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1/20/2015

Musical Instrument Project

For my project, I decided to make a home-made electronic keyboard using a Raspberry Pi and a Breadboard. In order to make this happen, there are basically three different things I had to do. First, I had to get the various pieces of hardware together. The “brain” of the keyboard is the Raspberry Pi, which is kind of like a mini-computer. Next, I had to buy a breadboard, which is basically a circuit that allows you to just stick metal pins into the holes instead of soldering them, making projects like this much easier. After getting the Pi and the breadboard, I then had to buy the necessary cables to connect the two. The second facet of this project was actually building the circuit. This included buying all the circuit components (jumper wires, resistors, button switches, etc.). I will get into how all these different pieces work together in the next paragraph but I wanted to give an overview of all the parts separately before I explain how they work in unison. Lastly, I had to create the instructions for the Raspberry Pi to know when a button is pushed and to play a pre-determined sound in response. These instructions for the hardware are known as programming, or coding. Luckily, there are many different code libraries out there, so I was able to have a reference point while writing the code. If you put all these different pieces together, you get a Raspberry Pi Electronic Keyboard.

Now that you know the different components that make up the keyboard, let me explain how it actually works. First, I plug the Raspberry Pi into an outlet and turn it on. Once it boots, I run the program that reads the input buttons on the breadboard and plays the designated MP3 file for each respective button. Essentially all the program does is identify which pins are connected to each button so that when I refer to “button 1,” it knows which wire that represents. The hardest part of this project was definitely building the circuit on the breadboard. But basically there is a cable running from the Raspberry Pi to the breadboard. From that connection, I run one wire to the power strip (this gives power to the circuit) and run one wire to the ground strip (this closes the circuit). The way the electricity flows through the circuit starts from the power strip, and then connects to a resistor, which regulates the electrical flow and makes sure nothing shorts or gets blown. The resistor then connects to the buttons that I press for each note. The other side of the button then connects to the grounding strip, which closes the loop and allows me to press another button. So each time I press a note the process I just explained occurs again. That’s why it’s called a loop, because for each button press it goes through the same process and then waits for the next button to be pushed.

