ControLIT!

An beginner’s Arduino project designed for STEM students ages 8+

INTRODUCTION

- For this STEM activity, you will learn how to build a functional controller that will allow you to play a video game. This game manual will guide you through the setup, circuit design, and everything you will need to get started!

Let’s Begin!

Materials

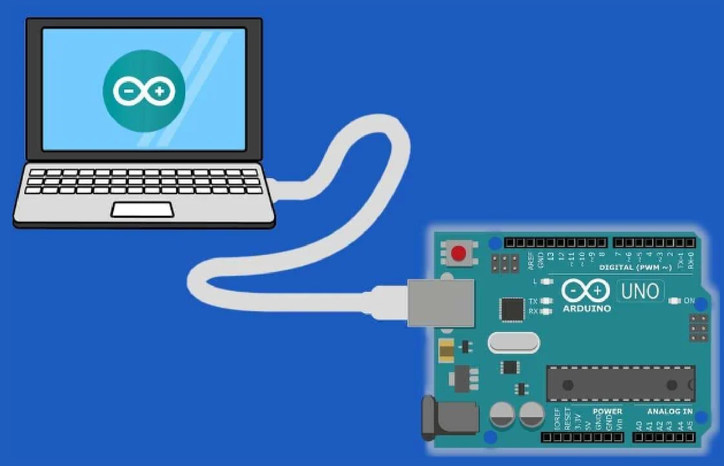
1. An Arduino Uno R3 Board.
2. 9 Jumper Cables
3. 4 buttons

4. One USB-B cable
5. A breadboard
6. A laptop

Level 1: Moving the Right Way

For this level you will learn to move the right way. So far, the button and two jumper cables have already been set up for you. All you need to do is connect the USB-B cable to the computer and you will be able to complete this level. You just gave the Arduino Board power and allowed the first button to work properly and as a result, you can now control your character. The way this works is that the current from your laptop now powers the Arduino board. Pretty cool right? For the next level you will learn how jumper cables and that in order to go forward, you must go back.

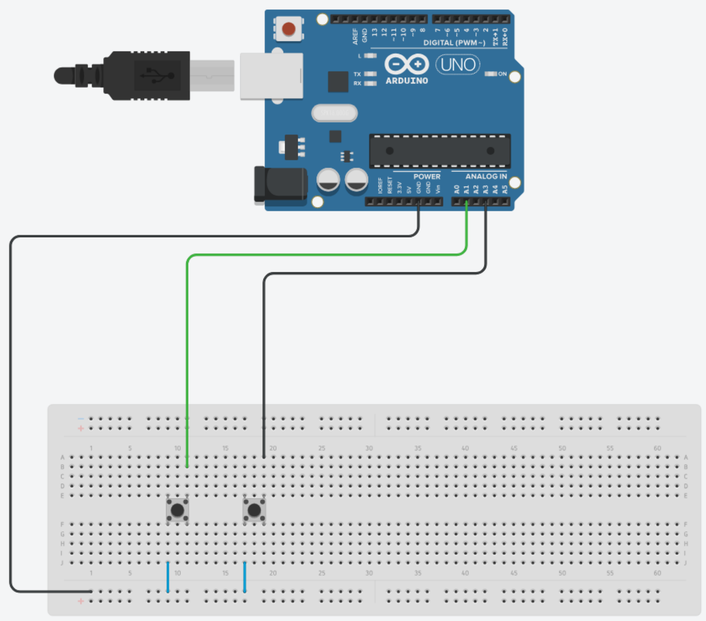
Diagram



Level 2: To move forward, you must go back

For this level you will need to use two jumper cables. Connect the first jumper cable to the A3 Analog in and then put the other end into the 19A slot on the breadboard. For the next jumper cable place one end of the jumper cable in the 17J slot and the other end in the negative slot on the end of the breadboard adjacent to 17J.

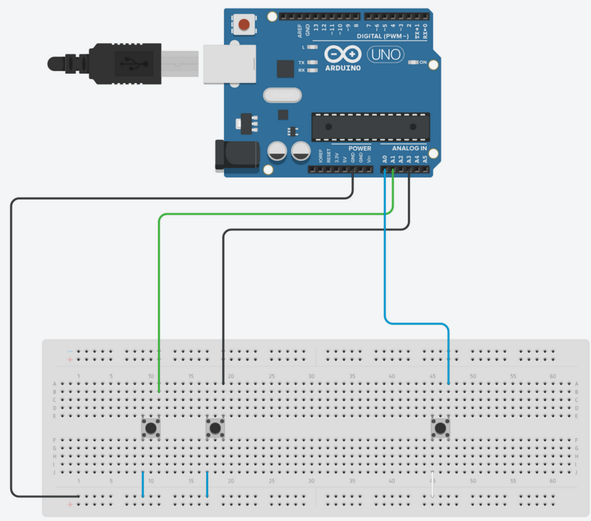
Notice how the jumper cables are set up. The first jumper cable you set up connects the button so that it can be read by your computer. Notice how the cable is set up adjacent to the cable attached to the button. This is because breadboards are electrically connected horizontally in the middle and vertically on the sides.



Level 3: Friends in High Places

For this next level you will have jump!. You will also build a button circuit from scratch. First place the button such that the metal prongs cross the bridge in the middle of the breadboard. Then set up the jumper cables in the same configuration as last time, except shifted to account for the new button placement.

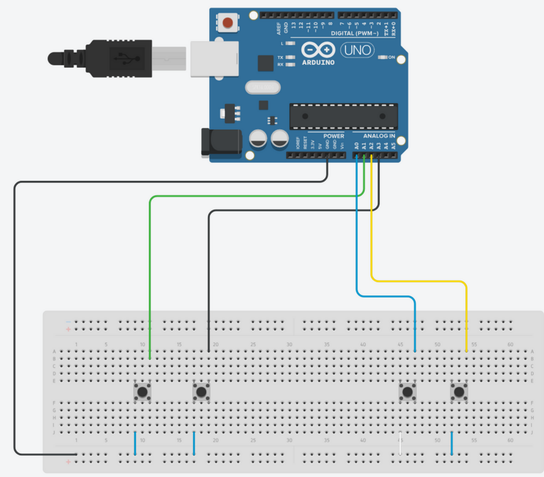
The button you just placed down works such that by pressing it, it allows for current to pass through from the upper layer to the lower layer, thus allowing for a change in the signal the Arduino Board receives electronically. Now that you have all of the pieces of a working button circuit, beat the level and unlock your final move!



Level 4: Food Fight

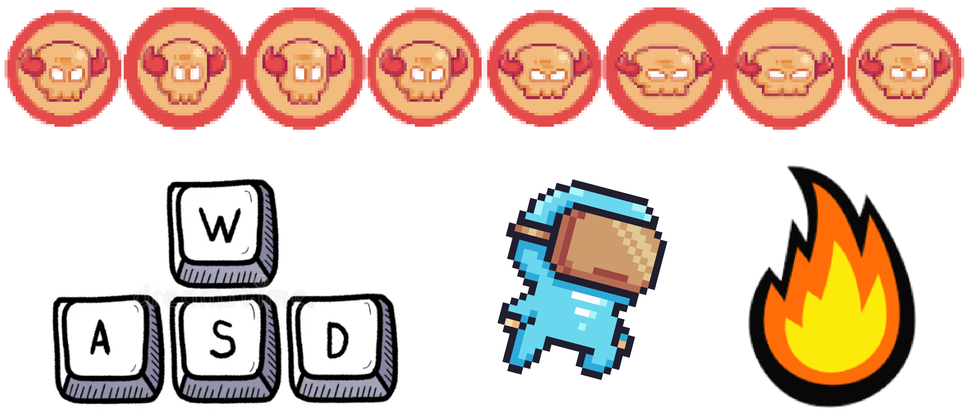
For this level you will need to unlock the last move: the orange thrrow. This time the button and jumper cables have been set up for you, but there are a few errors with how it's been set up. Can you figure out what the errors are?

If you get stuck look at how you set up the previous buttons and jumper cables. If you're still confused look at how the button is set up on the breadboard. Does the way it's set up not look right? Once you solve this challenge you will be able to move on to the real "challenge" of this game. Good luck!



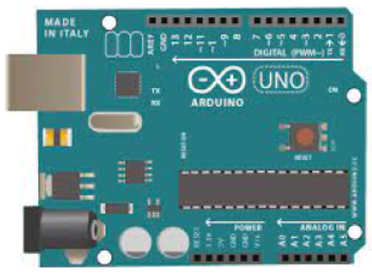
Level 5: The Challenge

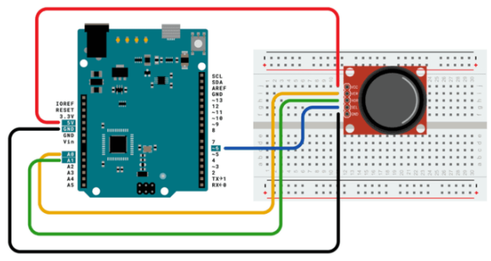
Congratulations! You have made it to the point where you have unlocked your entire move set. Complete this level and you will have officially finished the challenge. Good luck!



What did you learn?

Throughout this game you have learned how to make every part of a working button circuit. But this barely scratched the surface. There is so much more you can do with software and hardware when it comes to creating projects. I hope this game inspired you to look into more complicated projects in the future. Never stop learning. Thank you for playing!





Congratulations!

You have completed this STEM activity and created your very own game controller using an Arduino and breadboard!