

# Deliverable J

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## GNG 2101

Presented to:

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## **Abstract**

This user manual describes the UOsoldering online platform and product. UOsoldering offers a completely virtual soldering course designed to replicate in person soldering workshops online. This manual contains a description of the product offered, as well as a comprehensive description of how the product was designed and made, all relevant troubleshooting information, and health and safety concerns. Finally, detailed at the end of the manual is any recommendations for future works and potential additions to the current product.

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## Introduction

As education becomes more and more technologically oriented, students are finally able to learn new skills online like never before. However, when it comes to soldering, the educational resources out of the classroom are severely lacking. In order to remedy this, students can now use UOsoldering for all of their soldering needs! Due to soldering requiring practice in order to truly learn, UOsoldering includes not only all of the necessary information for beginner soldering, but also interactive activities to practice their skills and simulate real world soldering.

The only requirement to use UOsoldering is having a working computer and a stable internet connection. A computer mouse is recommended for best experience.

This platform is designed to maximize soldering learning in a safe, comfortable and efficient way. Users can learn all things soldering like never before; from the material and what it does, to the hazards involved, to interactive activities to practice some basic concepts.

## Main Body

### Product description

This product is a website that has all the information needed to learn how to solder at a beginner level. The website also contains a game that can be played to practice soldering, the levels of which are based on the activities the user goes through on the website.

### Product procedure

Website; The website provides the users with text and videos related to soldering.

1. Home: Contains very basic soldering information and introduction to the course
2. Tutorial: Contains more specific soldering information
3. Activity: Contains the soldering activity
4. FAQ: Allows user to ask questions and see the answers to the questions other people asked
5. Test: Tests user's soldering knowledge
6. Soldering kit: Optional

Game: The activity provides the users with a simple game that could be done under 2 minutes. It provides the users with soldering iron, iron station, solder, helping hand, wires and a wire stripper.

1. User pick up the iron and place it in the station
2. Pick up the stripper and strip both of the wires
3. Place the wires on helping hands
4. Pick up the iron and to solder and proceed to soldering
5. Clean up the iron with resin
6. Put iron back to the station

### How it was made

### BOM (Bill of Materials)

Table 1: Bill of Materials

#	Name	Description	Quantity	Unit Cost (CAD\$)	Extended Cost (CAD\$)
1	Soldering set	A set of items related to soldering <a href="https://assetstore">https://assetstore</a> .	1	4.99	4.99
2	PCBs	PCBs and components <a href="https://assetstore">https://assetstore</a> .	1	5.00	5.00
3	White smoke	Smoke for when the solder	1	0	0

		melts <a href="https://assetstore.">https://assetstore.</a>			
4	Table	Fold up table to work on <a href="https://assetstore.">https://assetstore.</a>	1	0	0
5	Unity	A game development tool to complete the activity.	5	0	0
6	Weebly	A website hosting service to host our website	1	0	0
7	Atom	A C# IDE that was used to edit unity scripts	4	0	0
8	Visual Studio Code	Text editor used to edit C# scripts	1	0	0

## Website

Materials: Weebly and soldering information.

Functions:

- Hosts the entire course.
- Provides soldering information.
- FAQ and forums

Instructions:

1. Weebly account created and required apps installed
2. listed the informations that should be on the website
3. Created outline/ background for each component of the website
4. Filled in all the texts and left spots for games and videos
5. Videos, activities, comments, forums were added to the website in their respective places.
6. A quiz was created on external sources and added to the website
7. The GitHub page of the game was created and running.
8. Linked the github pack to the website and configured compatibility settings for the two.
9. Collected user feedback and improved the final product.

Top Tool Bar:

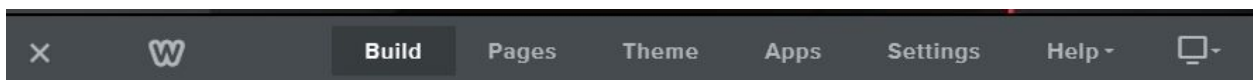


Figure 1. Top bar

**Build:** to edit the current page you are on.

**Pages:** add or remove pages of the website and rename them.

**Apps:** download apps developed by other users.



Figure2. Publish

Publish button at the top right corner to update changes made to the site.

### Left toolbar:

Drag and drop **Text/YouTube** Videos to place text/videos elements in the website then edit the text/URL

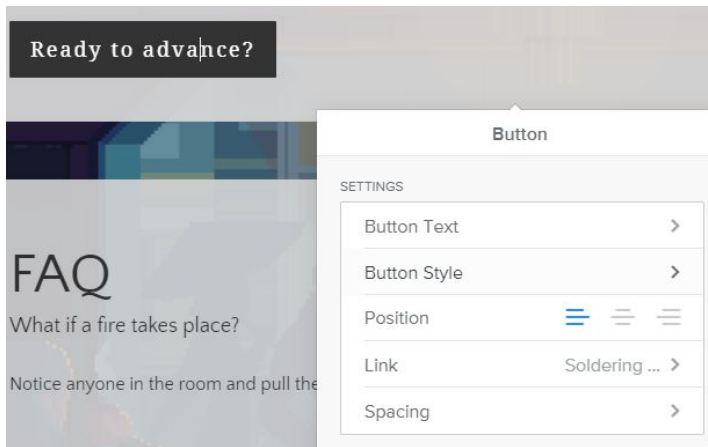


Figure 3. Button

Drag and drop **button**, and change the text by editing button text, and change the link of the website by clicking on the Link section to either in the website(Select page) or type in the address of the website(External sources)

### To add an iframe to the website such as quizzes or Unity games:

First find the embed code element and drag it into the website, and then click the element to edit custom HTML.

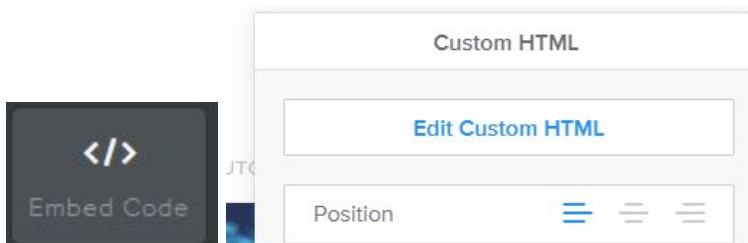


Figure 4. Inframe

Then for the code:(do not include everything between and --)  
`<iframe id="-name of website -"  
width="-width of window-"`

```
height="-Height of window-"
src="-Link to the website-"></iframe>
```

To set up a **unity game** on weebly, just upload the game to your github account,  
To build your game with this, in Unity:

1. File > Build Settings > HTML5/WebGL.
2. Install the module if you don't already have it. This will require restarting Unity.
3. Player settings > Set the resolution, check run in background, and choose a template.
4. Build!

To set up **github page**:

1. Navigate to your repository > Settings > GitHub Pages.
2. Set Source to master branch and Save.

### Unity lab

Materials/IDE: Using unity and the unity asset seen in the bill of materials (table 1). The Atom IDE was used to edit unity scripts.

Functions:

- Simulate soldering.
- Interactive portion of the course.
- Test the soldering knowledge
- Accessible on website

Instructions (All scripts are located on MakerRepo):

1. Download Unity and Atom (Items 5 and 6 from Table 1).
2. Create Unity Scene and go to the Unity store and obtain items 1, 2, 3, and 4 from the BOM (Table 1) above.
3. Go to UO Soldering MakerRepo and download all available scripts. Upload them to your unity scene..

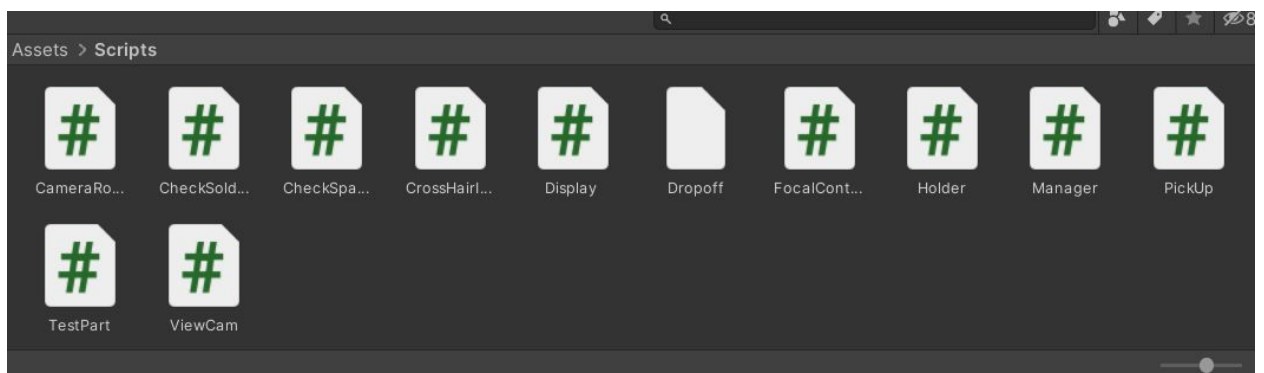


Figure 5: Scripts

4. Create a 3D cube and set its scale to 0.01 throughout. Assign the Focal Control script to it. Create an empty inside of the 3D cube. Assign Character Controller. Place the Main Camera inside that empty. Assign the Camera Rotation Script and Cross Hair Integration script.



Create two empties within the Main Camera. Have one empty have the transformation (19.8, -13.8, 52.6) and the other (-30, -18.5, 52). Assign Check Space script to both.

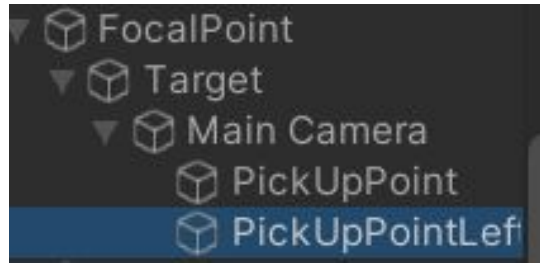


Figure 6: Focal Point Tree

5. Import item 4 (table and chair) into the scene.
6. Import item 1 (Wireless soldering iron) into the scene. Assign Pick Up script and set the information accordingly (Figure 3).

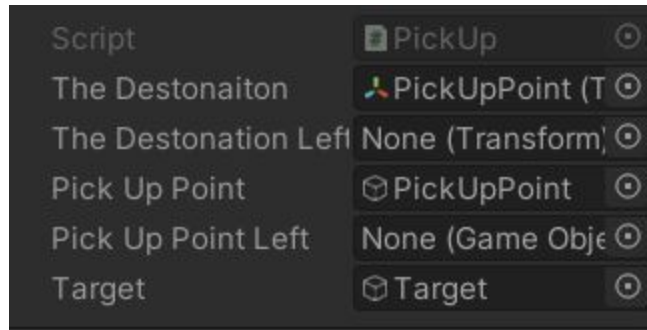


Figure 7: Pick Up Information

Create a 3D sphere under the soldering iron and have the center be at the tip of the soldering iron. Turn the scale to 0.05 and turn off the mesh renderer. Turn on sphere collider. Import item 3 (White smoke) and put it underneath the 3D sphere. Turn 3d Start Size to 5.

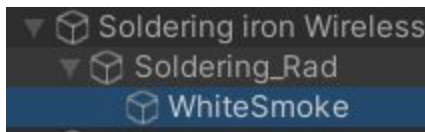


Figure 8: Soldering Iron Tree

7. Import item 1 (Coil tin solder). Assign Pick Up script and set the information accordingly (Figure 3).

Create a 3D cylinder in the coil tin solder and set the scale to (0.005, 0.08, 0.005). Create a 3D sphere in the 3D cylinder and have the center be at the tip of the cylinder. Turn the scale to 0.05 and turn off the mesh renderer. Turn on sphere collider.

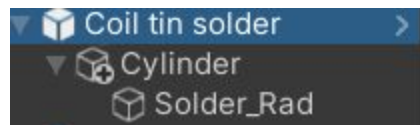


Figure 9: Soldering Coil Tree

8. Create 2 3D cylinders to simulate wires. Then where the wires intersect, create a 3D capsule and size it accordingly.

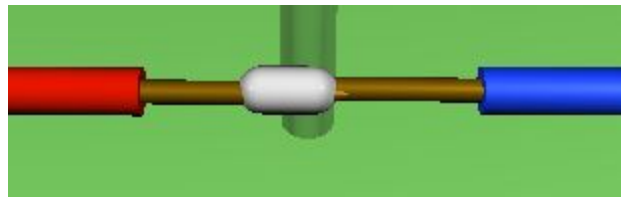


Figure 10: Soldering Location

Turn off the 3D capsule's activity.

9. Create a 3D sphere around the soldering point. Set the scale to (4, 1,4). Apply the check soldering script and apply accordingly.

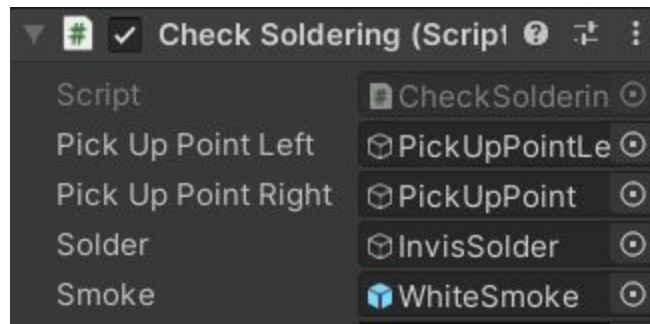


Figure 11: Check Soldering Information

10. Create a 3D cube and scale it (0.2, 1, 3). Assign the Display script with the set the information accordingly

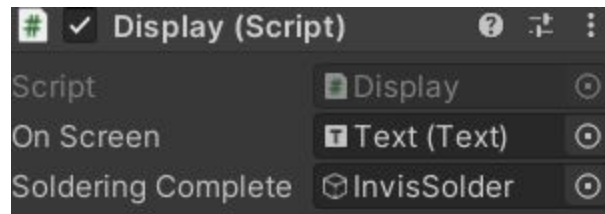


Figure 12: Display Information

Create a canvas in the 3D cube.

Create a text box in the canvas.

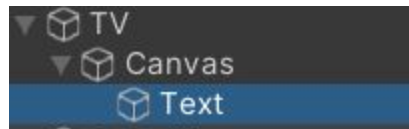


Figure 12:TV Tree

## **Health and Safety**

Make sure to not sit too close to the monitor as that can damage the user's eyes. Turning on the lights in the room you are using the product in can reduce the strain on the user's eyes. People with epilepsy may have issues with the product because of the bright colours.

## **Troubleshooting**

Website not loading:

- Refreshing the page
- Check you internet connection
- Try a different browser
- Check the status of the Weebly servers

Game not starting:

- Refresh the page
- Try a different browser
- Check the status of Github servers

## **Conclusions and Recommendations for Future Work**

The lessons learned were the difficulty of working in a group with multiple people because they all have different schedules so it is difficult to schedule around each of their responsibilities, for example each of us had different classes, work for those classes, tests, exams, responsibilities at home, and some of us even have jobs.

In the future we can add new features into our existing product. One new feature would be allowing the user to interact with the environment, the user would be able to choose the environment they solder in, what material they solder on, and if they choose to do things such as opening a window. Allowing this would test the user's safety knowledge while they played instead of with a test. More games can also be created that incorporate other tools related with soldering such as desoldering with a solder pump.

## **Bibliography**

<https://makerepo.com/Shivam/uo-soldering-z11>

## **Appendices**