**SIK Keyboard Code**

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 \* SparkFun Inventor's Kit Project

 \* Keyboard Instrument

 \* Date: March 29, 2016

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 \* Description:

 \* Use the soft touch potentiometer as a keyboard segmented into

 \* 8 keys: C, D, E, F, G, A, B, C. When each key is pressed, the

 \* corresponding note is played through a buzzer.

 \*

 \* Hardware Connections:

 \* Arduino | Soft Pot | Buzzer

 \* ---------------------------

 \* 5V | pin 3 |

 \* A0 | pin 2 |

 \* GND | pin 1 |

 \* 9 | | +

 \* GND | | -

 \*

 \* You will also need to attach a 10k resistor from pin 2 to

 \* pin 1 (GND) on the soft pot.

 \*

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// Constants

const int SENSOR\_PIN = 0; // Analog input pin for soft pot

const int BUZZER\_PIN = 9; // PWM digital output pin for buzzer

const int DURATION = 10; // Time (ms) to play a note

// This function is run only once as soon as the Arduino boots

void setup()

{

 // Set the buzzer pin as an output

 pinMode(BUZZER\_PIN, OUTPUT);

}

// This gets run over and over right after the setup() function

void loop()

{

 int sensorValue;

 char note = 0;

 int freq;

 // Read the value (0 - 1023) from the ADC

 sensorValue = analogRead(SENSOR\_PIN);

 // Map the key pressed to a note

 note = findNote(sensorValue);

 // If it's a note, play it!

 if ( note != 0 ) {

 freq = getFrequency(note);

 tone(BUZZER\_PIN, freq, DURATION);

 delay(DURATION);

 }

}

// Given an ADC value (0 - 1023), map it to a note

char findNote(int val)

{

 // Return the note based on the key pressed

 if ( (val > 10) && (val <= 160) )

 {

 return 'c';

 }

 if ( (val > 160) && (val <= 250) )

 {

 return 'd';

 }

 if ( (val > 250) && (val <= 350) )

 {

 return 'e';

 }

 if ( (val > 350) && (val <= 450) )

 {

 return 'f';

 }

 if ( (val > 450) && (val <= 560) )

 {

 return 'g';

 }

 if ( (val > 560) && (val <= 690) )

 {

 return 'a';

 }

 if ( (val > 690) && (val <= 850) )

 {

 return 'b';

 }

 if ( (val > 850) && (val <= 1023) )

 {

 return 'C';

 }

 // Return 0 to show that no key was pressed

 return 0;

}

// Translate a note (a, b, c, d, e, f, g) to its frequency

int getFrequency(char note)

{

 int i;

 const int numNotes = 8; // number of notes we're storing

 // Arrays containing our notes and frequencies

 char names[] = { 'c', 'd', 'e', 'f', 'g', 'a', 'b', 'C' };

 int frequencies[] = {262, 294, 330, 349, 392, 440, 494, 523};

 // Step though the notes

 for (i = 0; i < numNotes; i++) // Step through the notes

 {

 // If it matches a note in our list, return the frequency

 if (names[i] == note)

 {

 return(frequencies[i]);

 }

 }

 // If we looked through everything and didn't find a note,

 // return 0, as we still need to return something.

 return(0);

}