*SIMPLE 2D CAD APPLICATION* Product Design Specification

Team: Insignia Version *<1.0>*

*02/11/2001*

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   1. PURPOSE OF THE PRODUCT DESIGN SPECIFICATION DOCUMENT

Our Product Design Specification document documents and tracks the necessary information required to effectively define architecture and system design in order to give the development team guidance on architecture of the system to be developed. The Product Design Specification document is created during the Planning Phase of the project. Its intended audience is the project manager, project team, and development team. Some portions of this document such as the user interface (UI) may on occasion be shared with the client/user, and other stakeholder whose input/approval into the UI is needed.

* 1. PROBLEM DEFINITION AND SOLUTION

2D CAD can be used across a wide range of industries such as automotive, aerospace, fashion and industrial design. Helps increase productivity of a designer. It is used to design Curves and figures in two-dimensional and is used for accurate creation of photo simulations.

CAD 2D is a free intuitive painting and drawing application designed for people of all skill levels, who love to draw

This is a very easy program to use to Create or Modify an existing picture useful for tablets or mobile phones and a wonderful drawing program for all ages to free your imagination and inner artist

1. **FUNCTIONAL SPECIFICATION**
   1. FEATURES
2. Assist with the design’s creation, modification, analysis, or optimization of a design.
3. Handling objects such as shapes (for now, circles, quadrilaterals and lines) and layout for different applications.
4. Designs can be copied and pasted easily from
5. Drafting views such as planes, sections, and elevations, designers can visualize completed design and make any amendments as needed.
6. Software is much faster than manual drawing methods, it also allows designers to explore different design options more efficiently.
7. Being able to insert commonly use components into a drawing greatly speeds up the drawing process while also removing the potential for errors.
   1. SYSTEM REQUIREMENTS:

**Operating System:** - Window XP of higher with latest updates installed

**Processor**: - 500Mhz or more

**Ram**: - 128 MB or more

**Graphic** **Card**: - At least 64 Mb or more

* 1. DETAILS OF SCENARIOS

Line:

There are numerous ways for drawing a line. There can be as follows:

1. Firstly, we can draw the line free handily just by selecting the line tool and draw the line wherever you want. Talking about another way we can define two points and there will be line created.

2. Mistakes that can occur while we are trying to draw line is that you drag your mouse pointer out of the screen the line will not be created and in case of the two points if the user enter wrong values.

3. While you drag the cursor out of the screen it will pop up the message that you have taken out the cursor out of screen and if you reach the end of the screen it will say that you have “Reach out of bound”.

4. You can retry the changes just by clicking on the undo/redo button.

**CIRCLE**

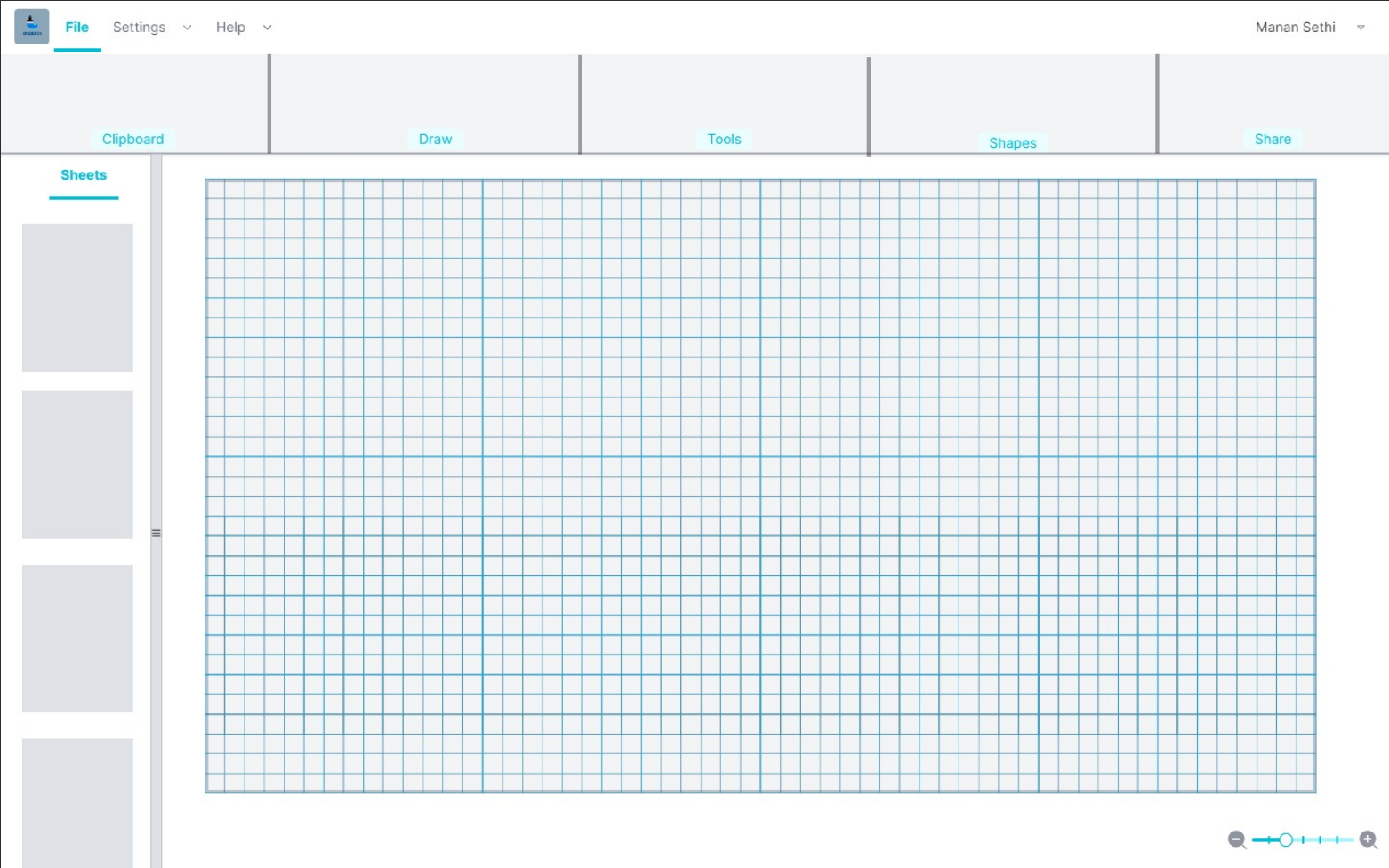
There are various user interactions possible for a circle.

First, we will be talking about how can we draw a circle in the application. So, there are 4 possible ways for the same. The first one being when we drag from one place and drag it down to the point where we want out circle to add. Basically, what we are doing is we are dragging the cursor and making a rectangle in which a circle will be filled. Next possible way will be we can specify a radius and a circle will appear with the same radius. Continuing further we can also draw circle by dragging the circle from the center to the corner of radius.

Next, talking about the mistakes that one can encounter the dragging can sometimes be quite large that the circle isn’t drawn. Also, there is a possibility that the radius entered by the user is quite large and the circle isn’t drawn.

The Expected messages for the error can be “There is no such circle possible”, or “There is an error! Please look carefully”.

1. **EXTERNAL USER INTERFACE**
   1. USER INTERFACE DESIGN

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1. **TECHNICAL SPECIFICATION**

* **Hardware detail**

Any dual core and higher processor

RAM greater than 64 MB

* **Operating System**

Window 7 and above

* **Performance**

Optimal performance as the app doesn’t requires much RAM,

* **Programming language and technologies**

IDE used -> Visual studio

Programming language -> C#

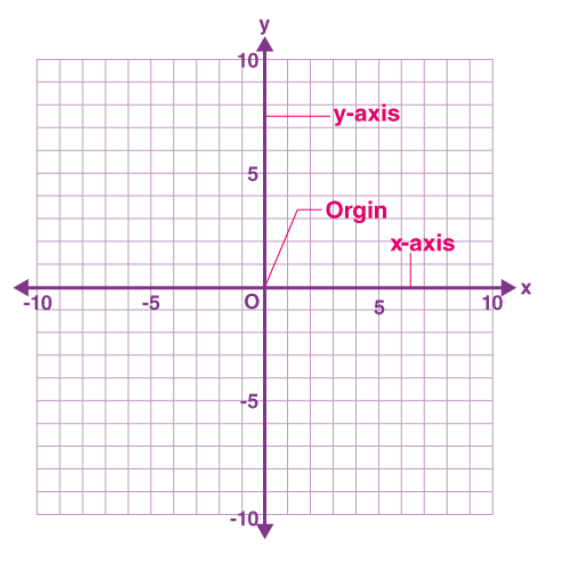
* **Version Control**

GIT version control

**Software Architecture:**

Cartesian plane:

The Cartesian plane to be made is to have four quadrants that are:



So that the origin that is the point (0,0) form the basis for all the other functions of the program to be specified, For an instance creation of a line requires two points to be used, Therefore both the points, if given vertices can find the exact length of the line, Area and perimeters of different figures to be used. Now here come the part of Full flagged geometric knowledge.

Point Snap:

The vertex of the mouse at any point in the Cartesian plane should be provided and shown either in a hovering box or at a status bar to be made at the bottom of the UI, to the X and Y coordinates of the point snap.

These points are further to be used in making of other figures whose functions are detailed below in the coming points.

Line:

Simple Line: A line can be created using two points. First point can be used as a starting point and further use the second point to use as the ending point of the line.

Multipoint Line: A multi-point line can be created by clicking on different points and the line should be automatically joint to make a connected of semi connected figure.

Drawing a Circle:

A Circle can be drawn by various means by the end user. Some of such methods are:   
1. Center Radius Circle: In this making of circle 1st point is to be taken as the center of the circle in the Cartesian plane. Now the other point has to be taken as the length of the radius required.

2. Two point Circle: In this making of circle 1st point is to be taken as the first tangent to the circle in the Cartesian plane. Now the other point has to be taken as the Second tangent to the circle and can be also used to set the size of the circle.

As the current application proposed is a basic program with various possibilities, we are implementing a Center Radius Circle. Now as we are using the Cartesian plane we can now find the location of the points on the drawing.

Drawing a quadrilateral:

There are different forms of quadrilaterals but the most common one used are to be given the privilege of easy creation in the program so the user finds it faster to draw images.

General quadrilaterals include:

1. Square
2. Rectangle
3. Rhombus

Now these above quadrilaterals are to be given certain shortcuts so as the user finds it easy to implement them in the drawing.

Other Shapes Even more than four sides can be implemented using a multi-point line.

Eraser: An eraser should be the part of the program so as to make the user free to draw and delete any part of the drawing.

Size Constraint for brush size and Eraser: There should be a universal or right click write size based mechanism so as to make the user enter the size of the brush as well as the eraser size to increase or decrease the thickness.

Select Tool: A select tool should be available in the system tray so as to select the part of the drawings that can be moved of copied.

Copy/Cut: The program should be able to copy the selected part of the image in the system clipboard.

Paste: The program should have a clear capability to paste any type of image data, into the drawing. Whether it be a

Open Issues:

Color picker:

Now, it is currently not decided whether to implement a color filler. Whether picker to be used should be able to pick from the whole Screen Snapshot or only from the drawing.

Color filler: The filler should be able to fill the closed figures with the color specified.

Color Pallet: The color pallet is a drop down with different shades of colors available to change the brush color and filler.

**Success Matrix:**

The project is based on the general requirement of the people from different backgrounds, whether it be a Digital Painters, Architects, Business Professionals, Photographers, Engineers whether they be from Civil, Graphics Designers, Computer Engineers or from most other fields, the proposed program is to provide overall basis for each and every image editing and creation.