FINAL REPORT

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I. Summary of Changes

The key revisions to the two applications are as follows:

1. Implementing a rough interface which insinuates how the game will function.
2. Added a space theme to the Attribute Blocks application.
3. Added a forest theme to the Tangrams Application
4. Restructured both programs to add game functionality.
5. Shapes are interactive and react to the environment.
6. Functioning start menu has been created.
7. Attribute Blocks application is mostly functional.
8. Borders and physics have been added to the Attribute Blocks application.

II. Functional Requirements Specifications

The goal for our project is to create two fully functional applications for the Library of Virtual Manipulatives based on the research of Dr. Sandra Bullock. Both applications must adhere to the requirements set upon the team by Dr. Bullock while also effectively teaching students the mathematical concepts that the applications are based upon.

Requirements

1. Both the Tangram and Attribute Blocks applications will be used as a teaching tool that will lead the student to a better understanding of shapes and their attributes.

2. The applications must be a touchscreen based application that will react to the touch of the student using the applications.

3. These applications must properly and effectively teach the mathematical concepts to the students using the applications.

4. The applications themselves must not veer away from teaching these mathematical concepts to the students or have any sort of features that could be considered distracting to the students when they interact with the applications.

Goals & Features

With these applications, the user will be able to easily identify the shapes and distinguish between these shapes by their attributes. In addition to this, the user will be able to create shapes or build upon shapes using the applications.

The applications will be able to let the user drag shapes into a perimeter in the middle of the screen and determine whether the shapes brought into the perimeter meet the standards that the application has set upon the user.

The applications will allow the user to create new objects or shapes inside of an outline given to the user by the application.

The application will give the user feedback on their progress which will indicate to the user if they have met the requirements of the program and move onto the next level.

If the user has not met the requirements then the applications will inform the user that the requirements have not been met and provide a message that will help guide the user to the correct answer.

Actors & Goals

Format – [Actor: Goal]

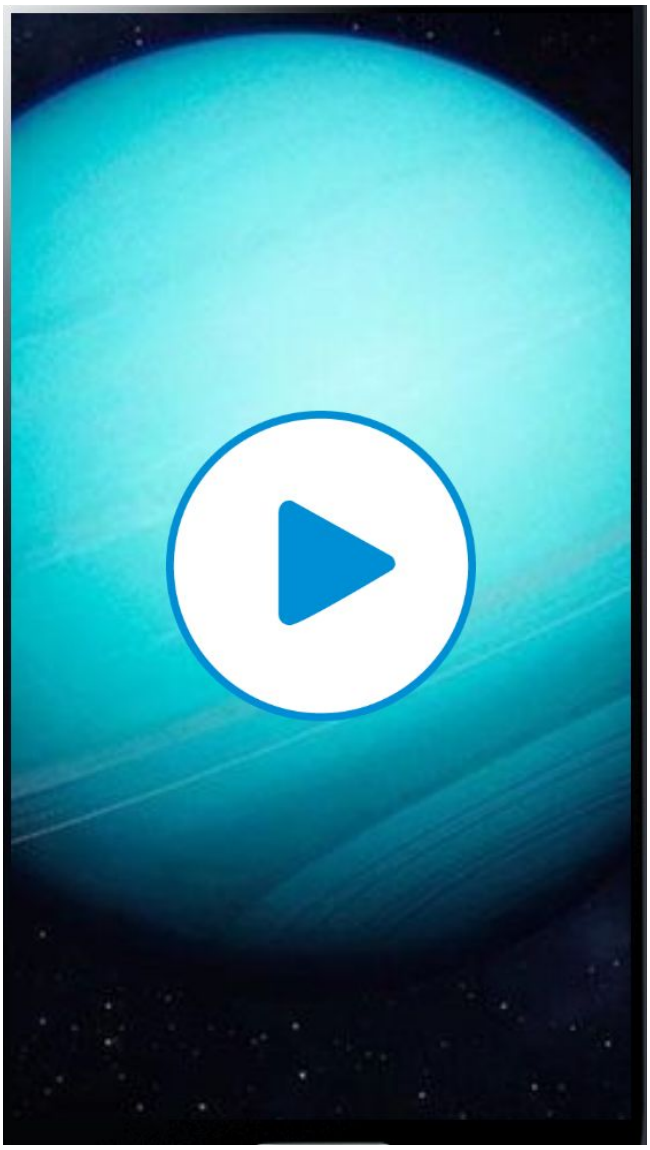
Dr. Emma Bullock- Presenting a feasible way to update and improve applications of the National Library of Virtual Manipulatives website.

National Library of Virtual Manipulatives- To provide applications for the teachers to use as teaching tools to improve the chances of successfully teaching their students the basic concepts of mathematics.

Teachers- To effectively teach their students the basic concepts of mathematics such as shapes and their attributes.

Students- To learn the basic concepts of mathematics like the shapes and attributes of those shapes from their teachers.

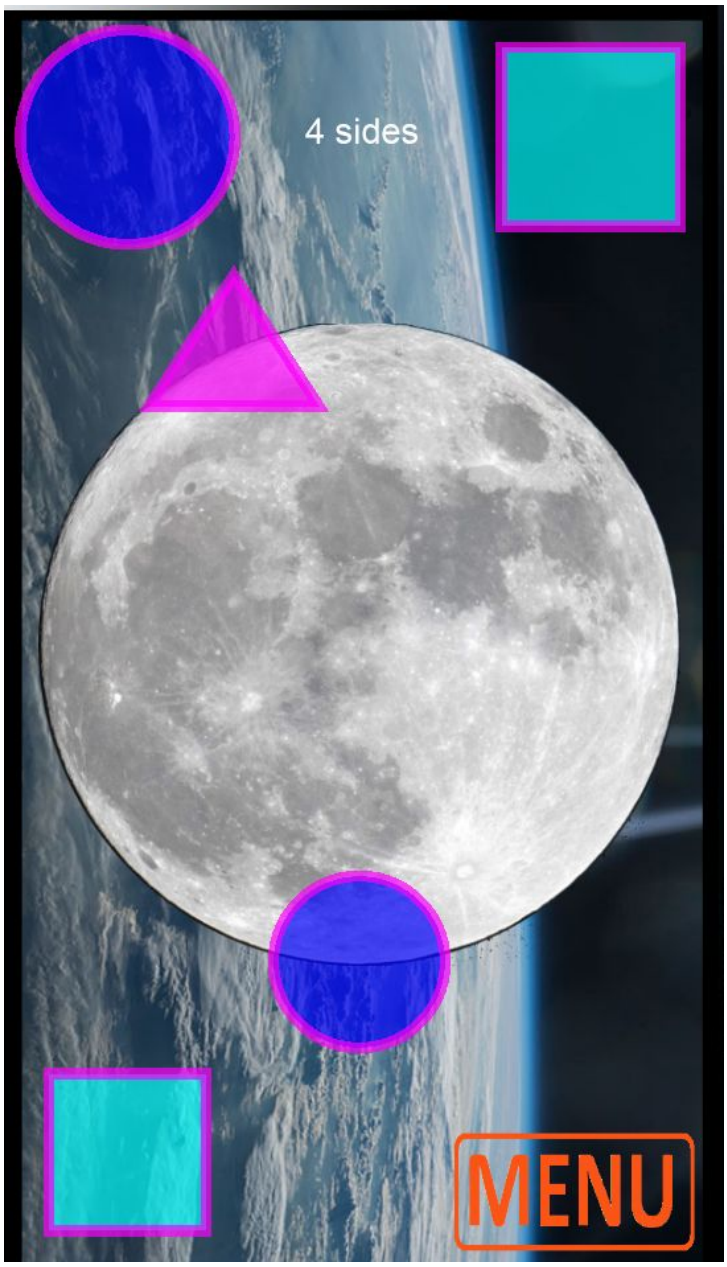
III. Galactic Attributes



Start Menu

The first screen to appear once the Galactic Attribute application has been installed and ran through the student or user's electronic device.

The start screen is simplistic and easy to understand. The play button indicates to the user that this button must be pressed in order to start the application. Behind the play button is an attractive display of Uranus, meant to please the eye and spice up the start menu. While also adhering to the constrictions of a space themed game.



Main Program

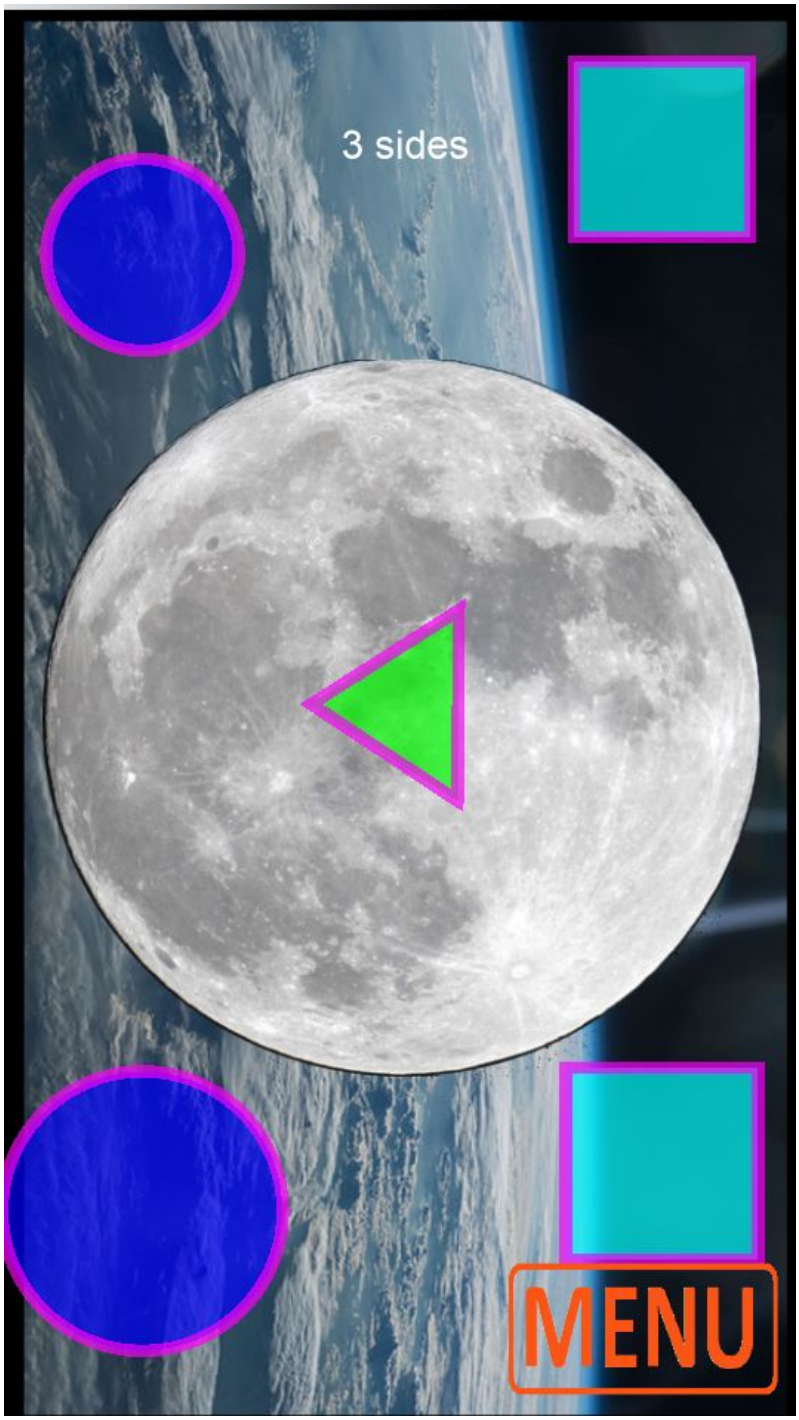
The main program of the application. With instructions in the middle of the top of the screen that describes the attributes of the correct shape which must be dragged within the perimeter of the circle in the middle of the screen. In this case, the circle is the moon. The shapes are scattered around the screen with each being big enough for a finger to touch and drag the shape within the inner circle. Once within the circle the application will decide if the user has correctly met the requirements of the directions on the screen.

Menu

The customization screen of the Galactic Attributes application. Within this screen is three buttons for which the user may utilize. The first button customizes the directions of the application which asks the user to place the correct shapes with the attributes listed in the directions into the perimeter of the circle on the program screen.

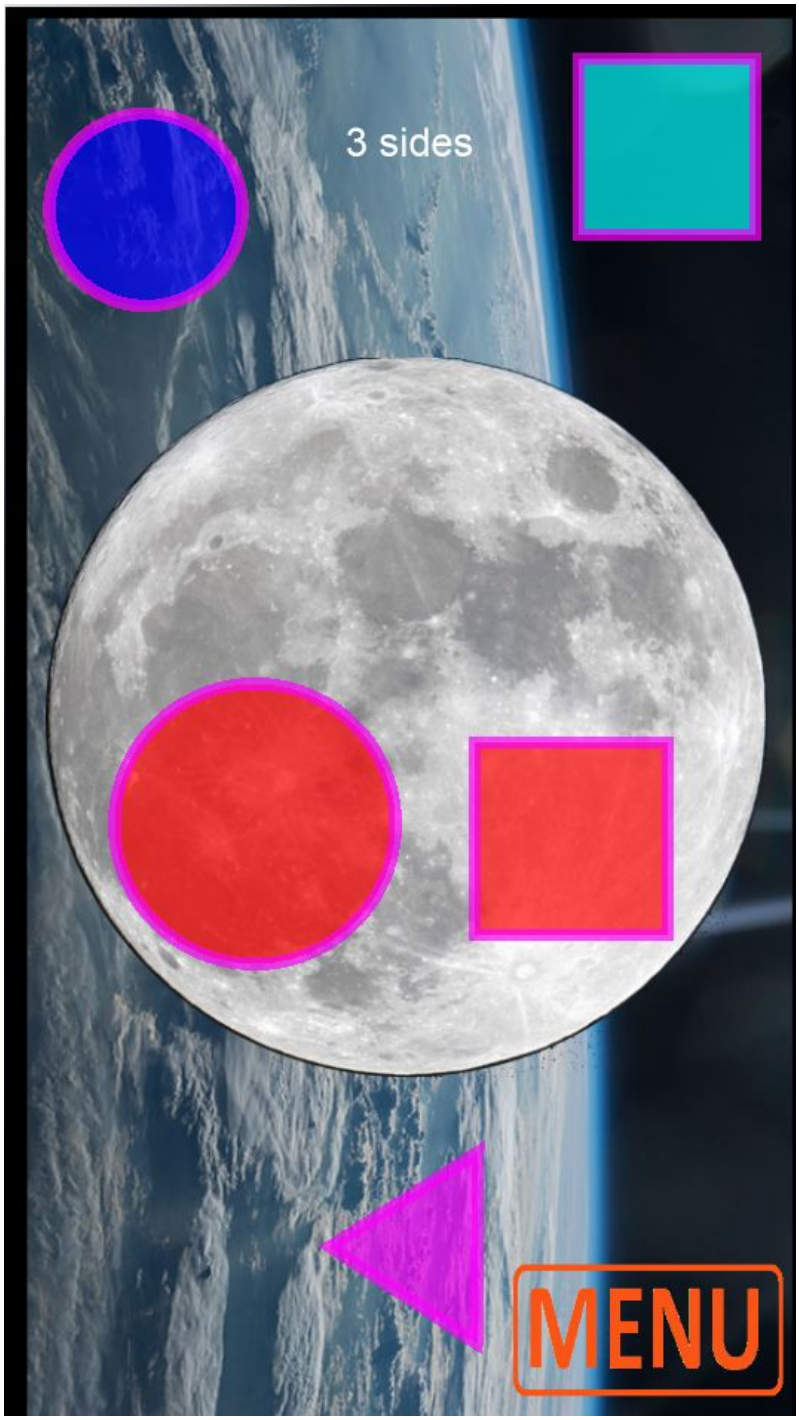
The second button customizes the theme of the Galactic Attributes application, while still remaining within the space theme constraint. This will change the background, and the circle within the middle of the screen.

The background to the menu screen is a picture of a spaceship taking off from a Launchpad. Giving the menu a more exciting look. A better alternative than having a plain background. In addition it also fits with the space theme.



Main Program: Scenario 1

When the user has chosen the correct shape that the application requires, the shape will light up into a green color. Green in this case indicates that the shape meets the requirements of the application.

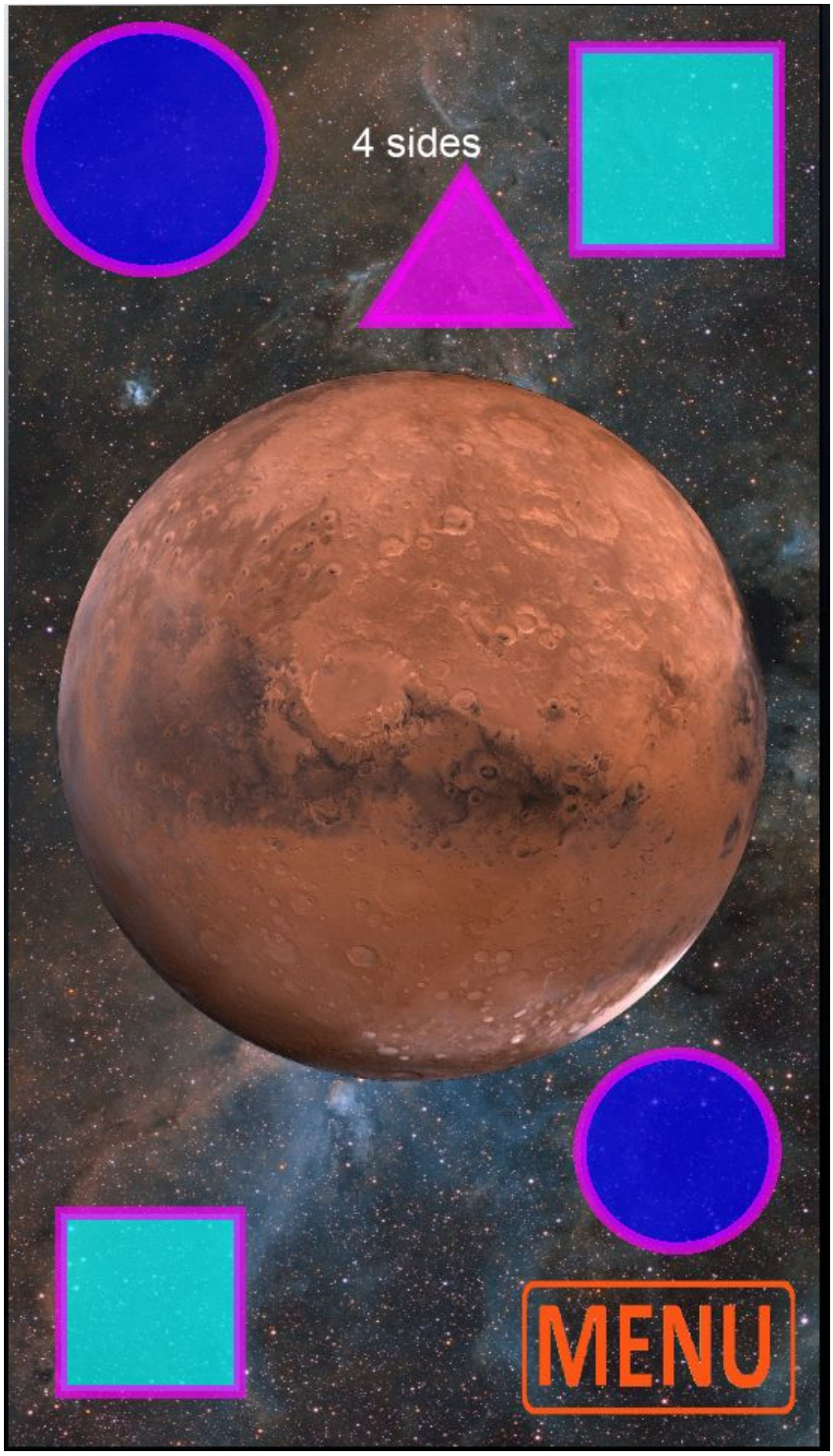


Main Program: Scenario 2

When the user has chosen the incorrect shape that the application asks for, the shape will light up into a red color. Red in this case indicates that the shape does not meet the requirements of the application and is therefore incorrect.

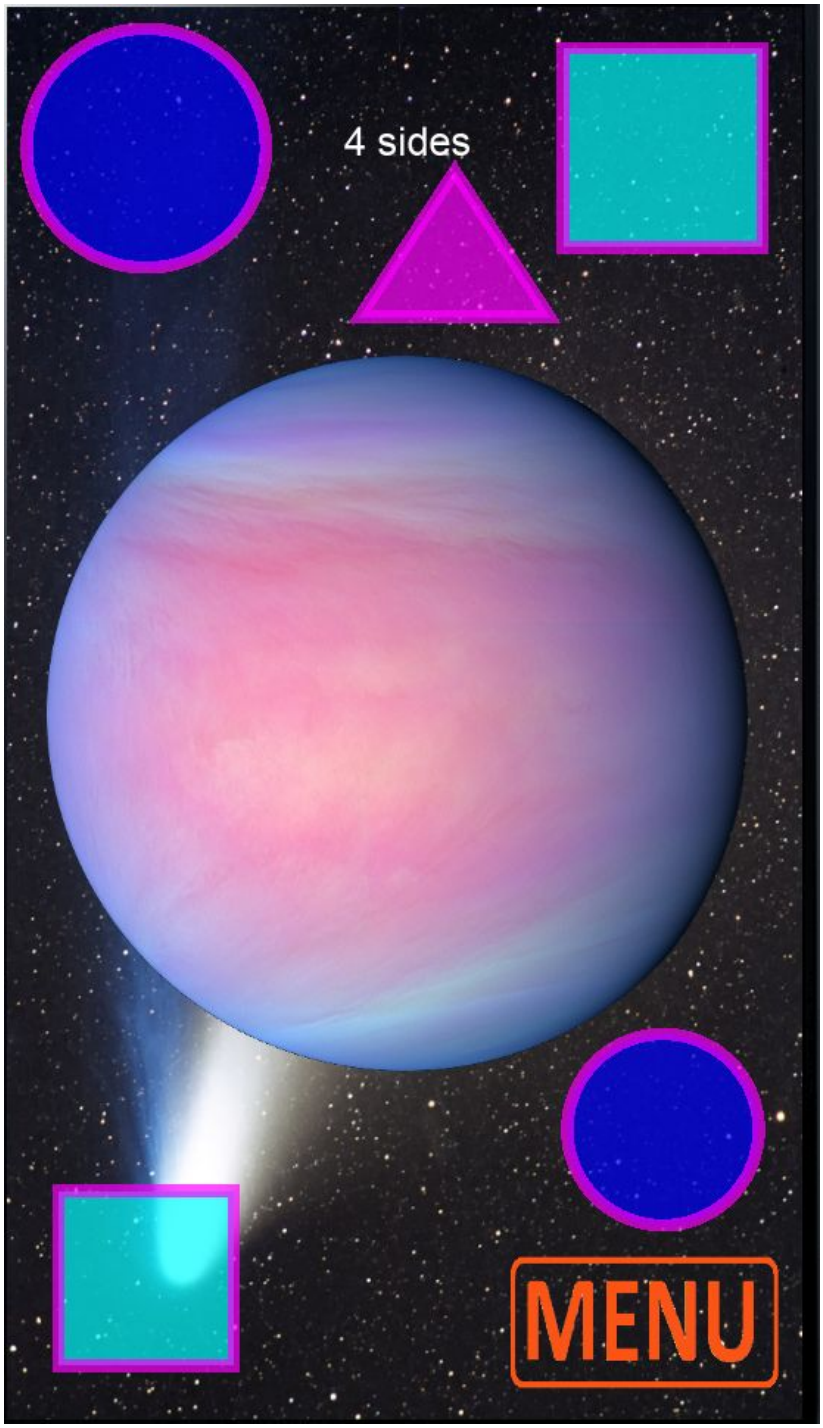
Theme 1: Moon

The first and default theme of the application. The perimeter is in the form of the moon and the background is a view of the surface of the moon.



Theme 2: Mars

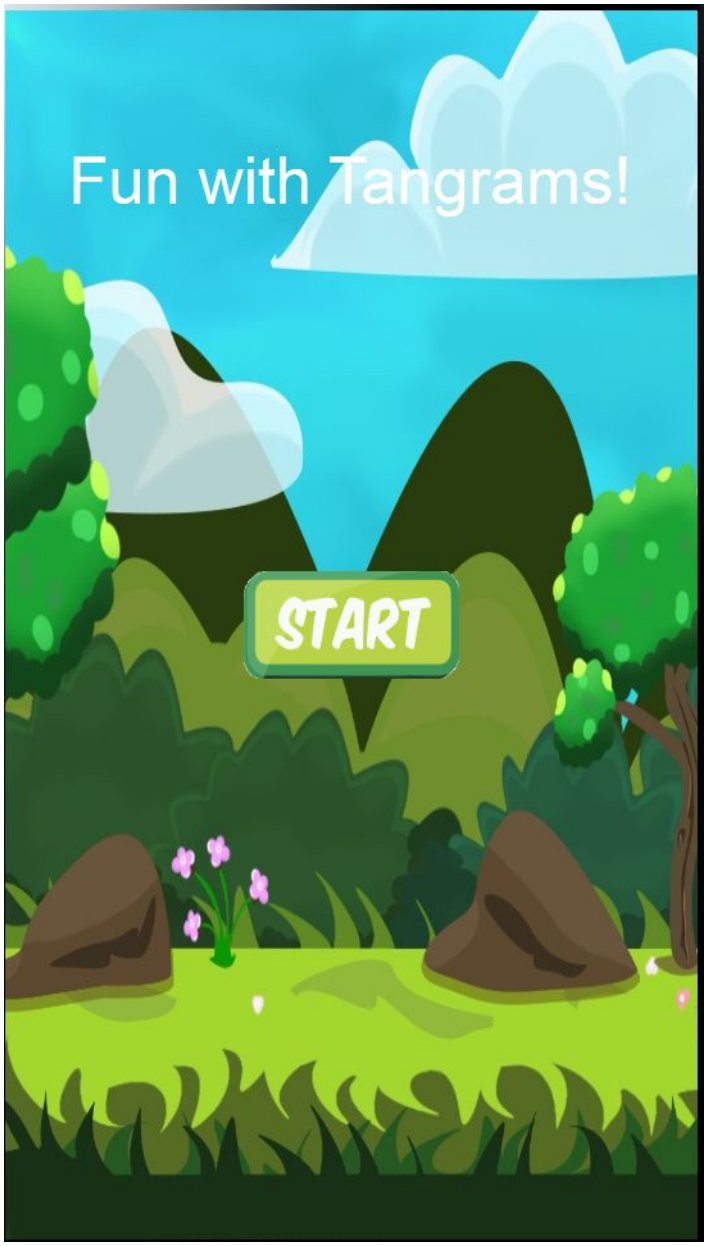
The second theme to the Galactic Attribute application. The perimeter is the planet Mars. The background is a picture of outer space.



Theme 3: Neptune

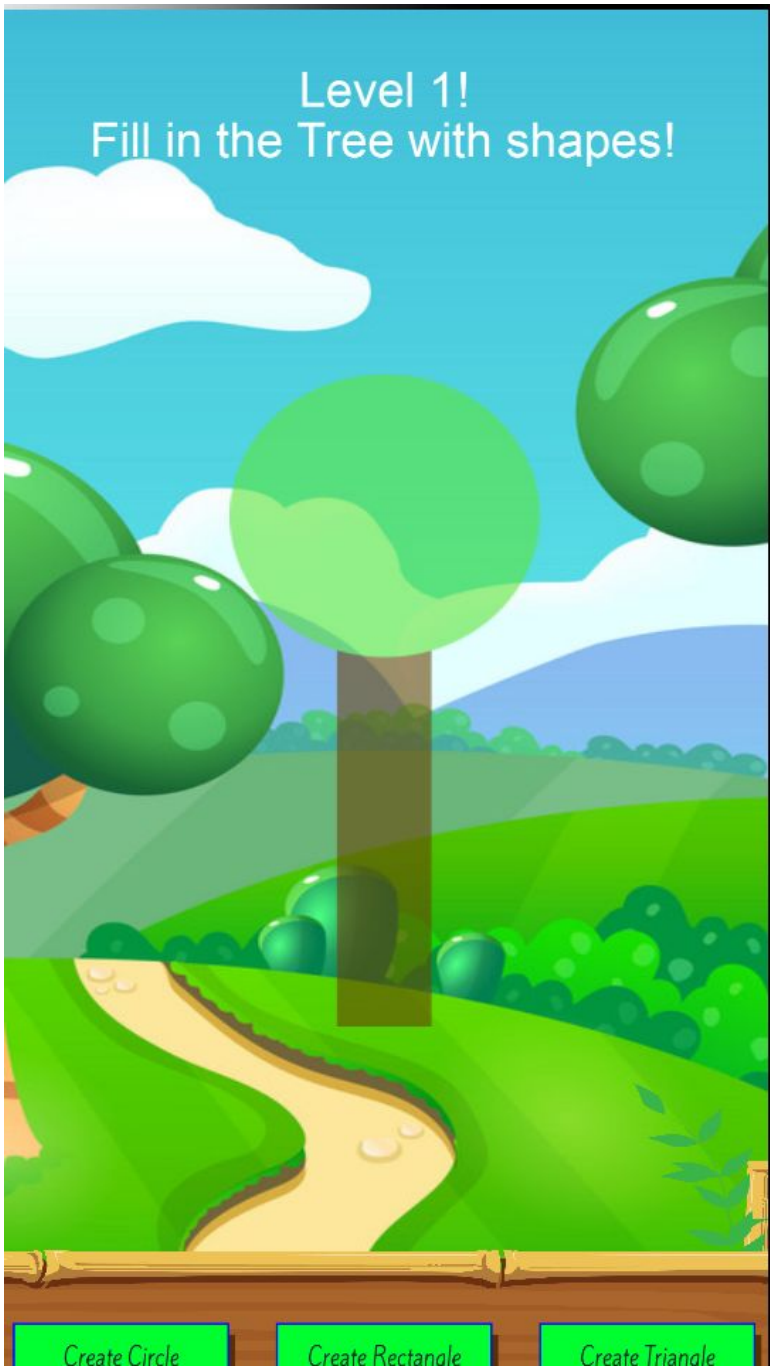
A theme of the iridescent planet Neptune with Neptune playing the role of the circular perimeter in the middle of the screen. Behind the planet is a comet hurtling through space in a magnificent display of light.

IV. Fun with Tangrams!



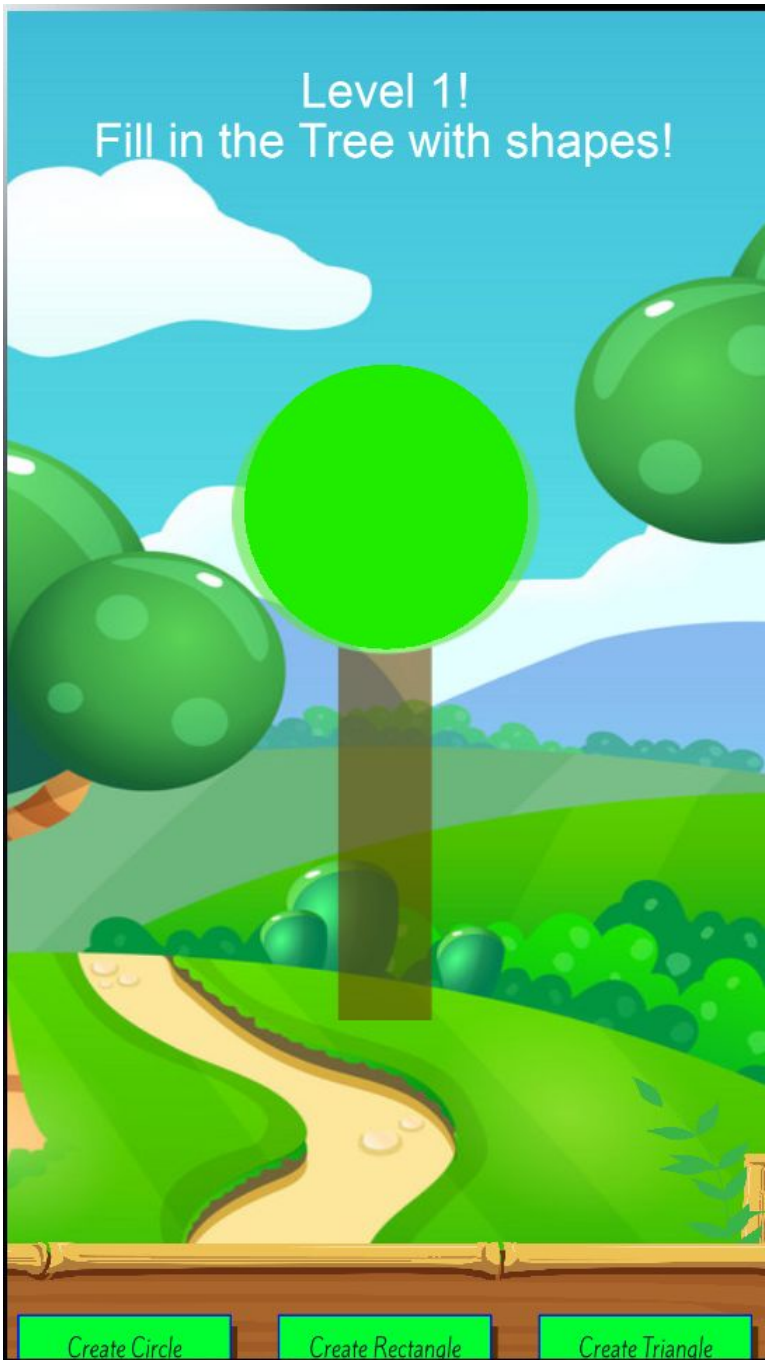
Start Menu

The first screen to appear once the user has opened the “Fun with Tangrams!” application on their device. The user is met with an artistic depiction of a forest, the name of the application, and the start button of the application. Once the button is pressed, the application will give off a sound to signal to the user that the start button has been pressed.



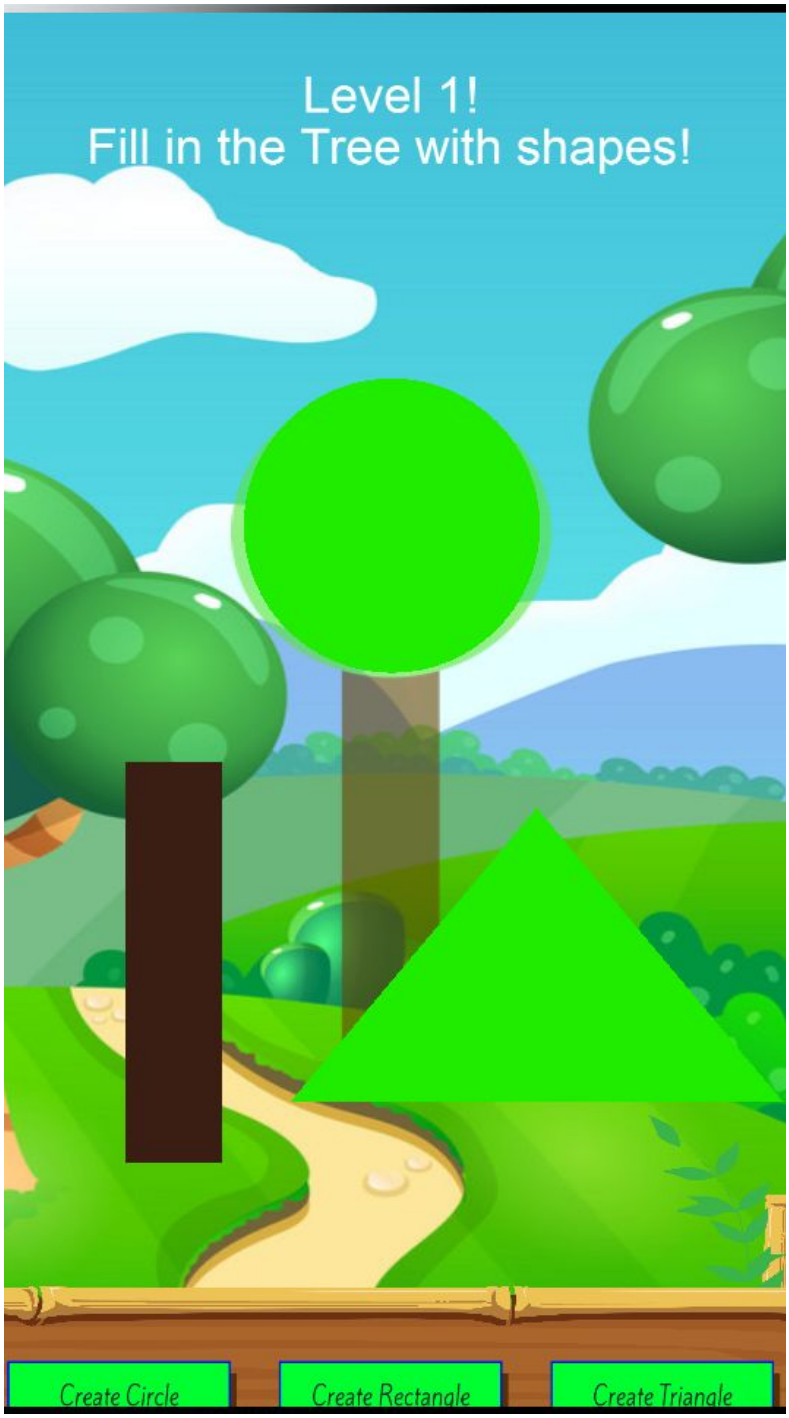
Main Program

The user is then booted into the main program from the start menu. The user is prompted with the directions that the program provides as well as an indication of what level the user is on. At the bottom of the screen is where the user can create shapes. In the middle of the screen is an outline of a combination of shapes in the middle of the screen.



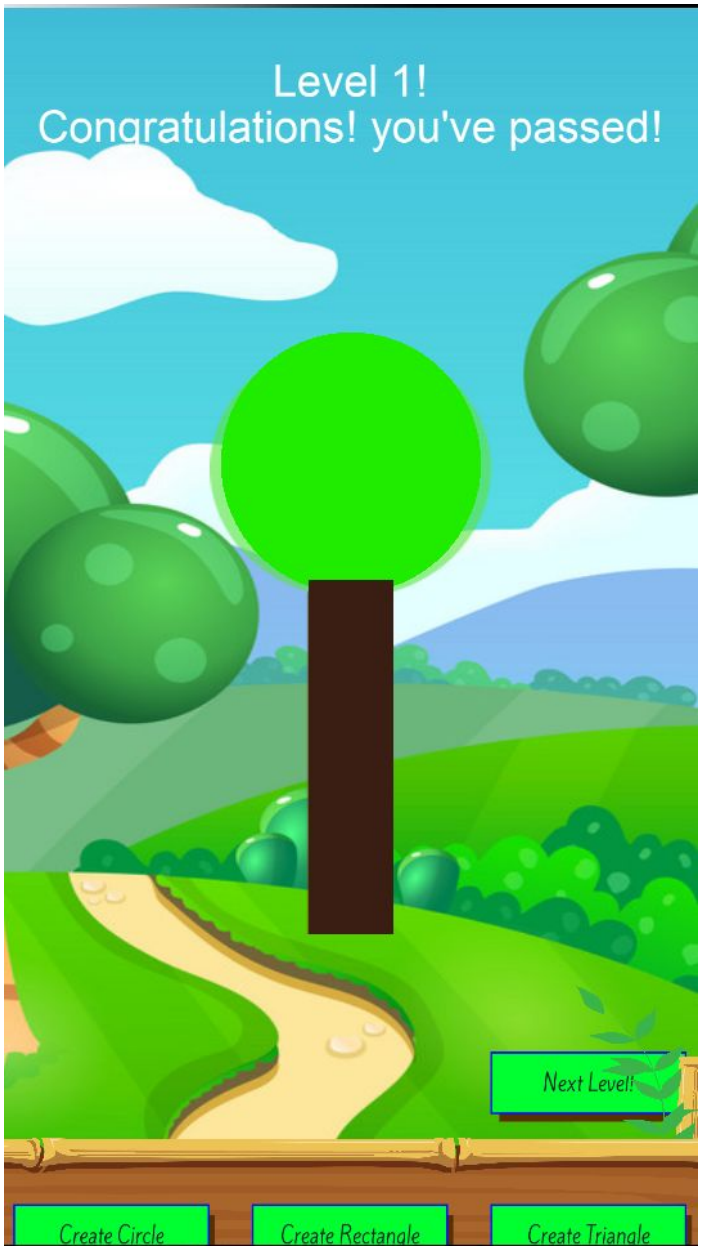
Scenario 1: Player places the correct piece

When a player selects a piece and drags the piece over to the correct outline, the piece will snap into the place of the outline. A sound will play that will indicate to the user that the piece they have selected is the correct piece.



Scenario 2: Player does not places the correct piece

When a player selects an incorrect piece and drags the piece over to the outline, the piece will not snap into the place of the outline. A sound will play that will indicate to the user that the piece they have selected is not the correct piece.



Completion

When the user has completely solved the outline puzzle, the directions at the top of the screen will relay to the user that they have completed the puzzle and will give the user a bit of congratulatory praise for their efforts. A new button will appear at the lower right side of the screen that will prompt the user to go to the next level.

Level Progression

As the user progresses through the game, each higher level provides more challenging puzzles. The levels will have more backgrounds as the player progresses through the levels to keep the user from getting bored with the visuals that the application provides.

V. SOURCE CODE