Requirements and Analysis Document for C7Paint

Grupp C7
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2.0

Contents

1 Introduction

What is the application?

This project aims to develop an application for painting and editing images, much like GIMP or Photoshop, but generally simpler. The application should contain basic tools for editing images and painting. This includes features such as:

- Painting on a canvas with a brush.

- An interface which is similar to most painting software, such as GIMP.

- Changing the brush to a different type, size, and color.

- Loading images into the application's canvas.

- Exporting what has been drawn or edited in the application to an image.

Who is the application for?

The application is aimed at the general populace for an easy and accessible image editing and painting application that is still more advanced than pre-installed applications such as Microsoft Paint.

1.1 Definitions, acronyms, and abbreviations

GUI Graphical user interface

MVC Model view controller

2 Requirements

2.1 User Stories

Done The user story has been completed

Not done The user story has not been completed

Priority has three orders:

1 highest priority.
    Should be done.

2 medium priority.
    May be done.

3 low priority.
    Not expected to be done.

ID: 1Bru
Priority: 1
Status: Done
Name: Brushes
Description:
    As a hobbyist illustrator I want to be able to use different types of brushes, such as calligraphy pens, so that I can draw more complex lines in my art.

Confirmation:
    Functional:

- Can I select different brushes/pens in the tools box?
- When I have a brush/pen selected, can I draw with it?
- Does the drawing of the brush reflect its type? Does a calligraphy draw a slanted line and does a circular brush draw a circle?

ID: 1Prp
Priority: 1
Status: Done
Name: Tool Properties
Description:
    As a user, I want to be able to configure my brushes and tools, such as changing the size of the brush head so that I can have more fine control over what the application does.

Confirmation:
 Functional:

- Can I select a tool in the interface and get a list of settings I can change in a settings window below the toolbox?

- Can I change a setting in a tool by either entering a new value or dragging a slider?

- When I change the setting it should be reflected by the tool's effect on the canvas when using it?

- Do Tool settings persist even if I switch tools, but I can clear my settings to reset the tool to its default values?

ID: 1Imi
Priority: 1
Status: Done
Name: Image import
Description:
 As a casual user I want to be able to import images into the program so that I can work with them inside the program.

Confirmation:
 Functional:

- Can I import all of the common image formats (.JPG, .PNG)?

- When I import an image, does it appear on the screen?

- Can I draw and interact with the imported image?

ID: 1Lam
Priority: 1
Status: Done
Name: Layer manager
Description:
 As an artist, I want the picture to have different layers so I can edit different parts of the image without changing other parts.

Confirmation:
 Functional:

- Can I edit a "layer" (a portion of an image) independently of other layers?

- When I draw on a layer over another layer does the data of the layer bellow persist when I erase or move the data above?

- Can I change which layer I am editing in the layer controller by pressing on the layer I want to select?

ID: 1Arl
Priority: 1
Status: Done
Name: Add and remove layers
Description:

As a user I want to be able to create and remove layers. I want to be able to create them so that I can create new drawing surfaces, so I mustn't affect something I have drawn on another layer. I also want to be able to remove layers so that don't have to create a new project every time I create a layer I don't want to keep.

Confirmation:

Functional:

- Does there exist a create and remove button for layers by the layer controller?

- When I press the create button does the application prompt me for the size of the layer I want to create?

- When I create a layer does it get added to the layer controller and can I draw on it?

- When I remove a layer by pressing the remove button does it get removed from the layer controller? Also, does it get removed from the main canvas view?

ID: 1Exi
Priority: 1
Status: Done
Name: Export images
Description:

As a user I want to be able to export my drawings into a standard image format so that I can use my drawings outside the program and share it with others that do not have the program.

Confirmation:

Functional:

- Can I export my drawings as a .JPG, .PNG, and as a .TIF?
- Can I select where the file should be exported and select this destination?

- Does the exported image look the same as what I see in the program?

ID: 1Era
Priority: 1
Status: Done
Name: Eraser
Description:

As a drawer I want to be able to erase what I've drawn so that a I can remove what I've drawn in a particular area. This allows me to change the area or simply remove an area.

Confirmation:
Functional:

- Can I select an eraser in the toolbox?

- When I use the eraser on the canvas does it remove what I've drawn?

- Can I change the size of the eraser?

ID: 1Lai
Priority: 1
Status: Done
Name: Layer visibility
Description:

As a user I want to be able to hide layers in the layer controller so that I can easily either remove a portion of a layer I don't want to export. Alternatively I want to also be able to quickly see how a layer underneath another layer looks in its fullness without modifying the layer above. This allows be to not have to destroy my work just to view separate portions of my work.

Confirmation:
Functional:

- Does there exist a button to hide or show a layer in the layer controller?

- When I toggle the button does the selected layer change its visibility?

- If I export a project with a layer that is hidden, does the hidden layer not show up on the exported image?

- When I save a project with a hidden layer, does it still persist when I load the said project?

ID: 1Lat
Priority: 1
Status: Done
Name: Layer thumbnails
Description:

> As a user I want to be able to quickly see what I've drawn on each layer so that I can quickly know which layer I want to remove, select, or modify.

Confirmation:

> Functional:
>
> - Can I see each layer separately as a thumbnail in the layer manager view?

ID: 2Cnp
Priority: 2
Status: Done
Name: Create new projects
Description:

> As a user I would like to create a new project/clear my current project when the application is running. This allows me to clear or create a new project without having to close the application.

Confirmation:

> Functional:
>
> - Can I select a "new" item in the menu for creating a new project?
> - Does a window prompt be for the size of the new created project when I press on "new"?
> - Is a new project created when I have selected a size? And does the old project get removed, including all of its layers?

ID: 2Exp
Priority: 2
Status: Done
Name: Export project
Description:

> As a user I want to be able to save and later reload my work so that I can continue my work even after I've closed my computer.

Confirmation:

> Functional:

- Can I save the project I am working on?
- Can I choose were it will be saved?
- Can I load a project, given a selected project file?
- Does the loaded project contain the same layers data as when the project was saved?

ID: 2Prb
Priority: 2
Status: Not done
Name: Project background
Description:

As an illustrator I want to be able to easily see where my canvas ends so that I do not draw outside of the canvas. It also helps be to see how the exported image will look.

Confirmation:

Functional:

- Does the canvas in the application have a background which is not the same color as the canvas?
- Does this background work for any size of a canvas. That is, if I create a new project with a different size, does this background adhere to the size?

ID: 2Cai
Priority: 2
Status: Not done
Name: Canvas info
Description:

As a user I want to be able to quickly see the size of my canvas, the location of my cursor on the canvas, and other general information about the canvas I am drawing on. This helps me for example align lines, since I can check that the x-coordinate matches on two points.

Confirmation:

Functional:

- Is there a bar at the bottom of the window containing information of where the cursor is and the size of the window?
- Does the cursor position change with the cursor?
- Is the cursor position relative to the drawable canvas?

ID: 2Shb
Priority: 2
Status: Not done
Name: Shape brushes
Description:

As a user I want to be able to easily draw shapes, such as a square or a start, without having to draw perfectly straight lines manually. This makes drawing easier for me.

Confirmation:
Functional:

- Can I select a tool for a few different shapes, such as triangle, square, star, and rectangle?
- When I drag my cursor with a selected tool, do I get a preview of how the shape will look when I release?

ID: 2Ucp
Priority: 2
Status: Not done
Name: User created brush patterns
Description:

As an advanced user I want to be able to use customize patterns with my brushes, so that I can create my own unique brushes that does exactly what I want.

Confirmation:
Functional:

- I can create a new brush with an empty brush head pattern.
- I can select a brush head pattern out of a list of predefined ones.
- I can enter my own patterns with a bitmap file.
- The pattern I've added is selectable in the list of predefined ones.
- When I select a pattern on a newly created brush and draw with it, the selected pattern is drawn.

ID: 2Sbf
Priority: 2
Status: Not done

Name: Sharpening and bluring filters
Description:

As a user I want to be able to blur or sharpen a selected region of a drawing or image so that I have greater control over how my art looks.

Confirmation:

Functional:

- Can I select a region and either increase or decrease its sharpness?

ID: 2Und
Priority: 2
Status: Not done
Name: Undo
Description:

As a user I want to be able to undo the last couple of strokes I've painted or any other effect I've done to the canvas so that I can reverse a stroke I am not satisfied with.

Confirmation:

Functional:

- Can I click a back button to undo a stroke with a brush?
- Can I click the button multiple times so that I can undo at least the 5 last strokes?
- Is any potentially overwritten data by the stroke which will be undone preserved when I press undo?

ID: 3Mob
Priority: 3
Status: Not done
Name: Momentum brushes
Description:

As an advanced user I want to be able to user brushes with momentum which affects the stroke's color and shape so that I can best emulate a real life stroke in the application.

Confirmation:

Functional:

- Does stroke opacity decrease when the stroke is curving?
- Does stroke opacity decrease with speed?

- Does stroke size decrease with speed?
- Does stroke size increase in curves?

ID: 3Tab
Priority: 3
Status: Not done
Name: Tabs
Description:

As a multitasker user I want to be able to work on multiple projects at the same time. I want to be able to switch between them by pressing on a tab with their name. I want all of my currently open projects to be visible in this tab view. All of this so that I can better work on multiple projects simultaneously without having to open multiple instances of the application since I don't have room for multiple applications on my small screen.

Confirmation:
Functional:

- Does there exist a tab view above the canvas?
- When I load a project does it appear in this tab view?
- WHen I press one of the tabs, which is not the one I am currently on, does the canvas change to that one?
- Does my selected tools, and their settings, persist even when I change project?
- Can I close an opened project by pressing a close button on its tab?

ID: 3Onc
Priority: 3
Status: Not done
Name: Online colaboration
Description:

As an artist with many colaborator in my drawings I want to be able to work with my colaborators remotely so that I mustn't be at the same place to work together.

Confirmation:
Functional:

- Can I start the program and connect to a remote endpoint or open for connections to my endpoint?
- Can I get the project of the remote endpoint I connect to?

- Can I draw or edit the project I have connected to and that the changes update on the other host user's canvas?

2.2 Definition of Done

Any given user story is considered done once the following criteria have been met:

- The code passes the user story's acceptance criteria

- The code passes every unit test

- All of the codes public methods are documented

- The code is briefly reviewed by the other project members

- The code has been integrated into the development branch

- Any bugs discovered via merging to the development branch has been mended

2.3 User interface

The graphical user interface (GUI) for the application consists of a primary view (see 1). In this view the user may use tools on the canvas. Tools can be found in the tool window, as can be seen in the top right corner, and consist of different brushes, a zooming tool, and much more. The GUI also features a window for configuring the selected tool from the tool window, which is located below the tool selection window. Under the selection window there is a layer window, which is where the user can select which layer they want to draw on. Additionally, the visibility of layers can be toggled.

In addition to these primary windows there also exists a bar for general info about the current canvas, such as canvas size, located at the bottom of the window.
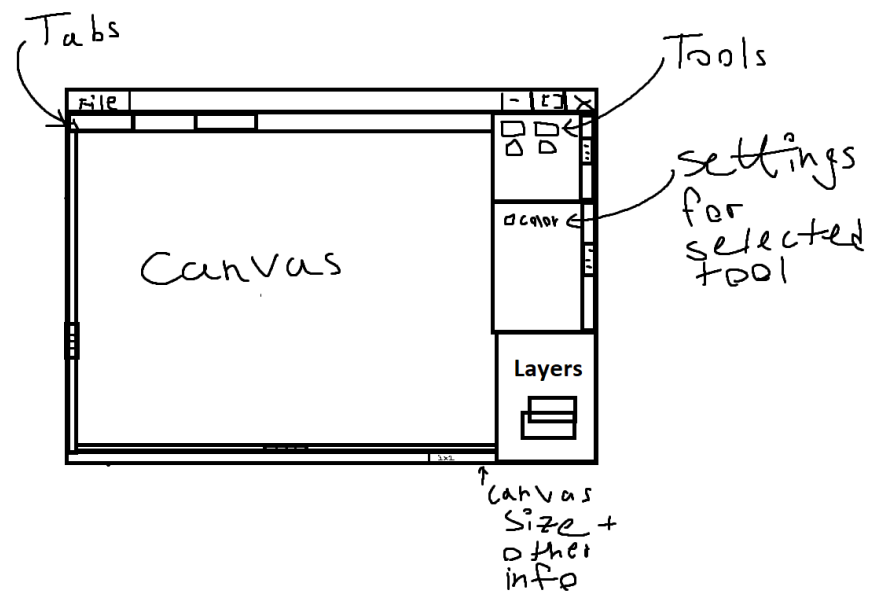
Tabs

Tools

File

Canvas

settings for selected tool

color

Layers

Canvas Size + other info
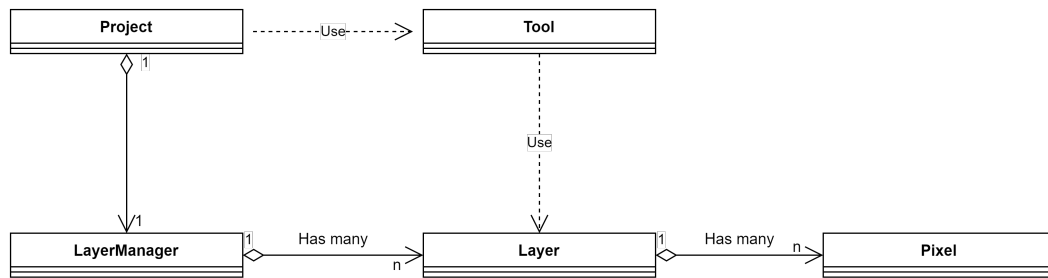
Figure 1: The first gui sketch

3 Domain model

Figure 2: Domain model of C7Paint

3.1 Class responsibilities

Project

The project is the highest level of data for a piece of work in C7Paint. A project contain all the data for a project (such as a LayerManager) and the metadata (such as the project name). This forms a larger aggregate of image data and miscellaneous metadata which views and controllers interact with. That is, the projects role is to be an intermediate step between its aggregates (LayerManager, Layer, and thus Pixel) and the view and controller. Additionally, it is this metadata which decides how large the canvas on the screen will be.

LayerManager

The LayerManager manages a collection of Layers. Its role is to allow the creation of new Layers and manipulation of existing Layers, such as reordering the or changing their visibility. It is also responsible for combining Layers into a singular image which can then be saved or displayed on the view.

Layer

A Layer represents a drawable surface that can be rotated, translated, or scaled. It stores pixel data which can be manipulated by a Tool object. That is, a layer stores the raw pixel data.

Tool

The Tool class represents tools such as brushes, fill buckets, or anything else which would manipulate a layer. That is, a Tool is responsible for larger scale manipulation of layers, such as drawing shapes on a layer or transforming a layer. As can be deduced, the the Tool section is very broad.

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Pixel

The pixel class represents an RGB color. It also handles color comparison and blending, but for the most part it is a data class. It is this type of data which a Layer contains.

4 References

5 Tools

Project continous integration tool:
Travis, https://www.travis-ci.com/

Build automation tool:
Maven, https://maven.apache.org/

Integrated development environment (IDE):
Intellij IDEA, https://www.jetbrains.com/idea/

Version control:
Git, https://git-scm.com/

Remote repository hosting site:
Github, https://github.com/

UML class diagram tool:
Diagrams.net, https://app.diagrams.net/

UML sequence diagram tool:
Sequencediagram.org: https://sequencediagram.org/

Structureal analysis tool:
Stan, http://stan4j.com/

6 Frameworks and Libraries

Project unit test framework:
Junit, https://junit.org/junit5/

Project graphical framework:
Javafx, https://openjfx.io/