

Requirements and Analysis Document for Paint++

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1.1

1 Introduction

The project aims to implement a raster graphics editor program which allows users to create and edit images. In modern society where graphics are required for marketing and entertainment purposes, high expectations have been placed on both its quality and quantity. To produce advertisement or illustrations at a high pace, and at the same time retain a satisfying quality level, would be a difficult task through physical means. For that reason, our program will contain digital tools and features which allow the process of photo editing and creating art in general to be considerably more efficient. Transformations such as scaling, translating or rotating an image or selection can be performed with less required time and effort, whilst producing a precise result. The purposes of a graphics editor range from e.g. photo editors enhancing the quality of a picture through modification of attributes, to artists creating art using digital brushes in combination with graphics tablets.

General characteristics:

- The application will initialize a project with a blank canvas on startup.
- The user will be able to locate and open an existing project at any time.
- The application can have several projects running, which the user can navigate between using tabs.
- The application will use a single consistent GUI similar to Photoshop/Paint.
- The application will save changes made to the settings of the program automatically when applied.
- The application will be used offline.
- The application will ask the user to save unsaved projects when closing the application.
- The application will let the user choose and use a single tool at a time.

1.1 Definitions, acronyms, and abbreviations

GUI - Graphical user interface

2 Requirements

2.1 User Stories

Story Identifier:

Story Name:

Description: (EPIC) As an artist, I want to draw and paint pictures through digital means because it is more efficient in terms of availability of tools and photo editing features.

Confirmation:

Functional requirements:

- User can use the program to draw art with different colors and use some features to edit photos.

Non-functional requirements:

- Performance-wise the application should work as a established raster picture editor such as Photoshop and Paint.

Story Identifier:

Story Name: Draw on canvas

Description: As an user, I want to draw on a canvas to create art.

Confirmation:

Functional requirements:

- Can I select a pencil to draw on a blank canvas?
- Can I press down the left mouse button onto the canvas to draw?

Non-functional requirements:

- Performance-wise the pencil should be able to draw fine strokes with low latency.

Story Identifier:

Story Name: Toolbar

Description: As a user, I want to have a toolbar for easy access to my tools to work efficiently.

Confirmation:

Functional requirements:

- Can I see the toolbar?
- Can I select tools and use them?

Non-functional requirements:

- Extensibility-wise it should be relatively easy to add more tools into the toolbar.

Story Identifier:

Story Name: Draw in different colors

Description: As a user, I want to draw in different colors to enhance my images.

Confirmation:

Functional requirements:

- Can I choose between different colors when drawing?
- Can I enter colors with hex-code?

Non-functional requirements:

-

Story Identifier:

Story Name: Opacity

Description: As an artist, I want to draw with adjustable opacity to reflect the real life drawing process.

Confirmation:

Functional requirements:

- Can I adjust opacity in percentage when drawing?
- Can I layer paint strokes with lower opacity to create a paint stroke with higher opacity?

Non-functional requirements:

-

Story Identifier:

Story Name: Save project

Description: As a user, I want to save projects to avoid losing progress.

Confirmation:

Functional requirements:

- Can I save projects with the "Save" feature in File menu?
- Can I save the project as an image with the "Save" feature in File menu?
- Can I specify the location where to save the new created project the first time saving? Else the user has to use "Save as" function to choose location.
- If I have not saved the project before, the "Save" feature will act as a "Save as" feature.
- Application notifies me on saving.

Non-functional:

- Reliability-wise the save feature have to meet the users/clients expectations. It has to be reliable in which the picture always can be saved, and the saved picture stores the correct data.

Story Identifier:

Story Name: Open project from desired location

Description: As a user, I want to open existing projects from different locations/directories to continue working.

Confirmation:

Functional requirements:

- Can I open existing projects with the "Open" feature in File menu?
- Can I open a project by clicking on a button and locating the project in the disk?
- Can I open existing images with the "Open" feature in File menu??

Non-functional requirements:

Story Identifier:

Story Name: Line tool

Description: As an artist, I want to have line tools to draw straight and curved

lines perfectly.

Confirmation:

Functional requirements:

- Can I select the tool?
- Can I press, drag and then release on the canvas to create a line between the "press" and "release" state.
- Can I choose size and color?

Non-functional requirements:

Story Identifier:

Story Name: Shape tool

Description: As an artist, I want to have a shape tool because it's hard to draw symmetrical shapes manually.

Confirmation:

Functional requirements:

- Can I select the shape-tool?
- Can I choose the desired shape to draw?
- Can I draw the shape on the canvas?

Non-functional requirements:

Story Identifier:

Story Name: Fill tool

Description: As an artist, I want to color certain areas instantly because it's time-consuming to do it manually.

Confirmation:

Functional requirements:

- Can I select the fill tool?
- Can I fill areas on the canvas with colors instantly by clicking on the area?

Non-functional requirements:

-

Story Identifier:

Story Name: Layers

Description: As an artist, I want to have different layers to avoid ruin previous paint strokes and/or divide into different pieces.

Confirmation:

Functional requirements:

- Can I add multiple layers?
- Can I edit each layers individually?
- Can I rearrange layers to decide the level of the layers?
- Can I draw on one layer without affecting other layers?
- Can I delete a layer without affecting other layers?
- Can I toggle the visibility of the layer on or off?
- Can I name the layers to identify what layer contains what?

Non-functional requirements:

Story Identifier:

Story Name:Undo Buffer

Description:As a user, I want to undo my mistakes so that I am free to try stuff and explore the program.

Confirmation:

Functional requirements:

- Can I undo everything that a tool has changed?
- Can I use a shortcut to undo?

Non-functional requirements: The undo function has to be reliable in that it gives an exact replica of the previous canvas state.

Story Identifier:

Story Name:Select tool

Description: As a user, I want to have a select tool to select an area to work with.

Confirmation:

Functional requirements:

- Can I select the select tool?
- Can I drag on the canvas to create an area to edit?
- User can only edit in the selected area.
- Can I deselect the selected area.

Non-functional requirements:

Story Identifier:

Story Name: Eyedropper tool

Description: As an artist, I want to have a eyedropper tool to easily swap between color nuances.

Confirmation:

Functional requirements:

- Can I select the eyedropper tool?
- Can I set the current color by extracting a color from a specific pixel on the canvas?
- Can I draw with the extracted color?

Non-functional requirements:

Story Identifier:

Story Name: Zoom

Description: As a user, I want to have a zoom feature to view smaller areas on my canvas.

Confirmation:

Functional requirements:

- Can I zoom in and out when using the zoom feature in the view menu?
- Can I zoom in and out when using the magnifying glass in the toolbar?
- Can i zoom in and out to fixed percentages, e.g. 50, 100, 150 and 200 percent?

Non-functional requirements:

Story Identifier:

Story Name: Initialize a project

Description: As a user, I want to create new projects so that I can begin working.

Confirmation:

Functional requirements:

- Can I create a new project if I click on "New..." button?
- Can I specify the location where to create a project?

Non-functional requirements:

Story Identifier:

Story Name: Resize and crop images

Description: As a user, I want to resize and crop my images to adjust to the desired size and/or area of an image.

Confirmation:

Functional requirements:

- Can I resize images?
- Can I crop images?

Non-functional requirements:

Story Identifier:

Story Name: Tabs

Description: As an artist, I want to have multiple projects running at once so that i don't have to close my current project when i have an idea for another one.

Confirmation:

Functional requirements:

- Can I open a new tab or close a current one?
- Can I open an existing image in a new tab?
- Do I get a warning when closing a tab with an image that has been changed?

Story Identifier:

Story Name: Move Tool

Description: As a user, I want to move around objects/pixels to rearrange its position on the canvas.

Confirmation:

Functional requirements:

- Can I select the move tool?
- Can I move everything that is drawn on a layer?

Non-functional requirements:

Story Identifier:

Story Name: Gradient Tool

Description:As an artist, I want to have a gradient tool to paint different color nuances with perfect precision

Confirmation:

Functional requirements:

- Can I select the gradient tool?
- Can I specify two colors to make a gradient?
- Can I paint with gradient by dragging between two points?

Non-functional requirements:

Story Identifier:

Story Name: Text on image

Description: As an artist, I want to write text on my images to create art with text.

Confirmation:

Functional requirements:

- Can I select the text-tool?
- Can I decide the size of the text-box by dragging the box to desired size when creating the box?
- Can I write in the box?
- Can I choose the color of the text?
- Can I choose font and font size?

Non-functional requirements:

Story Identifier:

Story Name: View and edit individual pixels

Description: As a pixel artist, I want to view and edit individual pixels to create images with pixel perfect precision.

Confirmation:

Functional requirements:

- Can I turn on grids when navigating to View menu?
- Can I edit individual pixels on the canvas?

Non-functional requirements:

2.2 Definition of Done

- The code is compilable.
- All tests are successful.
- GUI implemented.

2.3 User interface

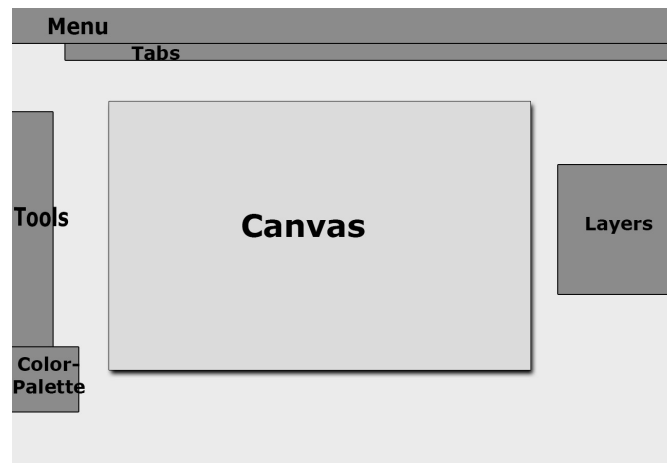


Figure 1: Show our initial sketch of the application

3 Domain model

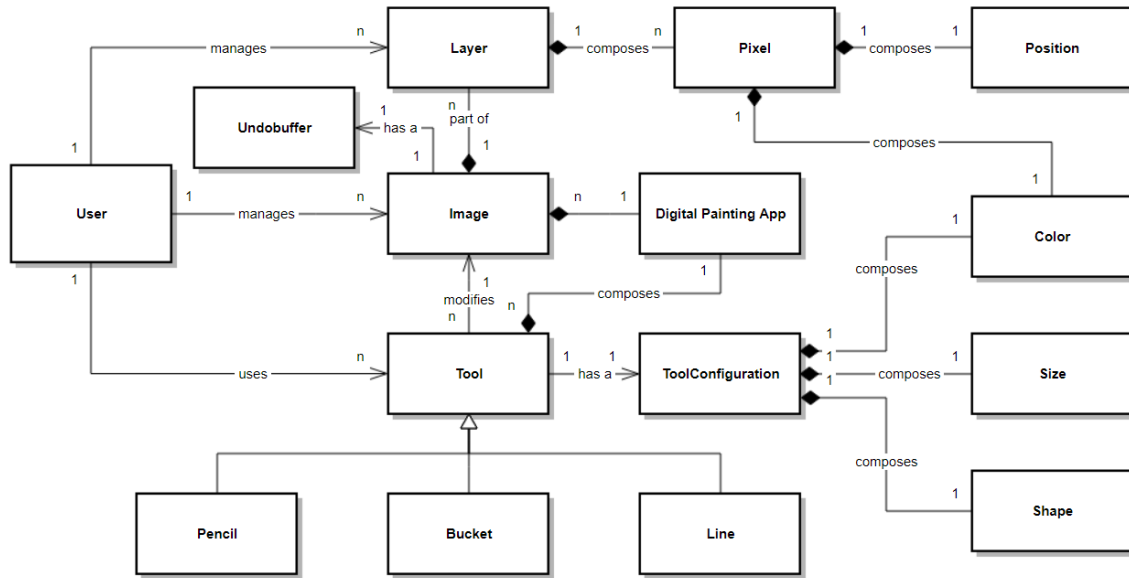


Figure 2: Domain model

3.1 Class responsibilities

Class: Digital Painting Application

Responsibility: The raster graphics editing application's responsibility is holding all the classes.

Class: Image

Responsibility: Containing the canvas on which the user edits. The image calculates the rendered canvas which is the result of all layers combined. It is also responsible for allowing the user to undo actions made on the canvas.

Class: Tool

Responsibility: An abstraction of all tools. Used for editing the canvas. Has a tool configuration which specifies the color, shape and size of the tools.

Class: Tool Configuration

Responsibility: Storing the color, size and shape of the tools.

Class: Pencil

Responsibility: Functionality for drawing pixels on the canvas with pixel perfect precision.

Class: Bucket

Responsibility: Functionality for filling an area of pixels on the canvas.

Class: Line

Responsibility: Functionality for drawing a perfectly straight line on the canvas.

Class: Position

Responsibility: Allows the pixels to be arranged in a certain way.

Class: Layer

Responsibility: Allowing the user to edit on several individual layers which together result in a canvas.

Class: Undobuffer

Responsibility: Containing old states of the canvas which the user can revert to by using undo function.

Class: User

Responsibility: The user which gives input to the application to create or edit an image.

Class: Pixel

Responsibility: Consists of a position and color which allows the canvas to be composed of colors arranged in a certain way.

Class: Color

Responsibility: To allow the user to edit the canvas using different colors and opacity.

4 References

Not applicable.