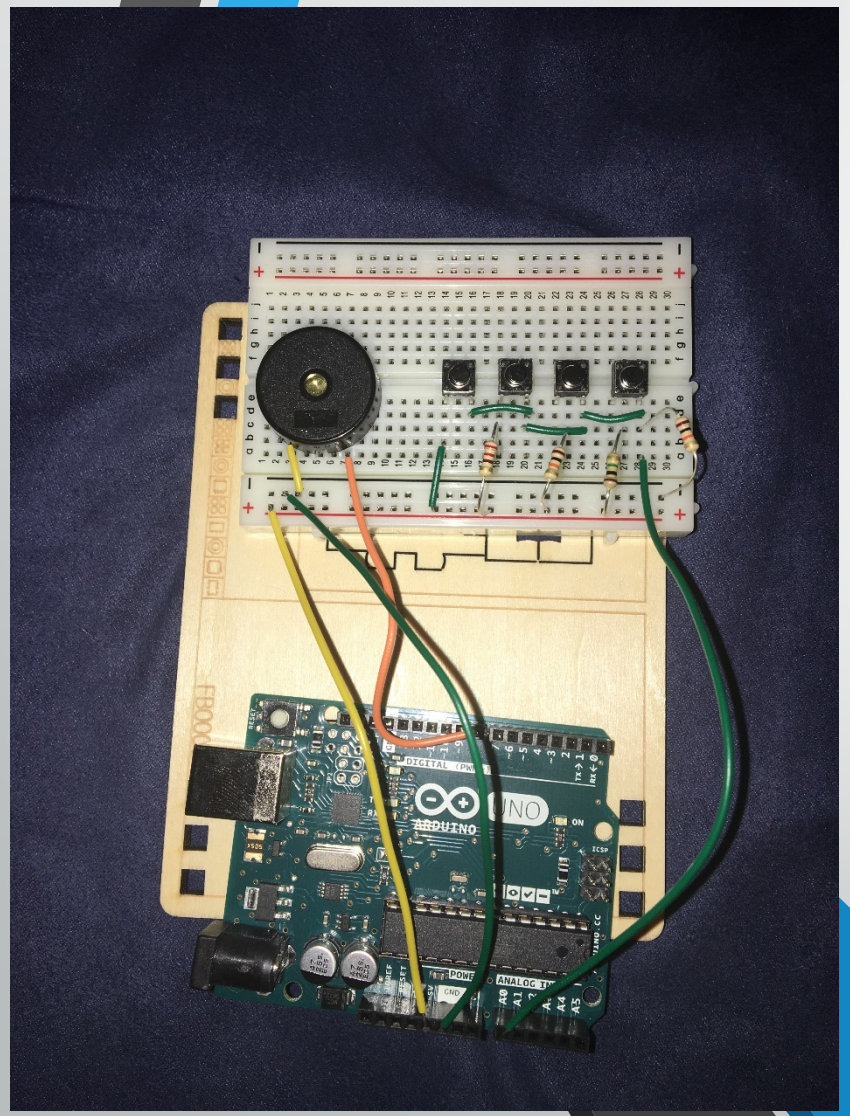


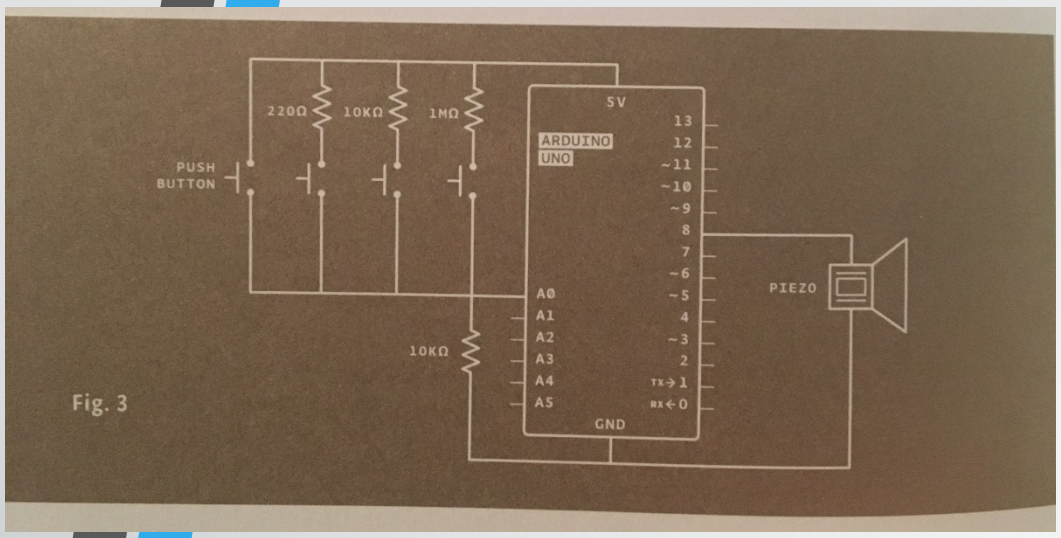
Arduino Keyboard Instrument Project

By Bradey Liverio

ICEN 360

Why Did I Choose This Project?

- One of my biggest interests has always been in music, I have always loved learning about it and making it!
  - Played in a jazz band and concert band in middle school.
  - Sang in Chorus and Concert Choir in middle and high school, also put many acapella videos up on social media for my friends and family.
- I wanted to do a project from the "Arduino Projects Book"
  - Looking through the book, found the "Keyboard Instrument" project and knew right away I wanted to do that project!



Theory

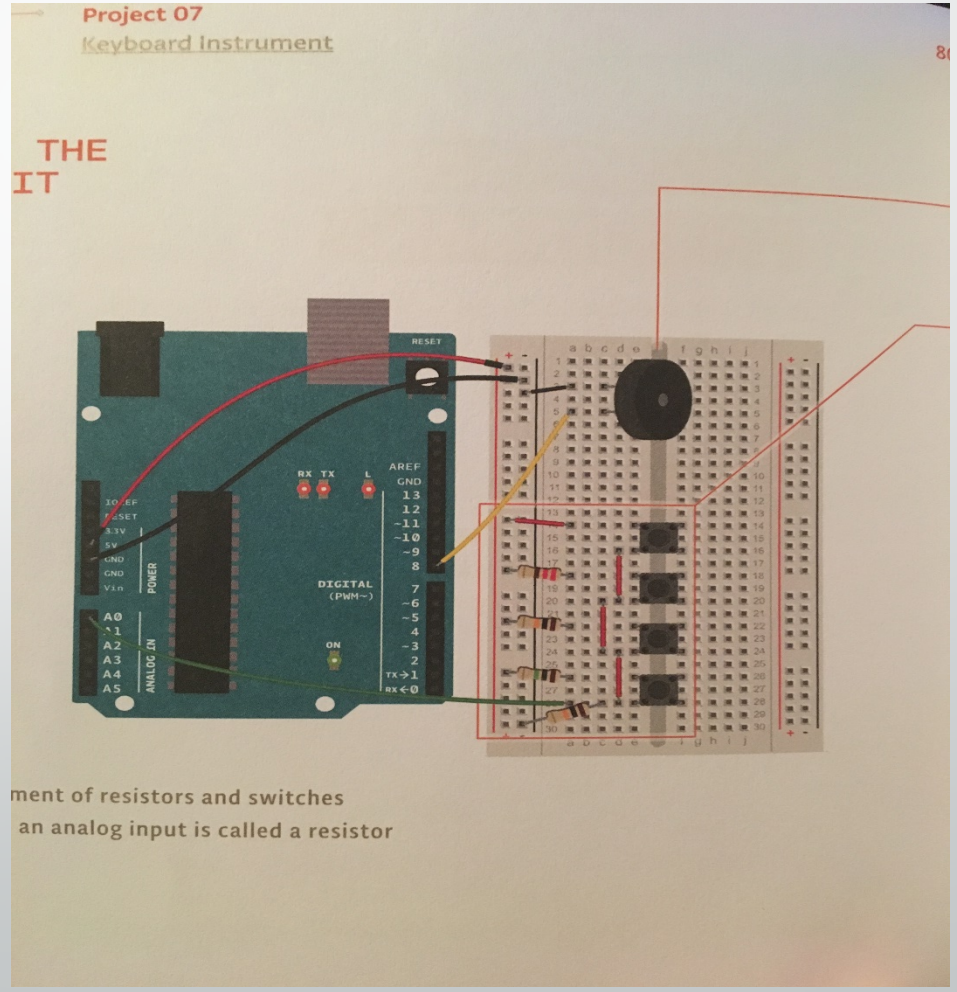
- To summarize from Starter Kit Book (Pgs. 79-80):
  - This project allows a resistor ladder to be built
    - Switches are connected in a parallel circuit to Ao.
    - Most connected to power by a resistor.
  - Each button has a unique voltage level that passes to input pin
    - If two switches are pressed at same time, an input is given based on the parallel resistor relationship.

Materials Needed for Project

- Arduino Uno
- Breadboard
- Ground Wires
- USB Cable
- Piezo Buzzer
- 4 Push Button Switches
- 1 220 Ohm Resistor (Red-Red-Brown)
- 1 Megohm Resistor (Brown-Black-Green)
- 2 10 Kilohm Resistors (Brown-Black-Orange)

Diagram of the Circuit

- From Starter Kit Book (Pg. 80)



Code for the Keyboard Instrument

p07_Keyboard | Arduino 1.8.2

File Edit Sketch Tools Help

p07_Keyboard

```
// create an array of notes
// the numbers below correspond to
// the frequencies of middle C, D, E, and F
int notes[] = {262, 294, 330, 349};

void setup() {
  //start serial communication
  Serial.begin(9600);
}

void loop() {
  // create a local variable to hold the input on pin A0
  int keyVal = analogRead(A0);
  // send the value from A0 to the Serial Monitor
  Serial.println(keyVal);
```

```
  // play the note corresponding to each value on A0
  if (keyVal == 1023) {
    // play the first frequency in the array on pin 8
    tone(8, notes[0]);
  } else if (keyVal >= 990 && keyVal <= 1010) {
    // play the second frequency in the array on pin 8
    tone(8, notes[1]);
  } else if (keyVal >= 495 && keyVal <= 525) {
    // play the third frequency in the array on pin 8
    tone(8, notes[2]);
  } else if (keyVal >= 4 && keyVal <= 20) {
    // play the fourth frequency in the array on pin 8
    tone(8, notes[3]);
  } else {
    // if the value is out of range, play no tone
    noTone(8);
  }
}
```

Done uploading.

```
Sketch uses 3448 bytes (10%) of program storage space. Maxim
Global variables use 207 bytes (10%) of dynamic memory, leav
```

Modifying the Code

- Can change values of Ao in if… else statement for Serial Monitor
- Code can be modified to give off different pitches
  - Can create sharps, flats, very low pitches, very high pitches
  - Made this modification https://www.youtube.com/watch?v=X1m2yDWh7-Y

Source for Information

- Fitzgerald, Scott and Michael Shiloh. *Arduino Projects Book*. Arduino LLC, October 2015.