# Pixel Art Rendering Tool for You!

Thomas Logan, Vincent Manoli, Brett Bivens

**Abstract**

**The Pixel Art Rendering Tool for You, also known as PARTY, is intended to be used by any type of user. PARTY is designed to be used by an artist interested in a pixel art style of artwork for use with sprites or for projects like video game making. The user may choose between either a Basic or Advanced interface while making their art and will be able to export their creation.**

## 1. Introduction

The Pixel Art Rendering Tool for You is designed with the intention of having an easy to use interface to make low resolution pixel art.

The Pixel Art Rendering Tool for You will have two modes: Basic and Advanced. These modes will have different tools so a user with any degree of past experience in pixel art should be able to use the program effectively. The main difference between the modes will be the degree of control the user will have over their art. A good example of this is color selection: In Basic mode the user will have about 15 different colors to pick from, while in the Advanced mode's color selection the user will have 3 sliders for red, green, and blue. The user will also be able to manually enter RGB values in Advanced mode if this is easier for them.

### 1.1. Background

This proposal will be using the term "pixel art" frequently. To help readers better understand this term we are providing the following descriptions. A pixel is a single colored square shape that belongs to a larger group of colored square shapes that together form an image. Pixel Art is digital art that is made on a pixel by pixel level. The dimensions of pixel art pieces are generally 25x25 to 100x100. A common use for Pixel Art is making sprites. A sprite is a low resolution art asset. Some examples of this low resolution artwork would be the artwork of old school Mario, Nyan Cat, Pac Man, and Terria. Sprites are generally made for 8 to 16 bit style games.

### 1.2. Challenges

The biggest challenge to overcome for this project is the implementation of the tools for the Advanced mode. Another challenge is getting the interaction between all the seperate windows of our program to work correctly. We are designing PARTY so multiple windows are opened based on a user's choice. An example of this is when the user selects the Advanced mode. Once the user has selected this mode, the tool bar will open and a canvas will be opened based on the user's desired dimensions. It may look like this user interface is one window to the user but in the background multiple windows are being used and are interacting with each other.

## 2. Scope

This program will be considered complete when the entire Basic mode is complete and at least half of the buttons in the Advanced mode are implemented. The user will also be able to download their picture. This feature currently saves the picture in a .txt format, so the user will need to have another program to be able to convert it into a standard picture format.

The current stretch goals we have are: to have the ability for the user to upload their own image to PARTY and be able to edit it, to implement the row tool in Advanced mode, and to add an export feature that will export the user's canvas and convert it into a ".jpeg" file.

### 2.1. Requirements

#### 2.1.1. Functional.

- User needs to have a selected mode – This will allow the program to decide which mode to load for the user.
- User can download their work – This will allow the user to use their work as assets in other projects

| Use Case ID | Use Case Name | Primary Actor | Complexity | Priority |
|---|---|---|---|---|
| 1 | Selecting Basic Model | User | Medium | 1 |
| 2 | Selecting Setting dimensions | User | Medium | 2 |
| 3 | Selecting a Color | User | Low | 3 |

TABLE 1. USE CASE TABLE

#### 2.1.2. Non-Functional.

- Internet Independent - The program will be self contained on the user's computer.
- User Input Dependent - The program will rely on user input to make the pixel art.

### 2.2. Use Cases

Use Case Number: 1
Use Case Name: Selecting Basic Mode
Description: User will be prompted to select either Advanced or Basic mode to be loaded. Once the user selects the Basic mode option, Basic mode will load.

1) User runs the program by double clicking the icon for the ".exe" file.
2) User will left-click on "Basic Mode".

Termination Outcome: The Basic mode template will be loaded and the Basic layout will be shown. (see Figure 1)

Use Case Number: 2
Use Case Name: Selecting Canvas Dimensions (Assuming Basic mode is selected).
Description: User will pick the desired dimensions of the canvas to make their art on.

1) User left-clicks the HEIGHT box and enters a height (Current max is 100).
2) User left-clicks the WIDTH box and enters a width (Current max is 100).
3) User left-clicks on the CREATE button.

Termination Outcome: The program will create a canvas set to the user's requested dimensions.

Use Case Number: 3
Use Case Name: Selecting A Color
Description: User will select a color in Basic mode and change pixels color's on the canvas to their selected color.

1) Once the Canvas is generated the user will left-click on one of the 15 colors located in the menu bar on the left of the screen.
2) User chooses and left-clicks the pixel(s) located on their canvas they wish to change the color of.

Termination Outcome: The user will have an individual pixel filled in with their chosen color at their mouse location on the canvas.

### 2.3. Interface Mockups

Figure 1 - The first figure shows the inital concept design of our Graphical User Interface (GUI). We have chosen to keep this image in this doccument to illustrate the difference between where we started and our final product. In this image the user can make their canvas to specific dimensions and can pick between up to 15 different colors.

Figure 2 - The second figure shows the startup screen that will greet the user after they have started the program. This window gives a brief explanation of what the Basic and Advanced modes offer.

Figure 3 - The third figure shows our new Basic mode. It is more developed than our original concept interface and now has load, save, and clear options avaiable to the user. The canvas is now generated before the user sees this image.

Figure 4 - The fourth figure shows our Advanced mode. In this mode the user has a tool bar to the left of the screen which contains the following options: save, load, pixel select, row select, splash, and clear, in that order. The user also has more control over color selection than the Basic mode's individual buttons in the form of three sliders controlling RGB values.

## 3. Project Timeline

If its hard to see the fine print of the timeline. The timeline has been uploaded to the GitHub repo. See Figure 5

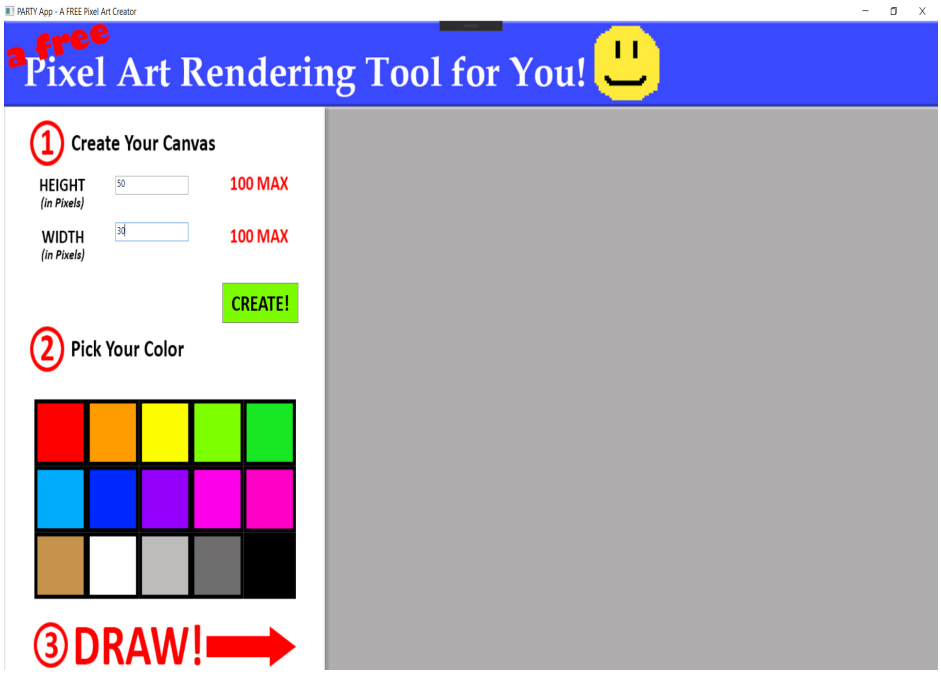


Figure 1. Example of Basic Interface

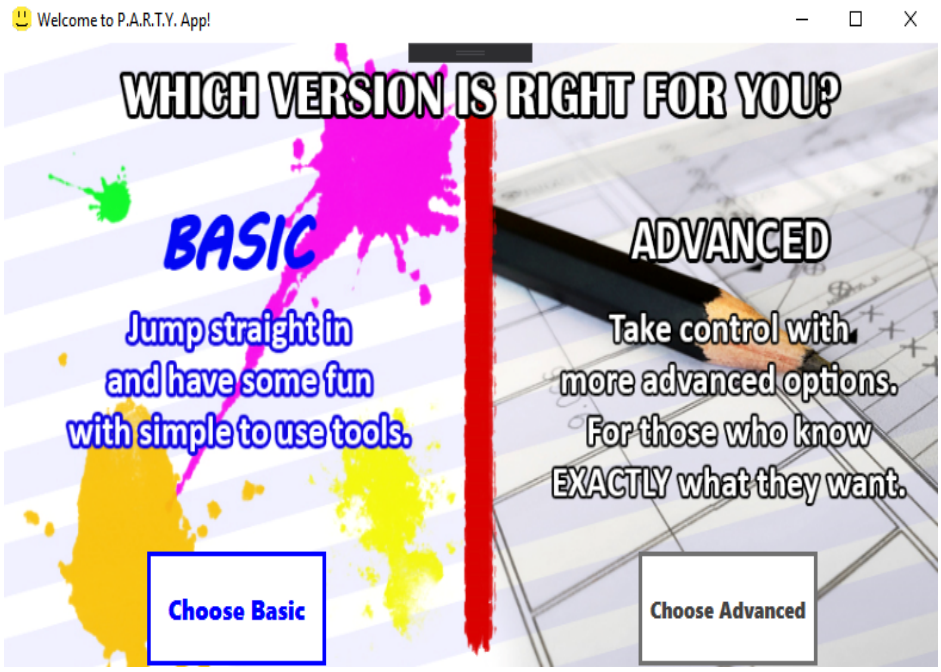


Figure 2. Choose Mode

## 4. Project Structure

Starting The Program: To begin, the user will need to make two selections on startup: the dimensions of the art piece the user wants to make, and which mode they would like to use (Advanced or Basic).

Basic: Basic is designed to be very minimal to help avoid any confusion for the user. The user will have 15 colors to pick from and possibly one or two tools at their disposal.

Advanced: Advanced mode is designed to have more specific control over color selection. In Advanced mode the user will have 3 sliders. One for green value, one for blue value, and one for red value. The user will also be able to manually

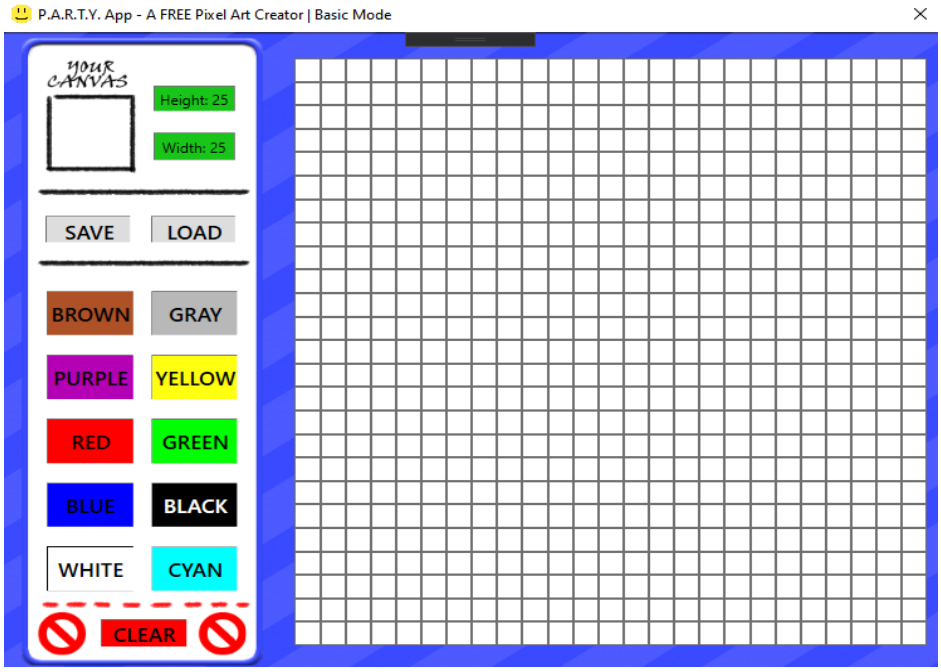


Figure 3. Basic Mode

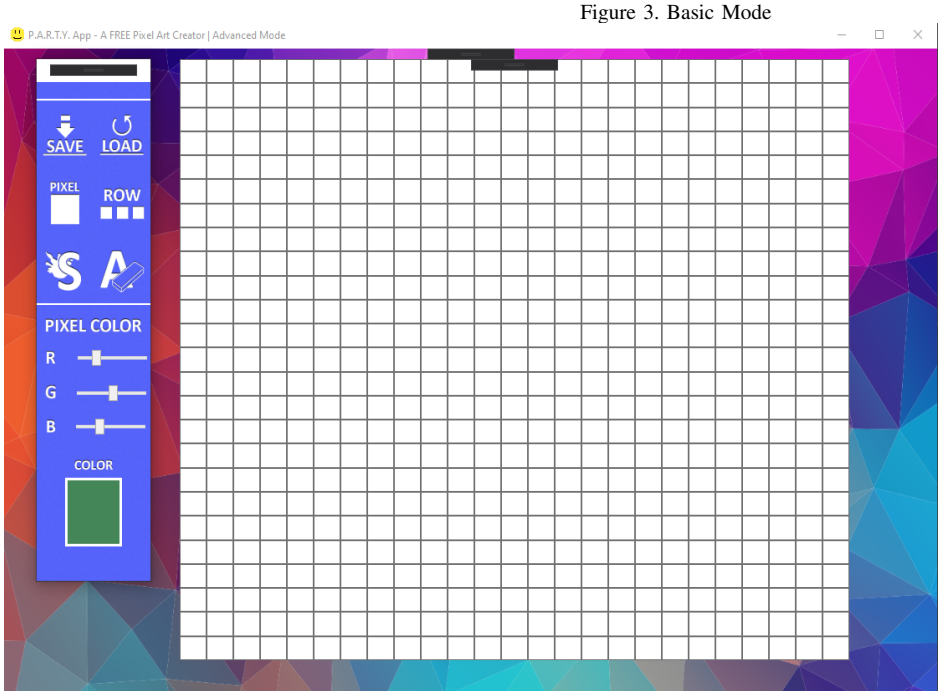


Figure 4. Advance Mode

enter values for each of these sliders in a provided text box to have even better control over color selection.

## 4.1. UML Outline

Figure 6 - Starting with VersionChoice, the user will select either Button Click or Button Click. This will tell what MainWindow should show to the user. Based on what MainWindow is showing to user, the user will select the dimensions. Then if Basic was select, will open. Once the user is done and wished to save then SaveFile will launch and LoadFile will launch if the user wants to load. If the user had picked Advanced then WorkGrid and Advanced would have opened.

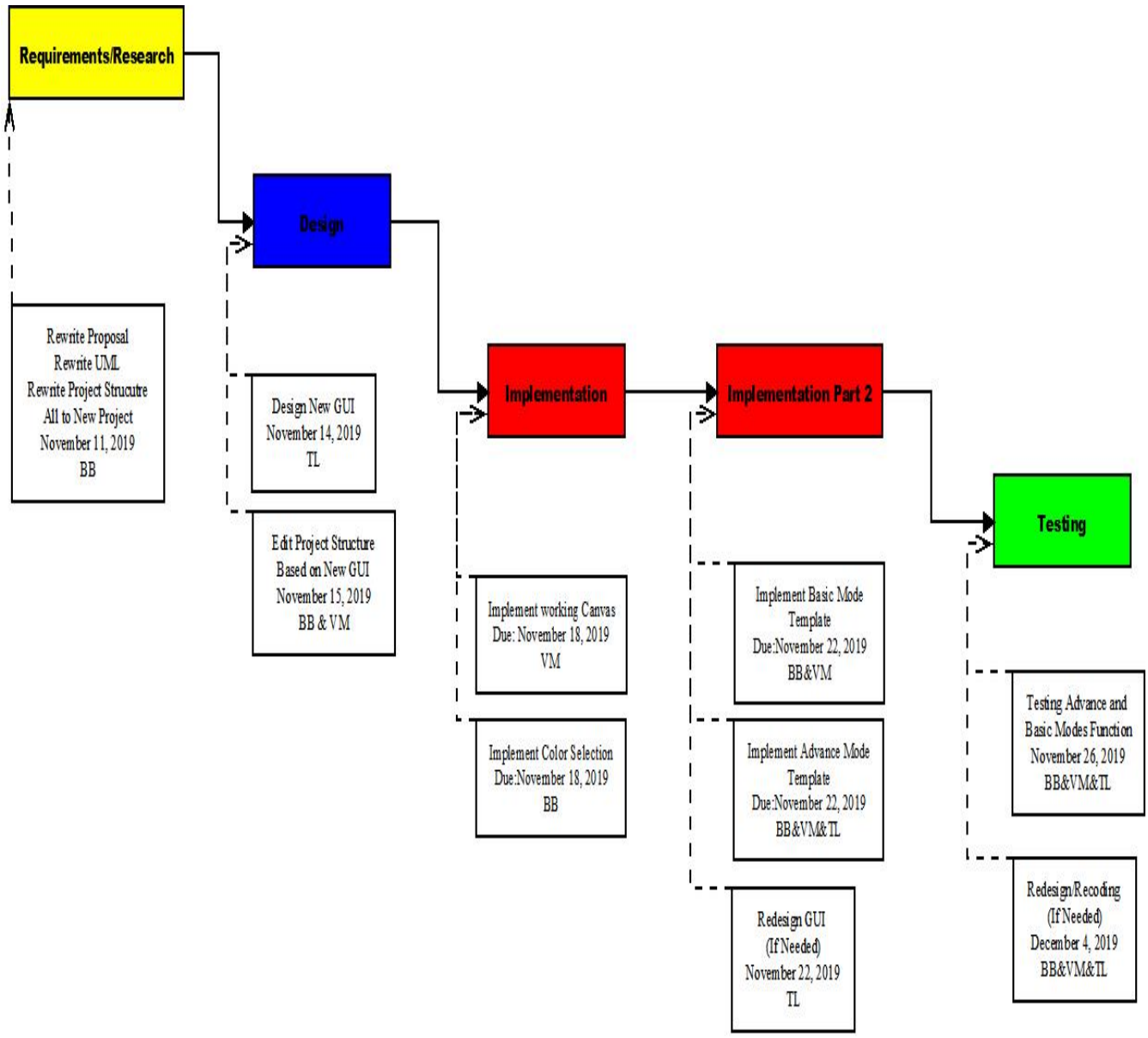


Figure 5. Time Line

WorkGrid generates the canvas and user will draw on and Advanced is simply the background for the Advanced mode. Once WorkGrid has generated the canvas then Toolbar will launch giving the user access to the tools they can use on their canvas. Once the user wants the save or load then SaveFile or LoadFile will launch accordingly.

## 4.2. Design Patterns Used

We used observer for this project. Ovserver was choosen beacuse that is the method PARTY interacts with its self. The canvas is its on seperate window in PARTY so there must be a method that the canvas uses to interact with the toolbar. An example of this is in Advanced mode, once a user has selected a color based on their rgb sliders then the toolbar sends that information to the canvas so when the user selects a pixel, their desired color is painted.

We used Factory Method as our second design pattern. Our factory method works to generate the canvas. Based on the information the user inputer (Basic or Advance) and what the dimensions the user wants.

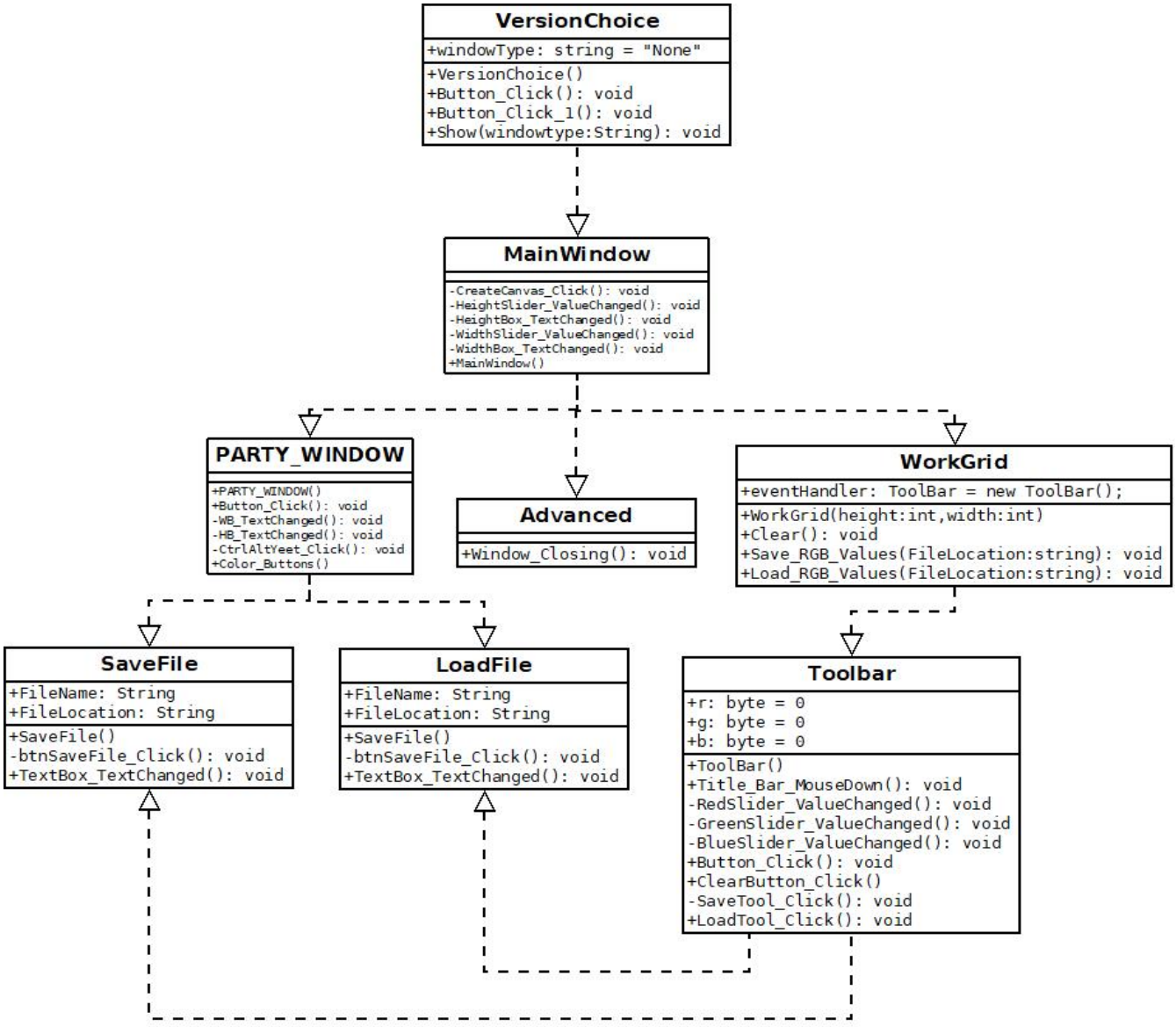


Figure 6. UML

## 5. Results

Most of PARTY has been implemented.The user can choose between advanced and basic. All of basic is implemented and the save and load function in basic mode works as intended. Advanced mode is mostly completed. The save and load functions works as intended and color choice works as intended. The only features that do not work is the row select button and the splash tool.

### 5.1. Future Work

We want to improve on 3 things. First, a better save and load function for advanced mode. We would have liked for PARTY to export a jpeg so the user can use the canvas they made in other projects like game development for example. Secondly, better color control in Advanced mode. In advance mode you had three sliders that control rgb values, but having a number next to each slider would help users pick a specific color based on thos 3 values easier. Lastly, implement the splash and row buttons properly.