

## Group 13 Final Report

### Abstract

This report details the process of creating our final prototype: the Galaxy Boy. Below, we have included the various parts of the project, from a final product description to an overview of the overall ideation and creation processes. Included are also descriptions of user scenarios and a user evaluation of the product.

### Product Description

The Galaxy Boy is inspired from the Nintendo Game Boy. We have designed it to be an ultra-portable, on-the-go gaming machine. It consists of a 3D printed tablet with an embedded 16x2 LCD screen and two buttons—A and B—that control the game. The game, titled Galaxy Run, can be described as an endless runner: the user controls a spaceship that must navigate past dangerous chunks of space dust and meteors, with the difficulty increasing as time goes on. Galaxy Run also keeps track of a score, the number of frames the user has survived for, to encourage longer playtimes in order to achieve a higher score. The software also has an easy-to-use reset function when the game is lost, meaning that it is easy to play over and over.

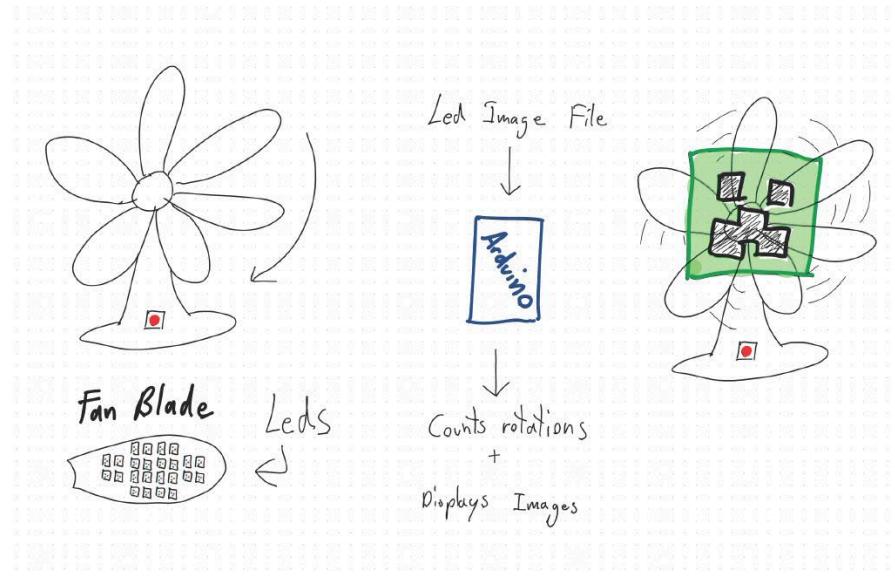
### User Scenario

When a user is bored or is looking for some relief from an arduous task, that is when they will use our Galaxy Boy. The Galaxy Boy offers an enticing mix of entertainment and skill, making for an experience that the user will not want to put down. Furthermore, the portability of the Galaxy Boy means that no matter where the user is, they can always bring along and pull out their Galaxy Boy.

### Discussion of Processes

Before settling on a holographic-themed direction, the group primarily discussed ideas blending technology and interactivity. Understanding that the project would have to take 5 weeks to actualize, feasibility was key, as overly ambitious projects had to be cut down and made more realistic. Therefore, the fan idea was settled upon, as it seemed within the scope of the class, combining elements of technology and interactivity.

Because previous members of the group had knowledge in programming, a holographic fan



design was appealing as it seemed doable on both a hardware and software level. During week two, however, it quickly became apparent that the idea would be difficult to implement. With more time it was definitely possible, however, because a slip ring was required due to the rotating nature of the product, the engineering plans needed to be made more realistic. Furthermore, programming many LEDs to correctly turn on and off in relation to the rotation of the fan, was incredibly difficult, even with the group's programming capabilities. Therefore, during week 2 the group began brainstorming how to scale the project down in a feasible manner while maintaining its technological and interactive elements. The group settled on creating something centered around the Arduino LCD screen, and using a Pepper's Ghost effect to make it holographic. This was attempted in week 3, where the screen was programmed to display the interaction between the press of buttons and a simple program written in the Arduino IDE. However, due to the limited brightness, it would be impossible to produce the desired

holographic effect unless the screen was turned on in a completely dark environment. Therefore, in week 3 the direction was changed to focus exclusively on the interactive elements of the project.

This led to the creation of the Galaxy Boy

in week 4. After designing a slick and

fitting outer shell to fit the electronics and be held by the user, the CAD was exported to the

Prusa Slicer and 3D printed overnight at the BDW. After putting each component together, the

Galaxy Boy was now a fully functional interactive device that ran an impressive top-down sci-fi

video game programmed by the group. This

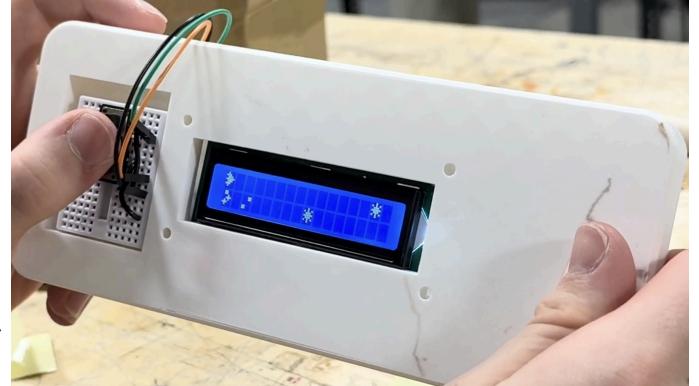
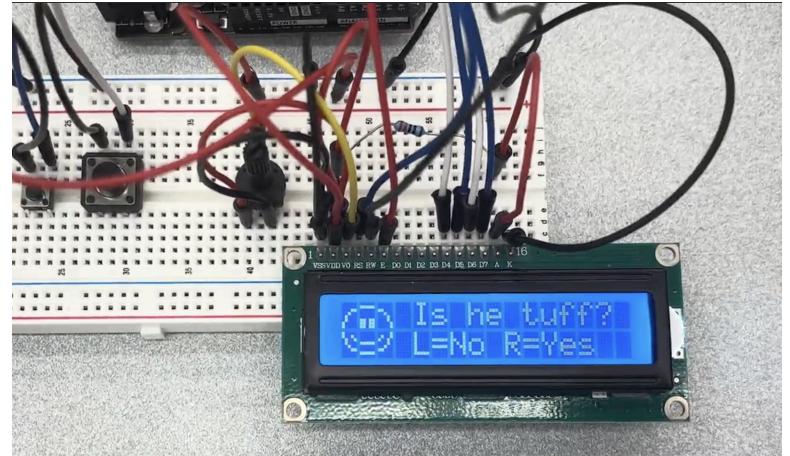
successful iteration streamlined the design

process into a final polishing stage during

week 5. Where the Galaxy Boy was further

enhanced and finalized by the addition of laser

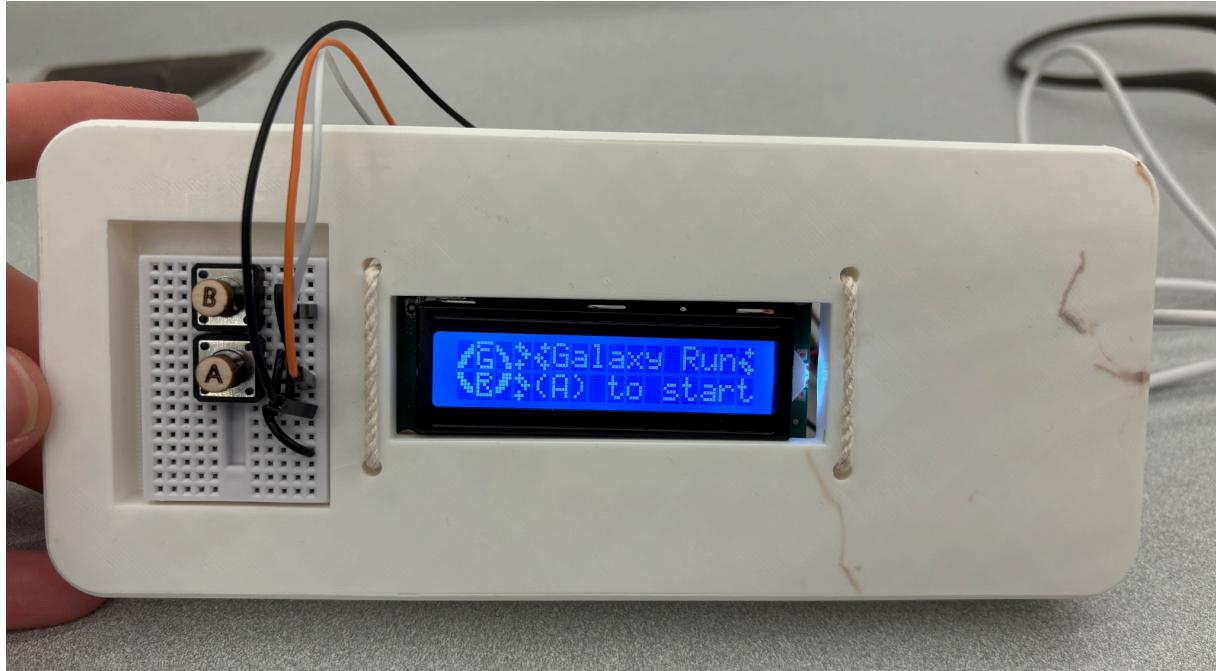
cut wooden button covers.



## Prototype Evaluation

After having other users test our product, they have many good things to report. One user mentioned that they were impressed it was functional given the scope of the project, which is the most important part in their opinion. Users also gave feedback on the overall look and feel of the Galaxy Boy. They mentioned that the aesthetics of the wood buttons add a great touch and a rustic feel. When commenting on the game itself, they mention that there's a lot more to it than

meets the eye, and it is exceptionally fun given the amount of time there was to complete the programming aspects of the project.



Final Product

### Creative Process and Future Work

As a group, many ideas for future modifications and improvements have already been discussed and considered. If this product were to be improved and brought to a more professional level, the body of the Galaxy Boy would be upgraded. Although the simplistic “brick” shape has a unique charm and appeal, a more professional controller mesh could drastically improve accessibility, as it would be easier for the user to hold and more comfortable to operate. Because the LCD screen is quite small and low resolution, it could be upgraded to a larger display with a higher bit resolution. To improve the gameplay, more buttons and control elements could be added to the physical controller as well as to the program itself. These ideas are reflective of our creative process as a whole, as they demonstrate our ability to rapidly and efficiently generate ideas, whether they will be implemented or not. Such was the case for our switch from a

holographic display to a game controller, as we created a product that maintained some reminiscence of the original interactive display idea. This creative process is ideal for future work, as being able to move beyond to more feasible prototypes and ideas is key to building a successful product.