



## Building a Simple Electronic Piano Using Tinkercad Circuits



by ms21

In this instructable, we will be building and implementing a simple electronic piano using a 555-timer on Tinkercad.

TinkerCAD is a free, browser-based 3D modeling and electronics design platform that allows users to easily create and modify 3D designs and circuits using a simple drag-and-drop interface. It is designed to be accessible for beginners and educators, yet powerful enough for advanced users to create complex designs. TinkerCAD is owned by Autodesk, a software company that specializes in computer-aided design (CAD) software.

Because of its ease of use, anyone with a basic understanding of computers can create this fun project in as little as 30 minutes.

**Reminder: Press on the images to view notes.**

### Supplies:

Above is a picture of the required components to build the piano. All the components will be found in the Tinkercad circuit workplace. You will also need a breadboard which is not listed in the picture above but is how the circuit will be implemented.

Here is a quick rundown of each component and what they do:

### Breadboard:

A breadboard is a device used to prototype electronic circuits without having to solder components together. It allows for quick and easy experimentation by providing a grid of holes where wires and components can be inserted and connected to form circuits.

### Pushbuttons:

A pushbutton is a type of switch that is activated by pressing a button. It is commonly used in electronic circuits to control the flow of electricity.

### Resistors:

A resistor is an electronic component that limits the flow of current in a circuit. It is commonly used to control the amount of voltage or current in a circuit and comes in a variety of resistance values.

### Timer:

A 555 timer is a type of integrated circuit that can be used to generate a wide range of electronic signals, including oscillating and pulse-width modulated signals. It is a versatile component that is commonly used in a variety of electronic circuits.

### Piezo:

A piezo is a type of electronic component that can produce sound when an electric current is applied to it. It is commonly used in electronic musical instruments and other devices that require a sound output.

### Capacitor:

A capacitor is an electronic component that stores electric charge. It is commonly used in electronic circuits to filter out noise or to stabilize voltage levels. It comes in a variety of capacitance values.

### **Power Supply:**

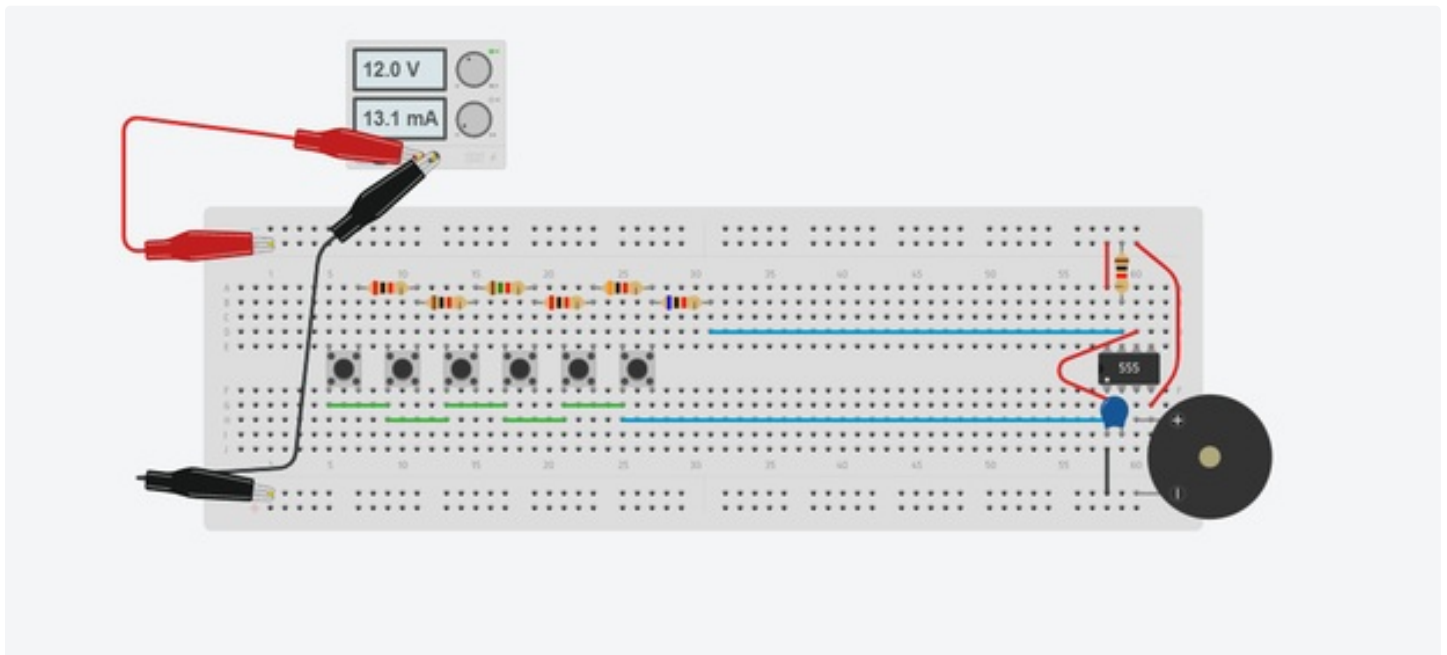
A power supply component is an electronic component that provides electrical power to a circuit. It is essentially a device that converts an input voltage or current into the desired output voltage or current to power electronic devices.

### **Wires/Wiring:**

In a circuit, wires are used to connect the various components together to allow the flow of electricity. Proper wire placement is essential to ensure that the circuit functions as intended and does not pose a safety hazard.

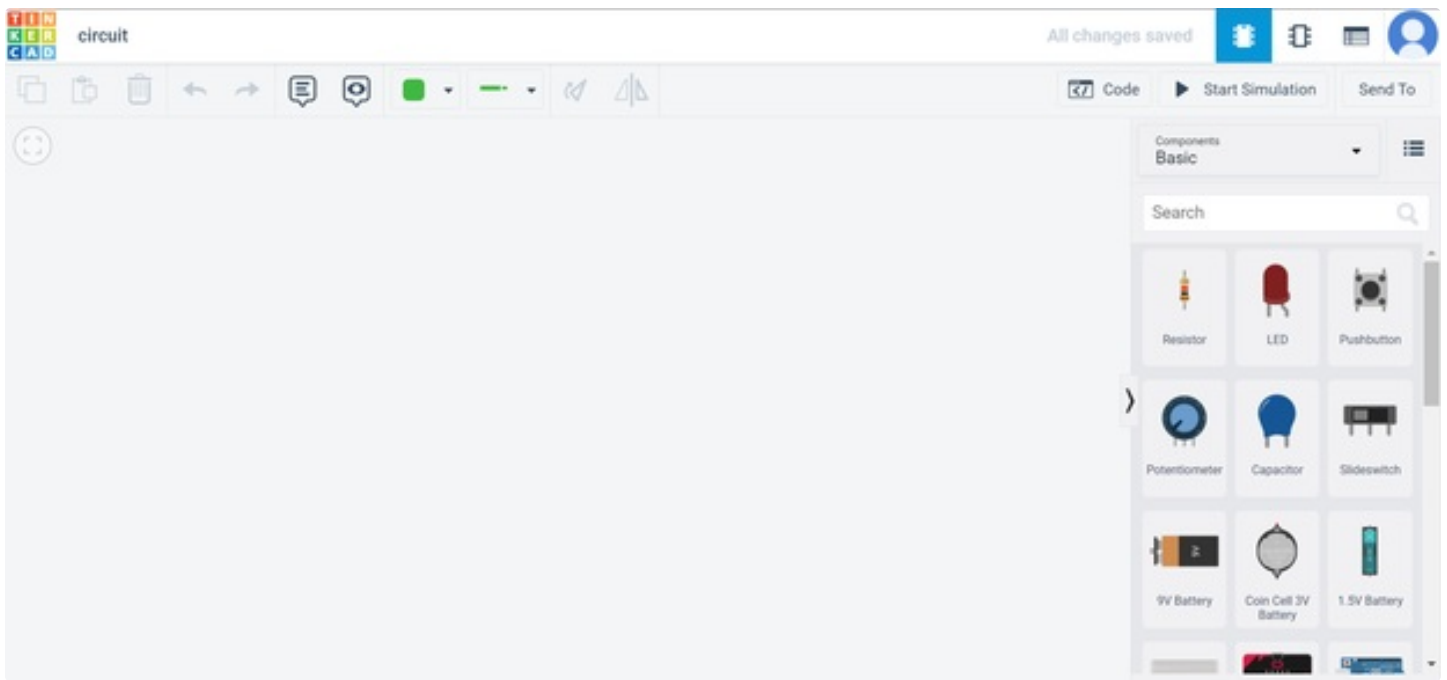
When placing wires, it is important to make sure that they are connected to the correct terminals of the components they are joining. For example, positive and negative terminals must be connected to their respective counterparts on other components, such as batteries or LEDs.

Wires should also be placed in a way that allows for neat and organized wiring, which can make troubleshooting easier if there are issues with the circuit. It is recommended to avoid crossing wires unnecessarily or leaving too much slack, as this can cause confusion or even accidental short circuits. For this implementation in Tinkercad, we will not need to worry about crossing wires or creating accidental short circuits because it is a software.



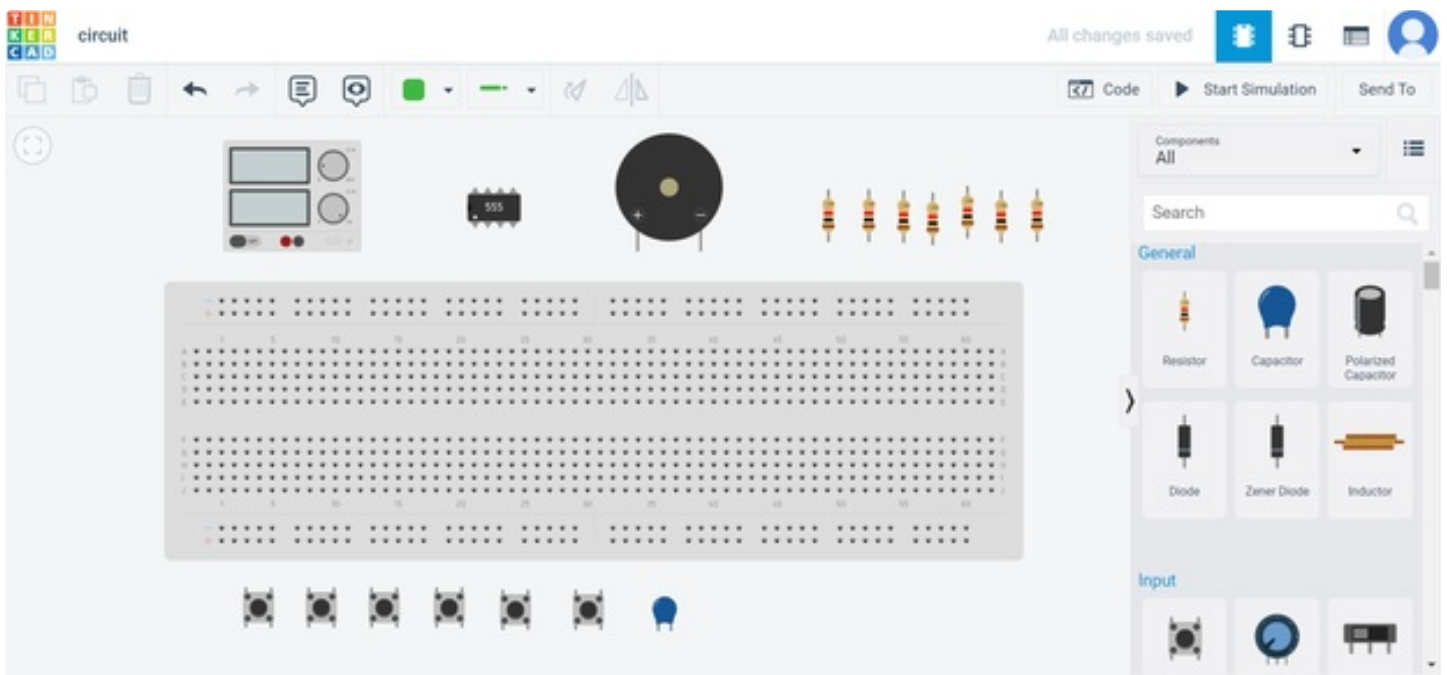
## **Step 1: Access the Tinkercad Circuits Workspace**

- Navigate to Tinkercad.com and create a free account! This hotlink will take you there- ([Circuits | Tinkercad](#))
- Once you have created an account, select the Circuits tab under "Tinker" at the top of the screen. Scroll down a little bit until you see "Start Tinkering" and select it. This should take you to a screen that says, "Your designs".
- Next, press on the blue "+ New" button towards the right side of the screen and select "Circuit". You should now have access to the circuit workspace.



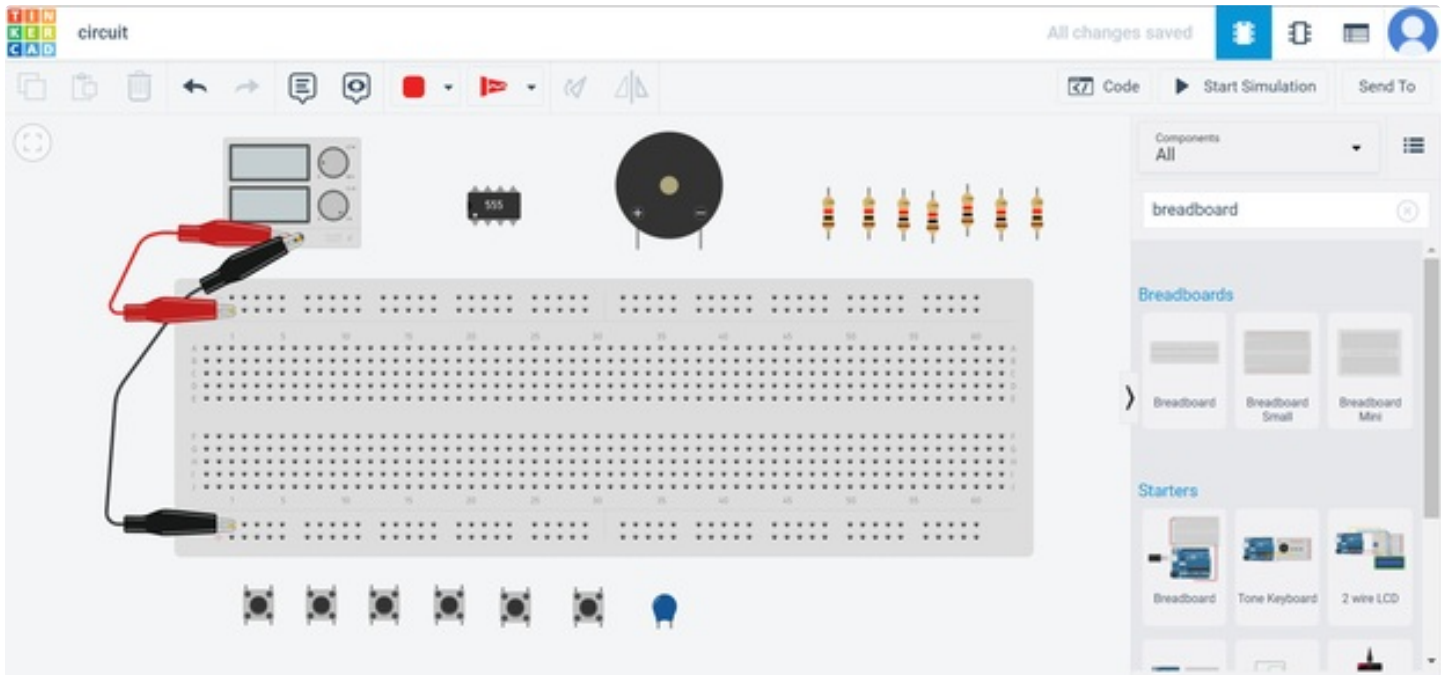
## Step 2: Gather the Required Materials

- Using the search bar at the right of the screen, search up the components listed in the supplies part and begin dragging them into the workspace.
- Search up "Breadboard" and drag the breadboard into the workspace, make sure it is the regular breadboard and not the small or mini one.
- Press on the image to view the notes if you need help.



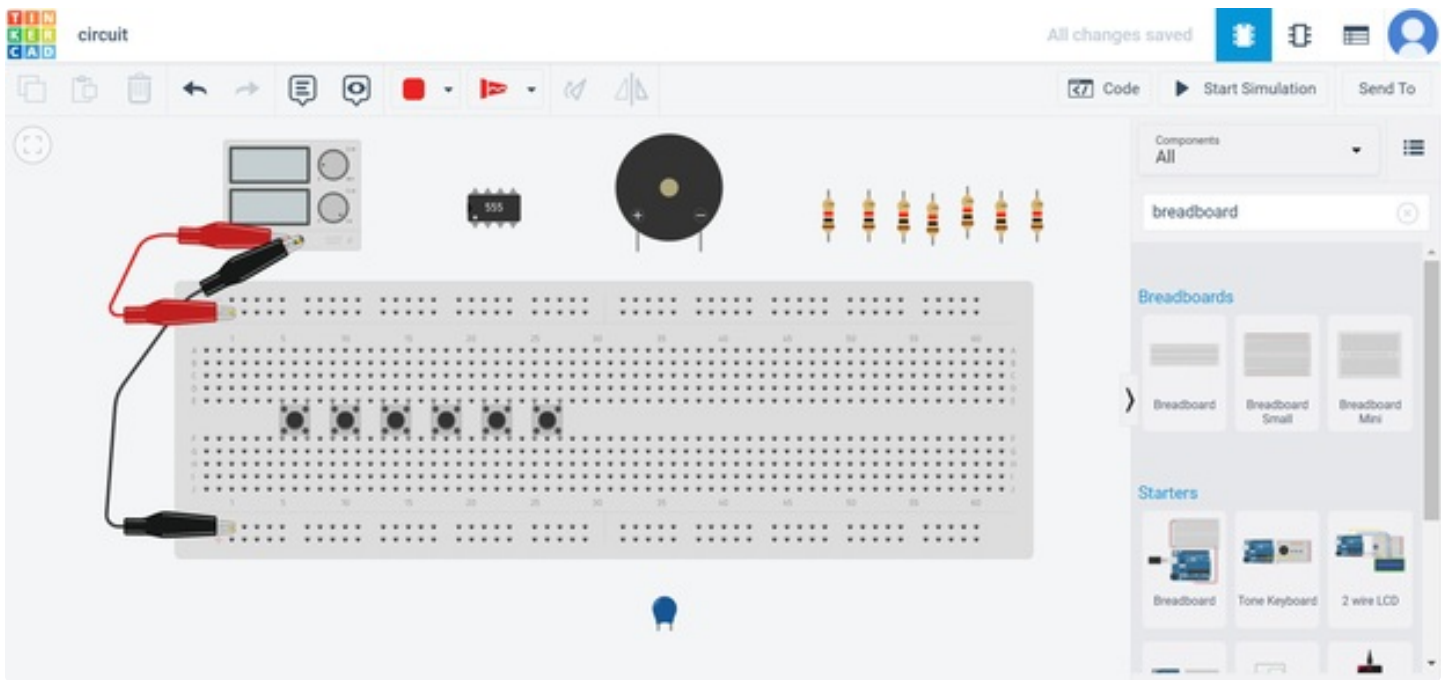
### Step 3: Connect the Power Supply to the Breadboard

- To connect the power supply to the breadboard, click on the red positive terminal on the power supply and connect it to the "+" (positive) terminal on the breadboard. This is the row with the red "+" next to it.
- Next, click on the black negative terminal on the power supply and connect it to the "-" (negative) terminal on the breadboard towards the bottom. This is the row with the black "-" next to it.
- While the power supply is selected, change the voltage value to 12 and the current value to 0.2.
- Press on the image to view the notes on changing the wire color and type and where the terminals are located on the breadboard.



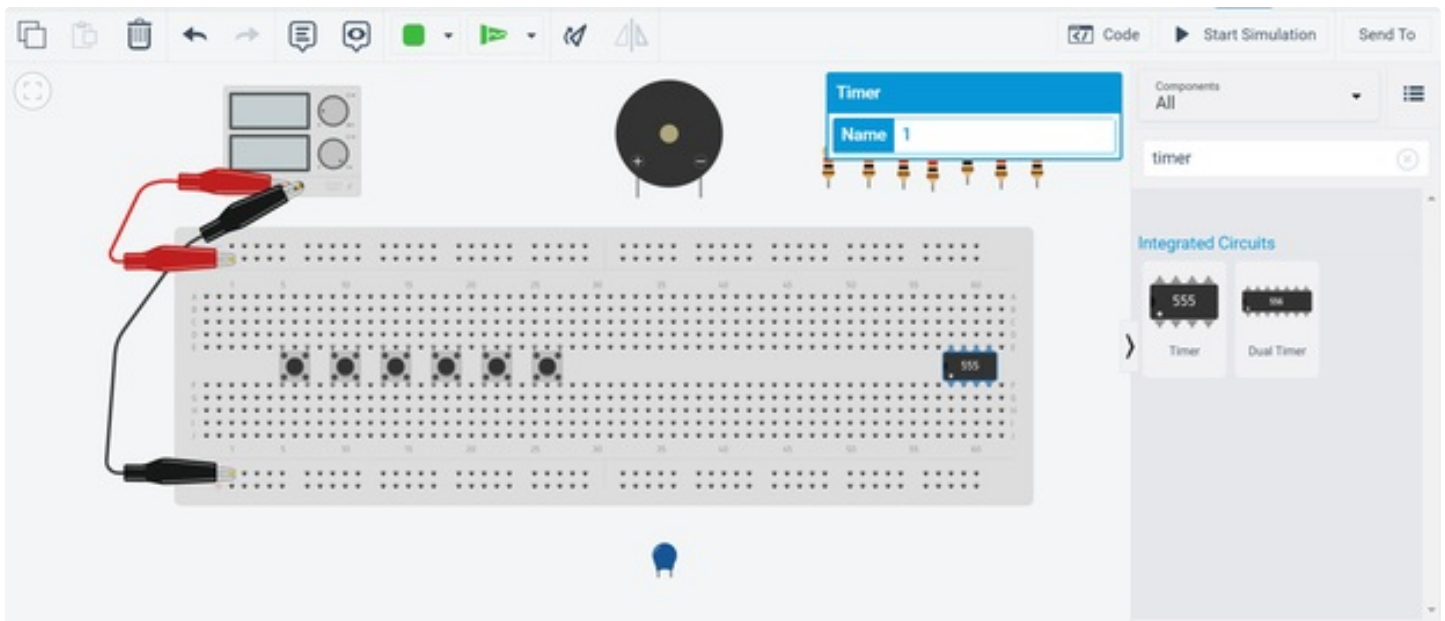
### Step 4: Connect the Pushbuttons to the Breadboard

- Starting from column five, place the first pushbutton between rows E and F (the gap between the holes on the breadboard). Now place the rest of the buttons in the same way one after another, making sure they have a one-hole gap in between.



### Step 5: Connect the 555 Timer to the Breadboard

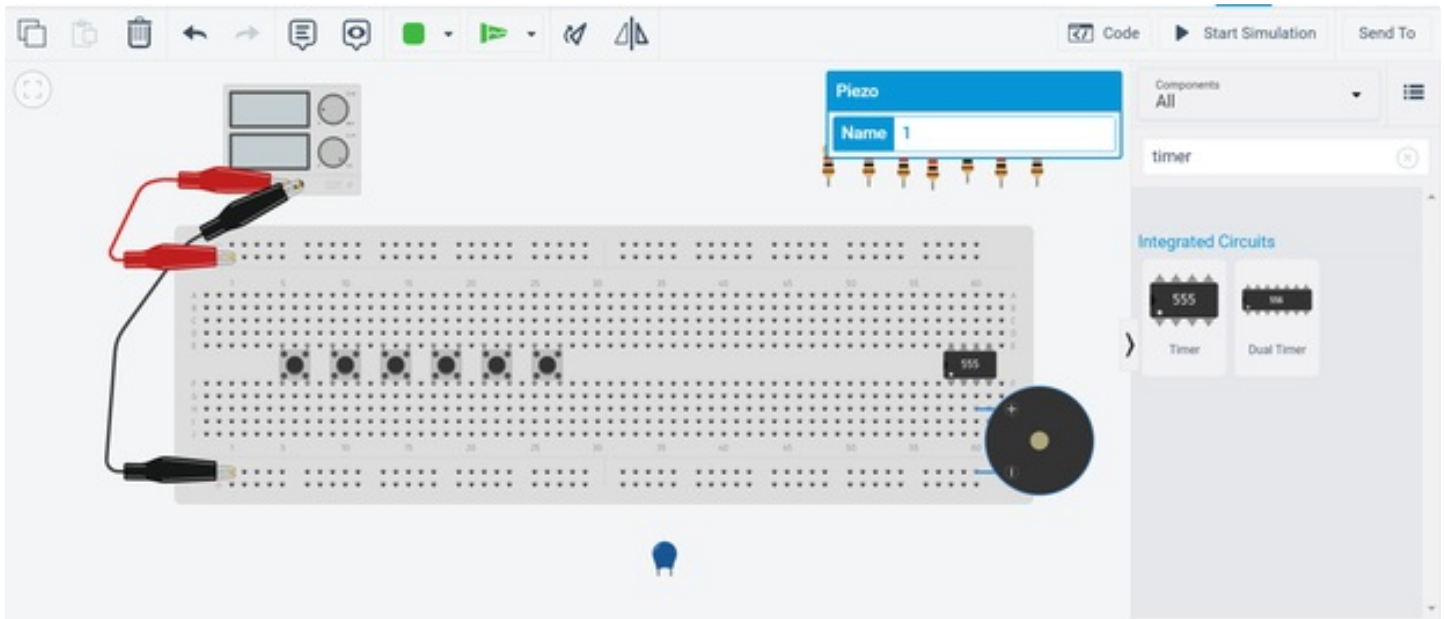
- Connect the 555-timer between rows E and F at column 58 on the breadboard. Press on the image to view the picture with a note to help.



### Step 6: Connect the Piezo to the Breadboard

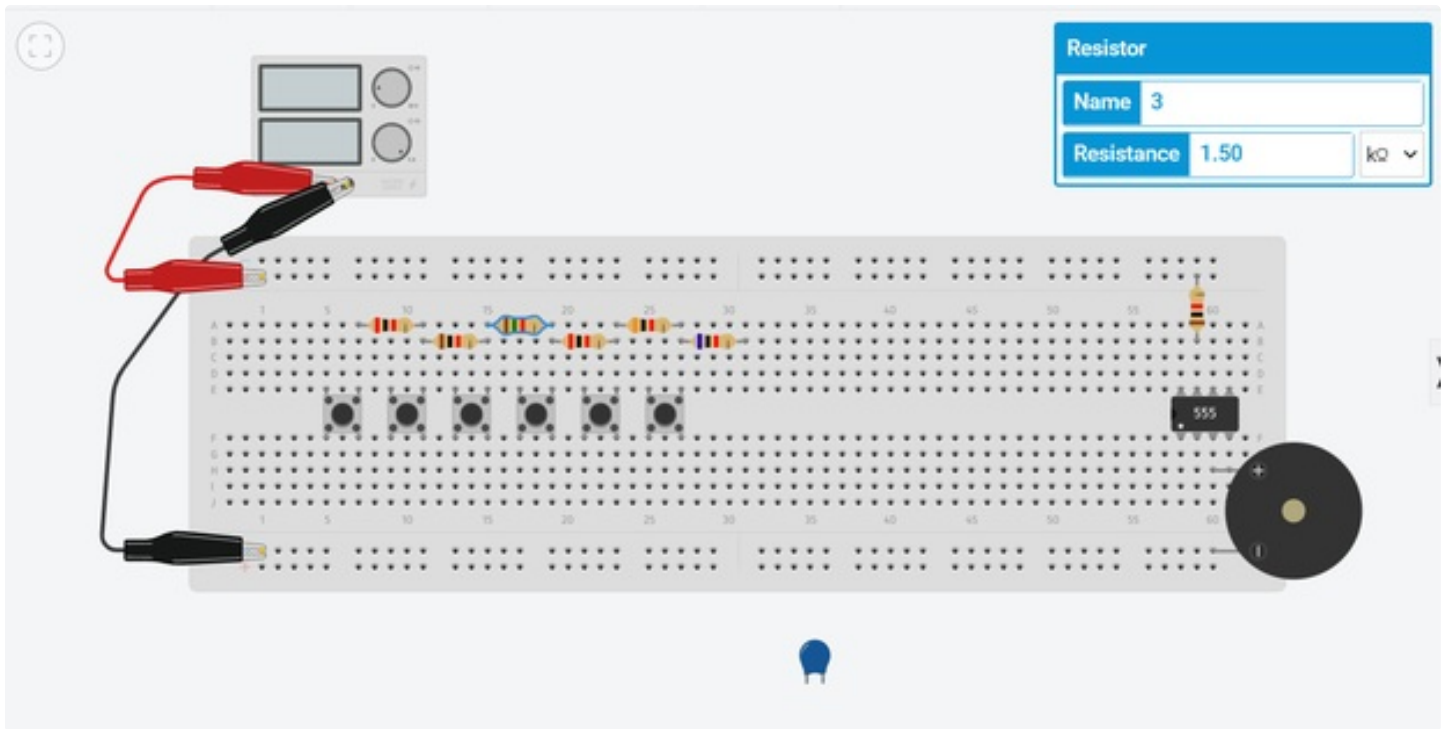
- Select the piezo component and rotate it three times by pressing "R" on your keyboard. Connect the piezo to column 60, making sure the '-' part of the piezo is connected to the negative row of the

breadboard towards the bottom (this is the same row where the negative part of the power supply is connected to). There should be 1 hole separating the '+' terminal of the piezo and the 3rd 'leg' of the timer.



## Step 7: Connect the Resistors to the Breadboard

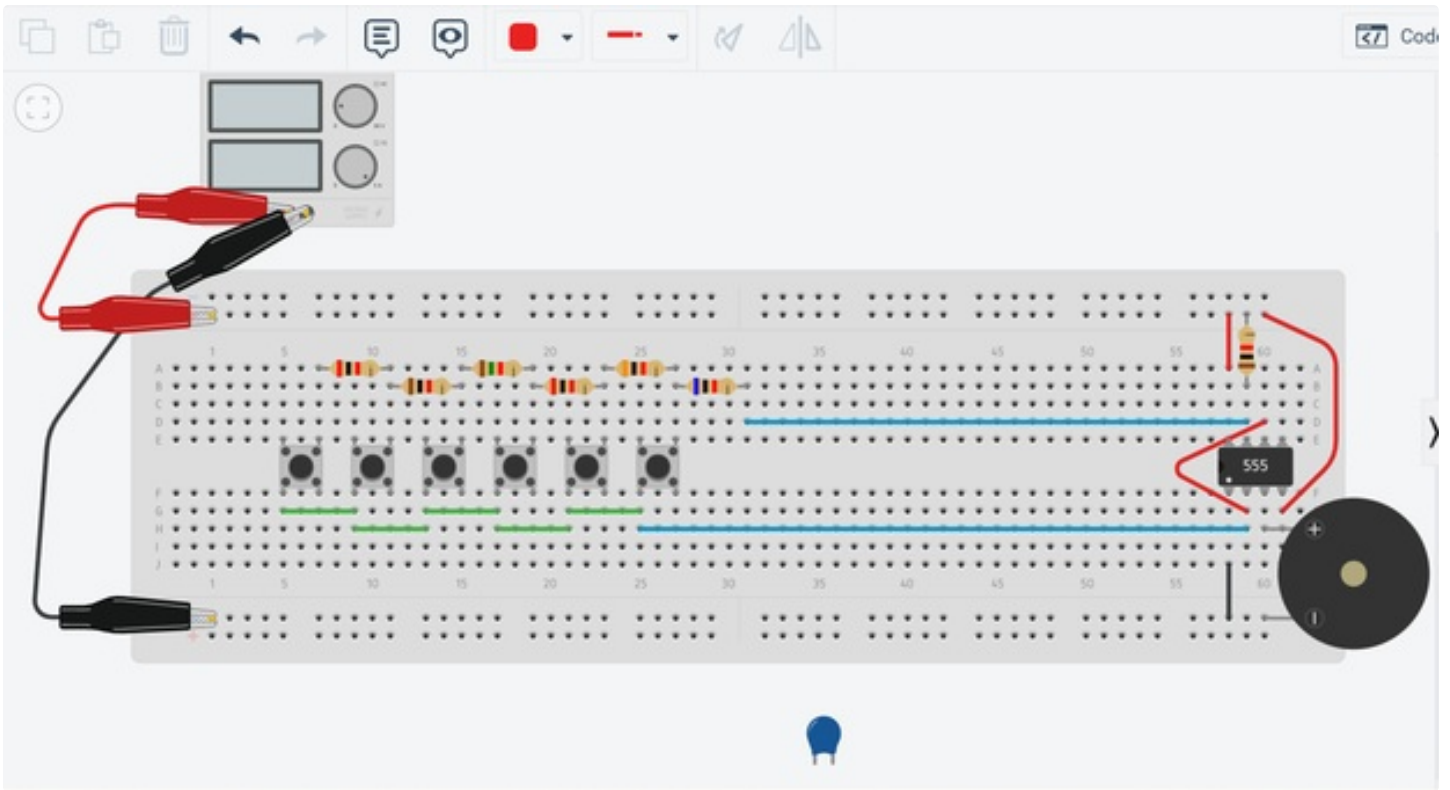
- To begin connecting the resistors to the breadboard, rotate the first six resistors so they are horizontal with the breadboard, do this by selecting each one and pressing "R" on your keyboard three times.
- Starting at row A; column 7, place the first resistor on the breadboard. The next resistor should be at row B column 11, the third at row A column 15, fourth at row B column 19, fifth at row A column 23, and the sixth resistor at row B column 27.
- The seventh and last resistor should be vertical to the breadboard. Place it at row B column 59 and the '+' column of the breadboard (The same row where the positive wire from the power supply is connected to).
- Refer back to the supplies picture for the resistance values of each resistor. Press on the image for notes if you need help.



## Step 8: Wire the Circuit

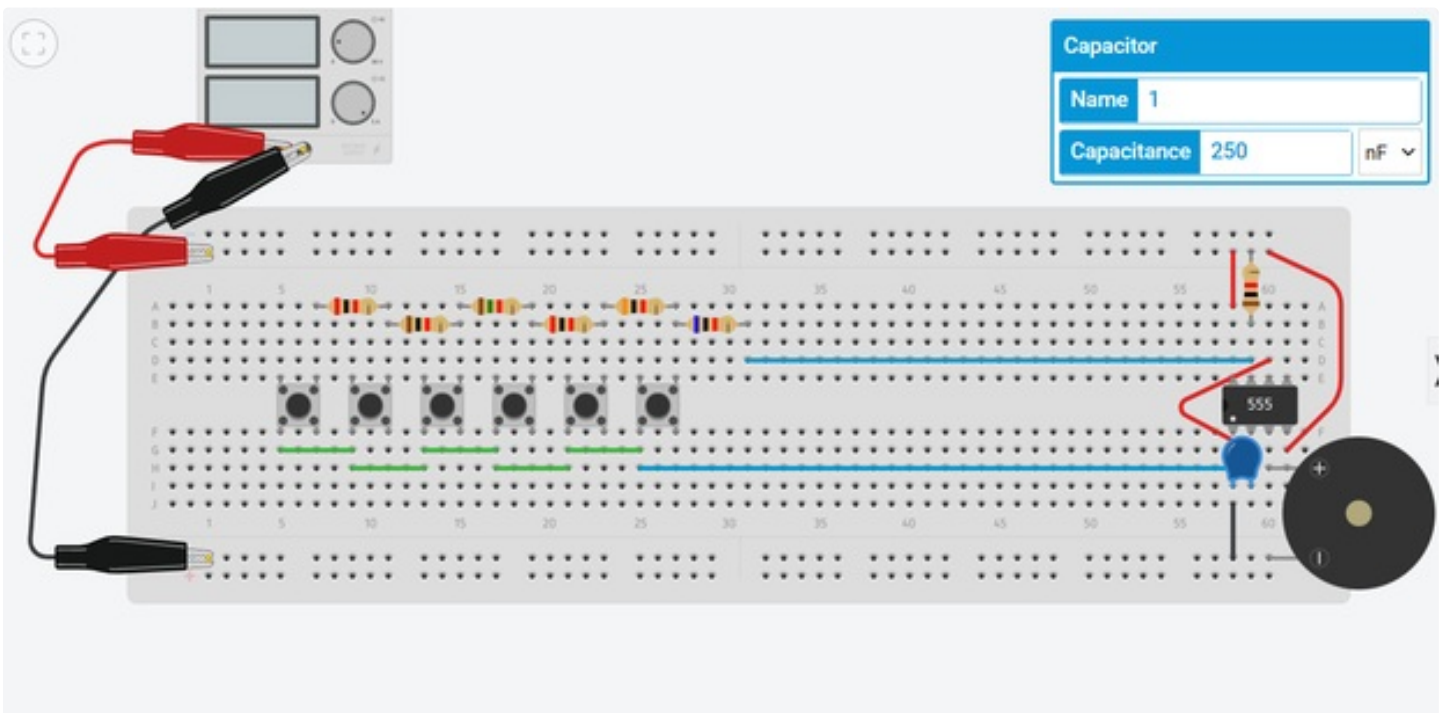
- Now it is time to place the wires (Press on the image for a breakdown on wire placement).

- 8.1) Starting from row G column 5, connect a wire to row G column 9.
- 8.2) Connect another wire from row H column 9 to row H column 13.
- 8.3) Connect another wire from row G column 13 to row G column 17.
- 8.4) Connect another wire from row H column 17 to row H column 21.
- 8.5) Connect another wire from row G column 21 to row G column 25.
- 8.6) Connect another wire from row H column 25 to row H column 59.
- 8.7) Connect another wire from row D column 31 to row D column 59.
- 8.8) Connect another wire from row J column 58 to the '-' row of the breadboard (same row '-' terminal of piezo is in).
- 8.9) Connect another wire from row A column 58 to the '+' row of the breadboard directly above it.
- 8.10) Connect another wire from row G column 61 to the '+' row of the breadboard at the top (Same row where the '+' terminal of the battery is connected to).
- 8.11) Connect the final wire which is from row D column 60 to row G column 59.



### Step 9: Connect the Capacitor to the Breadboard

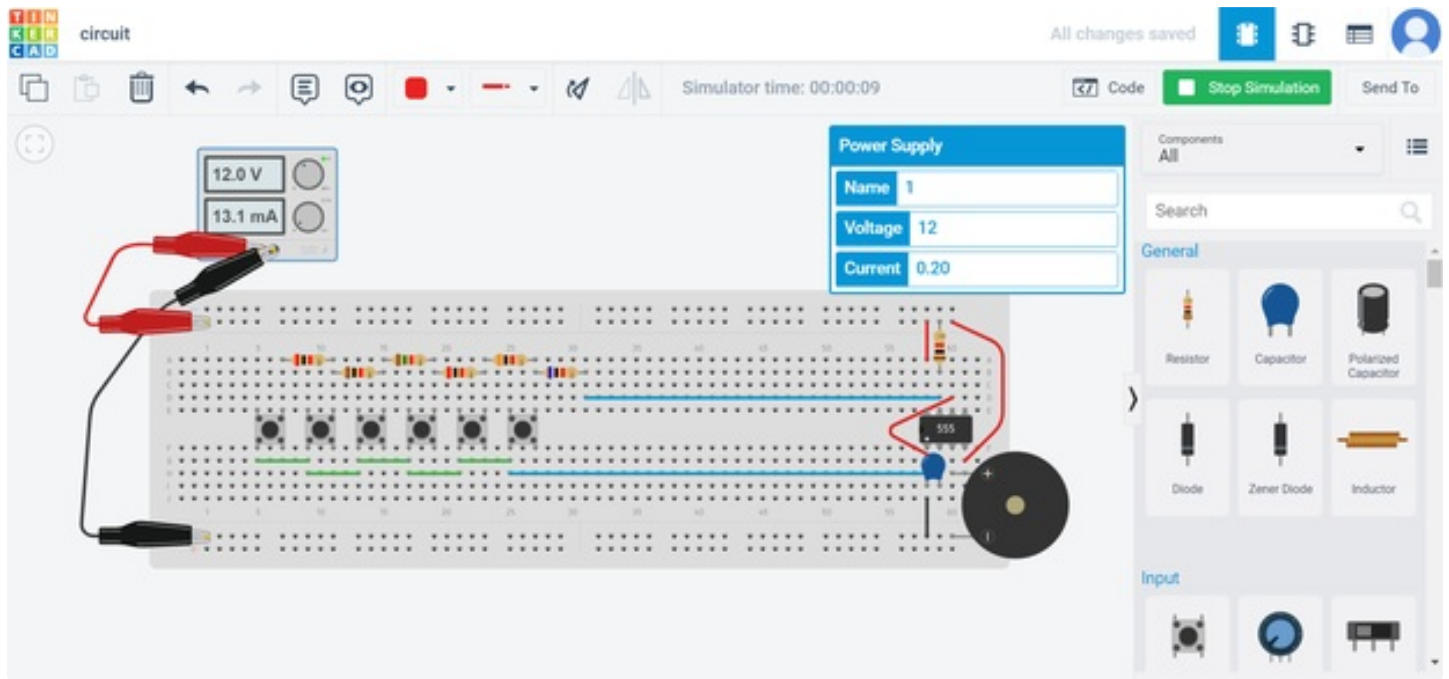
- Connect the capacitor at row I (i) column 58 on the breadboard. Press on the image to view a note to help.





## Step 10: Start Simulation

- Congratulations! The circuit is now complete. The only thing left to do is run the simulation by pressing the 'Start Simulation' button towards the upper right hand of the screen. Press the pushbuttons with your mouse to make it play! Attached is a video recording of the piano being played. Attached is a video recording of the piano being played.



<https://www.instructables.com/F86/SKQR/LFXZHLAO/F86SKQRLFZXHLAO.mp4>

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