CS348 Software Engineering Course

PAINT APPLICATION

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1. **INTRODUCTION**
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1.INTRODUCTION

This Software Requirement Specification (SRS) Document describes an android/web application that provides children to draw, paint, and create their own art along with having fun**.**

1.1 PURPOSE

The purpose of this document is to build an offline painting application to aid children to develop their mobility and creativity skills.

1.2 DOCUMENT CONVENTIONS

The format specified by IEEE was followed while creating this document.
User: Person interacting with the application
SRS: Software Requirements Specifications
APK : Android Package

1.3 INTENDED AUDIENCE AND READING SUGGESTIONS

This project is a prototype of the paint application for children of five to nine years age. The intended audience for this SRS is Professor Samit Bhattacharya, who is in charge of the CS-346: Software Engineering course.

1.4 **PROJECT SCOPE**

The software that this SRS specifies is the Creative Paint (CP) Application. Its goal is to create a convenient and easy-to-use application for children, trying to have fun while drawing. Above all, we hope to provide a comfortable user experience.

1.5 **REFERENCES**

IEEE, IEEE Standard 830-1998 IEEE Recommended Practice for Software Requirements Specifications, IEEE Computer Society, 1998.

1.6 **OVERVIEW**

The remaining part of the SRS contains:
- a. The Overall Description and Functioning of the Software
- b. Specific Requirements:
  - i. Functional - defining the fundamental actions that the software incorporates in accepting and processing the inputs and corresponding outputs.
  - ii. Non-Functional - software system attributes that are used to judge the operation of the system.

2. OVERALL DESCRIPTION

2.1 **PRODUCT PERSPECTIVE**

The product described in the document is a Paint App. It is a stand-alone Android application that can be launched after installing via a standard freely-distributed APK file. The product is envisioned to give children of the age group 5yrs to 9yrs a platform to explore their creative skills. It aims to provide a user friendly experience to them. Equipped with two different modes: 1)Game Mode 2)Practice Mode, the paint app offers a wholesome experience to art lovers.

2.2 **PRODUCT FUNCTIONS**

Functions included in the final app will be as follows:
1. Paint App Start Menu
2. Practice Mode
3. Game Mode
4. My Work
5. Inspiration

2.3 **USER CLASSES AND CHARACTERISTICS**

Information regarding users who can use the app:

1. Our app is targeted mainly for children between age range 5-9 years.
2. Children who just wanted to play for fun of any age.
3. Children who wanted to develop their art skills starting from basic levels.

The intended users for the product will have the following characteristics:
1. Able to understand the functioning and operation of the software on a basic level.
2. Able to afford and use a mobile app following the minimum hardware and software requirements.
3. The user is able to understand English.
4. The users of all ages can use our app.

2.4 OPERATING ENVIRONMENT

Our app will work on an android device with at least 512 MB RAM.

2.5 ASSUMPTIONS AND DEPENDENCIES

Performance of the app will depend on hardware configuration of device and operating system in use.

Assumptions:

1. Device uses Android 5 or higher / API level 24 or higher.
2. Touch screen

3. FUNCTIONAL REQUIREMENTS:

R 3.1 **Paint App Start**
- Input: App Icon
- Output: List of modes //List Of Options
- Description: When user starts the app, the main menu appears on the screen. Main menu consists of options like practice mode, game mode, my work and motivation.

R 3.1.1 **Practice Mode**
- Input: Practice mode
- Output: List of modes //List of options
- Description: Practice moder offers two options: Free Style and Image Practicing

R 3.1.1.1 **Freestyle Mode**
- Input: Freestyle mode
- Output: Drawing board layouts
- Description: User is prompted to select a drawing board from different choices to practice his/her skills.

R 3.1.1.1.1 **Drawing Board Layout**
- Input: Drawing board layout
- Output: Drawing board and Toolbox

Description: User selects a board from given alternatives. A toolbox along with white board appears.

R 3.1.1.1.1.1 **Toolbox**

Description:

R 3.1.1.1.1.1.1 **Pencil Tool**
Input: Size and Colour
Output: Pencil
Description: User can choose a pencil with a specified size and colour.

R 3.1.1.1.1.1.2 **Select Eraser**
Input: Size
Output: Eraser
Description: User can choose an eraser to clear the drawn image. He/She has the option to choose a size of the eraser.

R 3.1.1.1.1.1.3 **Brush Tool**
Input: Size and Colour
Output: Brush
Description: User can choose brush to draw an image. He/She has the option to choose a size of the brush

R 3.1.1.1.1.1.4 **Colour Fill**
Input: Colour & Image
Output: Coloured Image
Description: User can fill colour in an image. He/she has to choose a color and image in which they want to fill the colour.

R 3.1.1.1.1.1.5 **Select Shape**
Input: Type
Output: Shape
Description: User will be given different types of the shape to choose from. He/She will

R 3.1.1.1.1.1.6 **Undo**

Input: Image
Output: Image

R 3.1.1.1.1.1.7 **Save Image**
Input: Image
Output: Image Saved

R 3.1.1.1.1.1.8 **Share Image**
Input: Image
Output: Image shared

R 3.1.1.2 **Image Practicing Mode**
- Input: Image practicing mode
- Output: Drawing boards
- Description: User is prompted to select a drawing board from different choices to practice his/her skills.

R 3.1.1.2.1 **Drawing Board Layout**
- Input: A drawing board layout
- Output: Drawing board, Toolbox and default reference image.
- Description: User selects a board from given alternatives. A toolbox and white board, along with a default reference image appears.

R 3.1.1.2.1.1 **Image Selection**
- Input: An image
- Output: Drawing board, Toolbox and Image
- Description: User selects an image from given alternatives. A toolbox and white board along with a selected image appears.

R 3.1.1.2.1.2 **Toolbox**
Description:
R 3.1.1.2.1.1.1 **Pencil Tool**
Input: Size and Colour
Output: Pencil
Description: User can choose a pencil with a specified size and colour.

R 3.1.1.2.1.1.2 **Select Eraser**
Input: Size
Output: Eraser

Description: User can choose an eraser to clear the drawn image. He/She has the option to choose a size of the eraser.

R 3.1.1.2.1.1.3 **Brush Tool**
Input: Size and Colour
Output: Brush
Description: User can choose brush to draw an image. He/She has the option to choose a size of the brush

R 3.1.1.2.1.1.4 **Colour Fill**
Input: Colour & Image
Output: Coloured Image
Description: User can fill colour in an image. He/she has to choose a color and image in which they want to fill the colour.

R 3.1.1.2.1.1.5 **Select Shape**
Input: Type
Output: Shape
Description: User will be given different types of the shape to choose from. He/She will select the shape and it will appear on the board.

R 3.1.1.2.1.1.6 **Undo**
Input: Image
Output: Image
Description: User will use this option to revert back or undone the recent work done.

R 3.1.1.2.1.1.7 **Save Image**
Input: Image
Output: Image Saved
Description: Users will be able to save his work so that they can see it in future.

R 3.1.1.2.1.1.8 **Share Image**
Input: Image
Output: Image shared
Description: Users will be able to share their artwork on social media. //User has option

R 3.1.2 **Game Mode**
- Input: Game Mode
- Output: Multiple Levels //List Of Levels
- Description: Game mode starts. It is the game zone of the app where the user has many levels of the game to take part. The user can choose the current unfinished level or from the levels which the user has finished.

R 3.1.2.1 **Select a level**
- Input: Level
- Output: Drawing boards layouts
- Description: User is prompted to select a drawing board from different choices to practice his/her skills.

R 3.1.2.1.1 **Drawing Board Layout**
- Input: Drawing board layout.
- Output: White Board, Toolbox and default reference image.
- Description: User selects a board from given alternatives. A toolbox and white board, along with a default reference image appears.

R 3.1.2.1.1.1 **Toolbox**
Description:
R 3.1.2.1.1.1.1 **Pencil Tool**
Input: Size and Colour
Output: Pencil
Description: User can choose a pencil with a specified size and colour.

R 3.1.2.1.1.1.2 **Select Eraser**
Input: Size
Output: Eraser
Description: User can choose an eraser to clear the drawn image. He/She has the option to choose a size of the eraser.

R 3.1.2.1.1.1.3 **Brush Tool**
Input: Size and Colour

Output: Brush
Description: User can choose brush to draw an image. He/She has the option to choose a size of the brush

R 3.1.2.1.1.1.4 **Colour Fill**
Input: Colour & Image
Output: Coloured Image
Description: User can fill colour in an image. He/she has to choose a color and image in which they want to fill the colour.

R 3.1.2.1.1.1.5 **Select Shape**
Input: Type
Output: Shape
Description: User will be given different types of the shape to choose from. He/She will

R 3.1.2.1.1.1.6 **Undo**
Input: Image
Output: Image
Description: User will use this option to revert back or undone the recent work done.

R 3.1.2.1.1.1.7 **Save Image**
Input: Image
Output: Image Saved
Description: Users will be able to save his work so that they can see it in future.

R 3.1.2.1.1.1.8 **Share Image**
Input: Image
Output: Image shared
Description: Users will be able to share their artwork on social media.

R 3.1.2.1.1.1.9 **Submit**
Input: Image
Output: Rewards

Description: Image is processed and according to percentage of level completion, rewards are given.

R 3.1.3 **My Work**
- Input : My Work Mode
- Output : Images
- Description: In this section the user can see all the work he/she has saved in the past. All of his/her past paintings are present in this section.

R 3.1.3.1 **Delete Images**
- Input: Images
- Output: Dialogue Box
- Description: On clicking the delete option a dialogue box appears. It has two operation types which user can select: 1) Cancel 2) Delete

R 3.1.3.1.1 **Cancel Operation**
- Input: Cancel
- Output: "My Work" section
- Description: User will go one step back to My Work section where all his previous work is displayed hence cancelling the deletion.

R 3.1.3.1.2 **Delete Operation**
- Input : Delete
- Output : "My Work" section
- Description : If user selects the delete operation, image is being deleted and user will go one step back to My Work section

R 3.1.3.2 **Image Menu**
- Input: Image
- Output: List of operations
- Description: On long pressing an image, options for renaming, deletion and sharing of that particular image appears.

R 3.1.3.2.1 **Rename Image**
- Input: Image and Name
- Output: Renamed Image

- Description: After entering the preferred name for the image by the user, image name changed to that name for easier future references.

R 3.1.3.2.2 **Delete Image**
- Input: Image
- Output: Image deleted
- Description: On clicking the delete button of the image, a dialogue box appears to confirm deletion or not.

R 3.1.3.2.3 **Share Image**
- Input: Image
- Output: Image shared
- Description: On clicking the share button of the image, different options (whatsapp, facebook, instagram) to share that particular image appears.

R 3.1.4 **Inspiration**
- Input: Inspiration mode
- Output: Paintings
- Description: This section shows different drawable images to give an inspiration to the child and motivate him/her to draw. He/She can see different drawings by scrolling left and right. Images with drawing and its title appears.

4. EXTERNAL INTERFACE REQUIREMENTS

1. **User Interface**

   == Describe the logical characteristics of each interface between the software product andthe users. This may include sample screen images, any GUI standards or product familystyle guides that are to be followed, screen layout constraints, standard buttons andfunctions (e.g., help) that will appear on every screen, keyboard shortcuts, error messagedisplay standards, and so on. Define the software components for which a user interfaceis needed. Details of the user interface design should be documented in a separate userinterface specification.

2. **Software Interface**
   The game will run on all devices supporting Android 5.0(Lollipop) API 21 and above.

3. **Hardware Interface**
   The application has no designated hardware so there are no direct hardware interfaces.

4. **Communication Interface**
   Only communication interface is the internet. It allows the user to share his/her art on social media.

5. NON FUNCTIONAL REQUIREMENTS

1. **Performance Requirements**
   512MB RAM: Better and more RAM will help in loading the pages instantly.

2. **Availability**
   The system will be available for use whenever the user deems necessary 24/7. The system shall allow users to restart the application after failure of the app with the earlier user saved works and settings.

3. **Maintainability**
   The system will be updatable from software patches available through the App Store. Updates can be downloaded through the standard Android interface. Any discrepancies will be addressable by any developer as the coding will be done according to the coding standards of IEEE.

4. **Portability**
   Since the game is developed using the android studio, it will run on any android device and windows supporting android applications.
   The paint software can be used on any Android phone satisfying the minimum hardware/software dependencies as specified in this SRS document previously. Installation of this application can be done through the standard Android File Manager, and this application can be shared through an APK file between devices.

5. **Reliability**
   5.1 The software will be able to run 99% of the time when launched.
   5.2 There is a potential for errors relating to the state of the operating system that could prevent the game from launching (for example not enough resources available, etc.). The chance of such an occurrence is at most 1%.
   5.3 The application will stop running if sent to run in the background,

or the phone is accidentally powered off.
5.4 The system will not be prone to errors caused by unexpected input.

6. Usability

6.1 Contextual Inquiry (CI)

One member from our team observed his 7 year old relative and another member did for his 9 year old neighbour.
We set up our contextual enquiry in the following format. One of the contextual inquiry can be considered as active and another one as passive.

1. Plan
   One of the sessions was physical and the other one was a recorded one.
      The goals of the session are planned as below:
         a. How do children learn to draw ?
         b. Main difficulty faced in drawing ?
         c. Preferred way of learning art by child ?
         d. How interested or enthusiastic is the child about art ?

2. Initiate
   We took permission from our relatives regarding taking the feedback from their children. We had set up sessions of about 90 minutes each where the children did not formally know   about it. The overall environment of the child was not disturbed and the interaction was casual yet professional.

3. Execute
   Recording the observations
   Asking relevant queries and clarifications

Patterns/Areas	Child A	Child B
Context of use	Primarily for school work, not interested in art in general	Keen interest in art, uses this as a leisure and hobby activity
Pain points and issues in physical drawing	Not getting hooked to it, difficulty in learning because of handling of	Difficulty in handling material

Imagination and creativity	Good at imagining	He faces difficulty in drawing completely on his own, picks up quickly with reference images
Interest and Enthusiasm	Not much enthusiasm in drawing as such in traditional method	Very much excited and enthusiastic about new prospects
Parents interference and support	Parents do not want to give exposure to smartphones at this age.	Parents do not have time to monitor whether their child is learning properly.
Software, Applications	Uses smartphones under parents guidance.	Uses various applications and is quite familiar with digital entertainment as well as learning

4. Close
We thanked them for their cooperation and giving their ideas and suggestions regarding art.

5. Reflect
Analyzing the data generated through Affinity diagram

Exposure to Technology	Access to materials	Time devoted in drawing	Motivation to complete levels	Inspiration from peer works	Parent Reluctant
Save drawing for future use	Storage Difficulties	Problem using complex apps		Rewards and appreciation	Easy to modify saved work
Fond of different types of artworks	Lack of interest	Need to be creative	Absence of art teacher	Fond of sharing good art	Difficulty in using toolbox
Cost effective learning	Imagination problem	Self learning	Likes Gaming	Better interface for drawing	Self-motivated
Pain in initial setup	Drawing generally difficult		Issues in filling colors	Systematic structure of learning	

Motivation: Rewards and appreciation, Likes Gaming, Motivation to complete levels, Fond of different types of artworks, Imagination problem, self-motivated

App Usability: Problem using complex apps, Difficulty in using toolbox, Better interface for drawing, Issues in filling colors, Drawing generally difficult

Future Use: Save drawing for future use, Storage Difficulties, Easy to modify saved work

Learning: Exposure to Technology, Absence of art teacher, Self Learning, Need to be creative, Systematic structure of learning

Sharing with Others: Inspiration from peer works, Fond of sharing good art, Lack of interest

Traditional vs Modern : Pain in initial setup, Access to materials, Cost effective learning, Parent Reluctant, Time devoted in drawing

Rough

- Pencils/Brush
    - Different Types
        - Markers
        - Wall spray
    - Thickness or Size
    - Opacity/Transparency
- Erasers
    - Different sizes
- Color Selection Tool
    - Different Colors (Number of colors)
    - Different sizes
    - Using wagon wheel of RGB
- Shapes
    - Types Of Shapes
        - Rectangles, Circles, Polygons, Triangles
    - Allow resizing of the shape
- Rough Work/Stickers
- Colors Fill Bucket
- Image Selection Window
    - Level wise images to choose from
- Undo/Redo
- White Board
    - Will we be having a feature to change the color of the board?
- Images/Drawings for Inspiration

- Save/Download

Hierarchy

App :

Practice :

Freestyle :

Select the board:

Image practicing :

Select the board:

Game :

Select a Level (around 10 levels):

Select the board:

My works:

Motivation