1 Introduction

1.1 What is eCAD?

Figure 1: eCAD logo

eCAD is a fully comprehensive 2D CAD application that you can download and install for free. It is available for major operating systems which includes Microsoft Windows and Linux. It is available in more than 20 languages and for major operating systems which includes Microsoft Windows and Linux.

The app is great for industrial designers, but anyone who wants to learn how to make 2D CAD drawings will like this program. For a free software, eCAD gives you a lot of tools to work with. New users will be able to create basic drawings, while advanced users can make engineering plans with the software.You can start drawings from scratch. But it is also easy to put in ellipses, arcs, lines and circles. eCAD also has a powerful zoom tool that lets you look at models at dierent distances. This is essential for designers who are going to make life size copies of a drawing. eCAD also has grids which are extremely useful for those new to CAD. Once you have made the basic object, you can customize it in many ways. Scaling is particularly easy here. Also Dimensioning which is must in every CAD software is there. We can calculate the distance between two points and can get the size of the object. Here, its worth mentioning about snapping part. We can have snapping to grid, center etc. One if wants to work by writing a code can do so in scripting feature. You can download and install eCAD freely, with no fear of copyright infringement.

1.2 License

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Figure 2: GPLv3

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Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it eectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

2 Installation

To access the eCAD we need to follow few steps. There are also basic requirements which we need to have to run eCAD. As it works onn both Windows and Ubuntu. So we have dierent process for both.

2.1 For Linux

1. Downloading
   - Install Qt libraries using sudo apt-get install qtdeclarative5-dev qt5-default
   - Download zip folder of eCAD or clone it from https://github.com/GreatDevelopers/eCAD
2. Installing
   - cd eCAD
   - qmake
   - make
   - ./eCAD

2.2 For Windows

1. **Downloading**: Download zip folder of eCAD from https://github.com/GreatDevelopers/eCAD
2. **Installing**: Install Qts latest version available with mingw compiler from Qts official downloads. After installation launch Qt creator load eCAD.pro, from the build menu select Build Alland Run.

3 Interface

3.1 Menubar

In eCAD we have menubar. In menubar it contains different menu items and sub menuitems. Each menuitem has its own specific requirement and advantage. Each menu item is described as below:

Figure 3: Menubar

1. **File Menu**: It contains following submenus.
   - New: On clicking this menuitem we can create a new document. The shortcut key to is Ctrl+N
   - Open: This is used to open a file which was already saved, so that we can edit that file as per user requiremenet. The shortcut key is Ctrl+O
   - Save: On clicking this we get our file save in xml format. The shorcut to this is Ctrl+S
   - Save As: When one wants to save the file with different name. He/She can do so with Save As functionality. The shorcut to it is Ctrl+Shift+S
   - Import: Using this one can import the file from outside souce. One can import jpg and png images in eCAD
   - Export: Also once file is made need to be exported. In eCAD one can export the file in the pdf, jpg and png format.
   - Close: On clicking this the current document gets close.
   - Print preview: Before printing user may want to view the file to print. This can be done by clicking on it or by pressing Ctrl+Shift+P
   - Print: To print the file click on it or press Ctrl+P.
   - Quit: To quit or close the software click on it or press Ctrl+Q
2. **Edit Menu**: It contains following submenus
   - Cut: To cut the item click on this or press Ctrl+X
   - Copy: To copy the item click on this or press Ctrl+C
   - Paste: To paste the item click on this or press Ctrl+V
   - Undo: To Undo click on it or press Ctrl+Z
   - Redo: To Redo click on it or press Ctrl+Shift+Z
3. **View menu**: It contains following submenus
   - Grid: On clicking this Grid appears and disappears
   - Zoom In: On clicking this the view gets zoom in
   - Zoom out: On clicking this the view gets zoom out
   - Panning: One can move the screen using this feature

- Status Bar: This shows the current screen position and also what to do next after clicking on entities.
- Tool Bar: It futher have submenus for toolbar, scripting widgets and console mode.

4. **Select**: It contains following submenus
   - Select all: This will select all the entities
   - Deselect all: This will deselect all entites
   - Select Window: This will select full window
   - Select entity: This will allow to select one entity
   - Deselect window: This will deselect window
   - Invert Selection: This will invert the selection.
5. **Draw**: It contains following submenus
   - Points: It is used to add points.
   - Line: It is used to draw Line
   - Circle: It is used to draw Circle
   - Ellipse: It is used to add the ellipse
   - Arc: It is used to add the arc
   - Text: It is used to add the text
   - Image: It is used to add the image
6. **Modify** : It contains following submenus.
   - Delete selected: It will delete the selected items.
   - Delete entity: It will delete the single entity.
7. **Dimension**: It contains following submenus
   - Horizontal: It will add the horizontal dimension.
   - Vertical: It will add the vertical dimension.
8. **Snap**: It contains following submenus
   - Free: It will be free snap.
   - Grid: It will be for snap to grid.
   - Center: It will be for snap to center
   - Middle Points: It will be for snap to mid points
   - End points: It will be for snap to end points
9. **Help**: It contains following submenus
   - Manual: It will open the manual of the eCAD.
   - About: It will about page of eCAD.

3.2 Toolbar

Figure 4: Toolbar

Toolbar contains the shortcut of the various items in menubar. Like new, open, save, close, undo, redo etc. There are two toolbar standard toolbar and main toolbar.

1. **Main Toolbar**

 This creates a new Document.

 This opens a document.

 This saves a document.

 This cuts the selected entity.

 This copies the selected entity.

 This paste the entity at the position.

 This undo the previous action.

 This redo the previous action.

2. **Standard ToolBar**

 This will create points

 This will create line

 This will create circle

 This will create ellipse

 This will create arc

 This will create a box to insert text

 This will insert image

3.3 Working Space

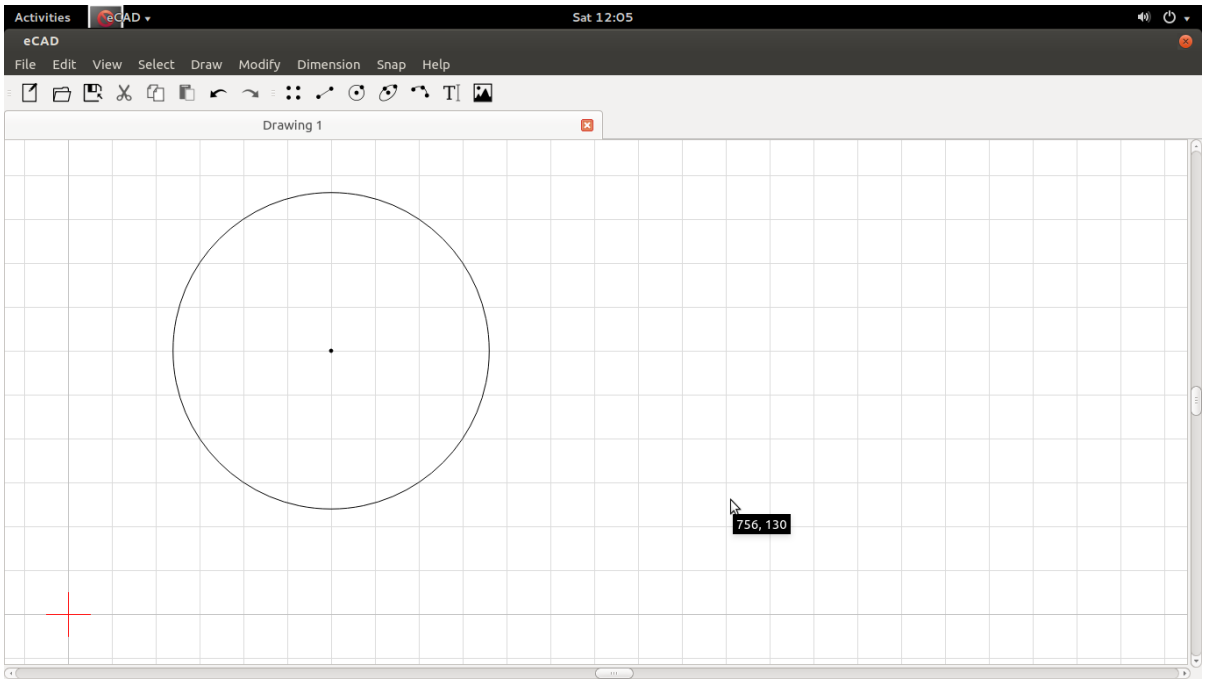


Figure 5: Working Space

This is the working space where all the entities are drawn. We can increase or decrese the working area by closing or opening the widgets like scripting console and status bar. At present the are closed. This is the maximum area one will get to work. One can also make more than one document so that he/she can work easily. All depends upon user need.

3.4 Scipting Console

In scripting console user can write the script/code to draw the drawing. So this feature is effective for technical user, who is excited and want to code. The code for each entity is very simple. There are different icons of in scripting. Each have its different meaning.

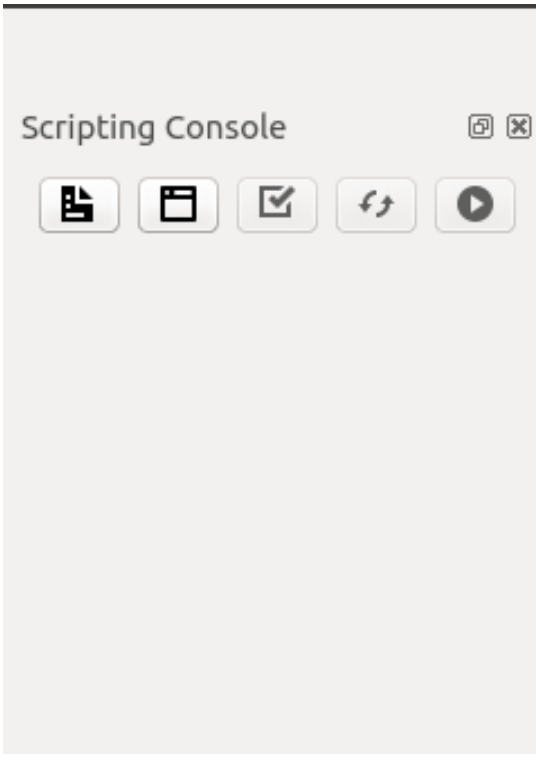


Figure 6: Scripting console

 This will create a new document in scripting console.

 This will load an existing script

 This will save the script which is written.

 This will clear the existing script.

 This will execute the current script.

3.5 Status Bar

Figure 7: Status Bar

The status bar tells us aout two things

- Current screen position
- What to do next while making an entity through UI part.

4 CAD documents

4.1 Creating a new document

There are different ways in which we can create a new document. Either from the file menu, from toolbar or by using the shortcut keys.

1. **From File Menu**: Go to File then New a new document will be created.

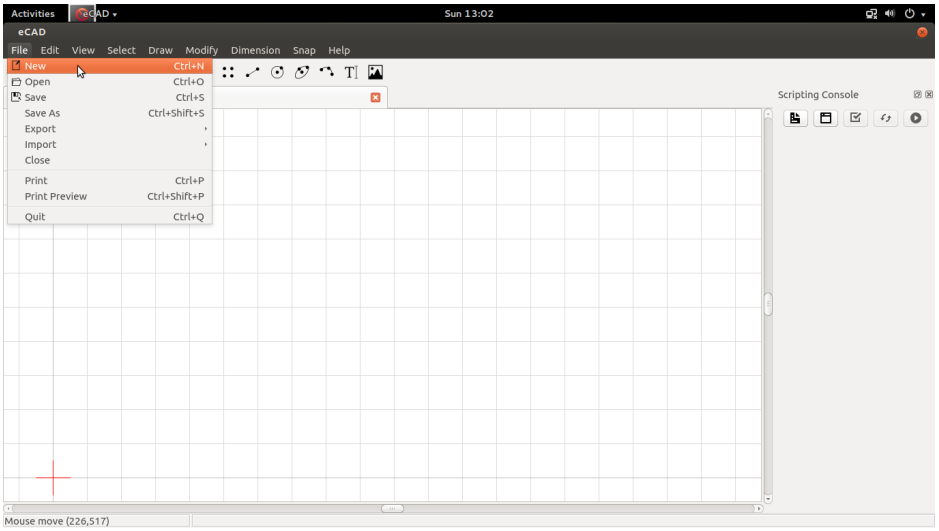


Figure 8: New Document from file menu

2. **From toolbar**: Click on the icon for new document. It will be created

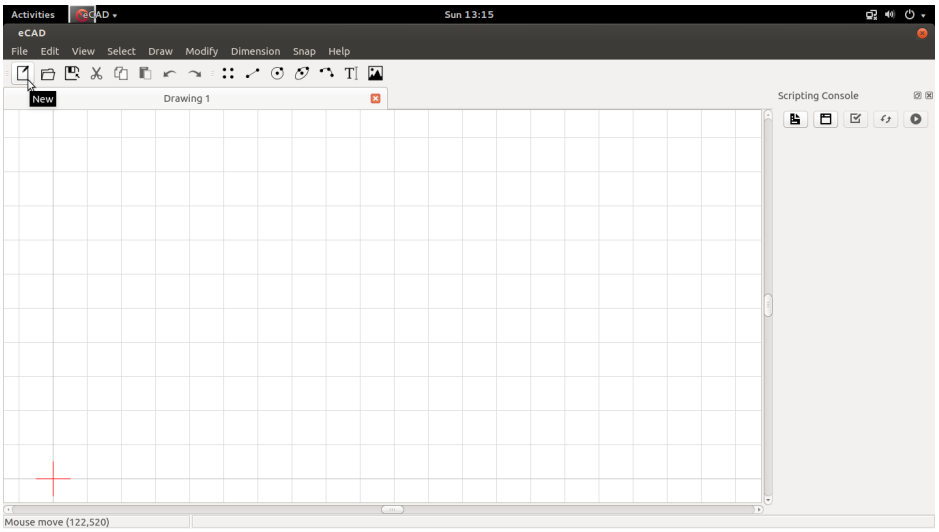


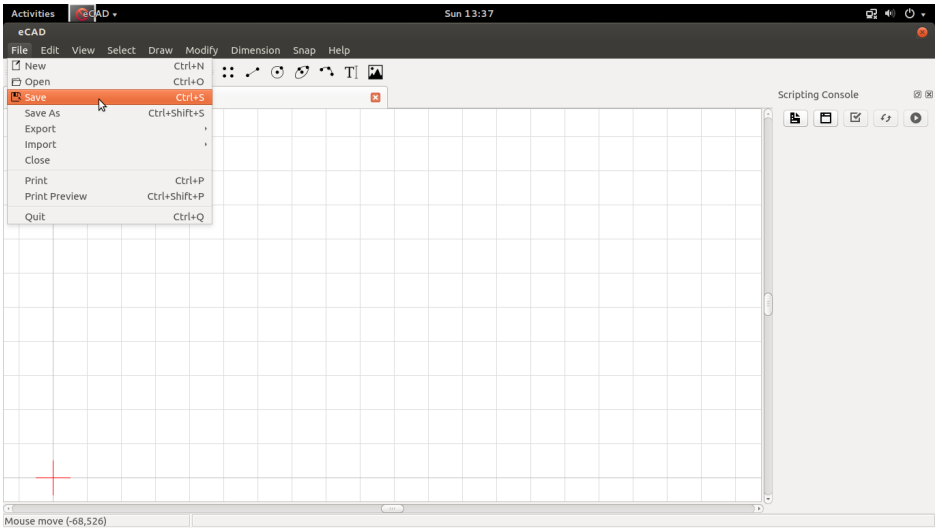
Figure 9: New Document from toolbar

3. **From Shortcut**: Press Ctrl+N a document will be created.

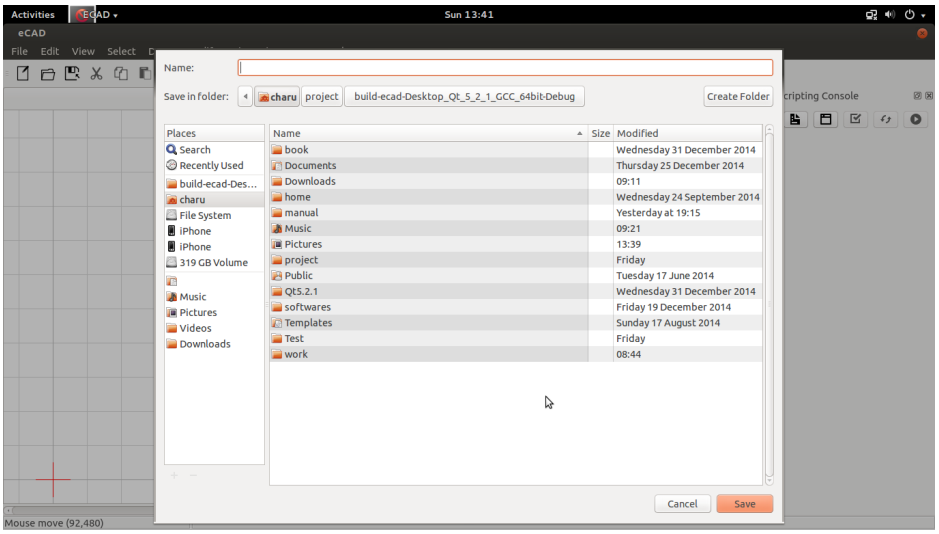
4.2 Saving a Drawing

We can save the drawing either from file menu or by using shortcut.

1. **From File Menu**:



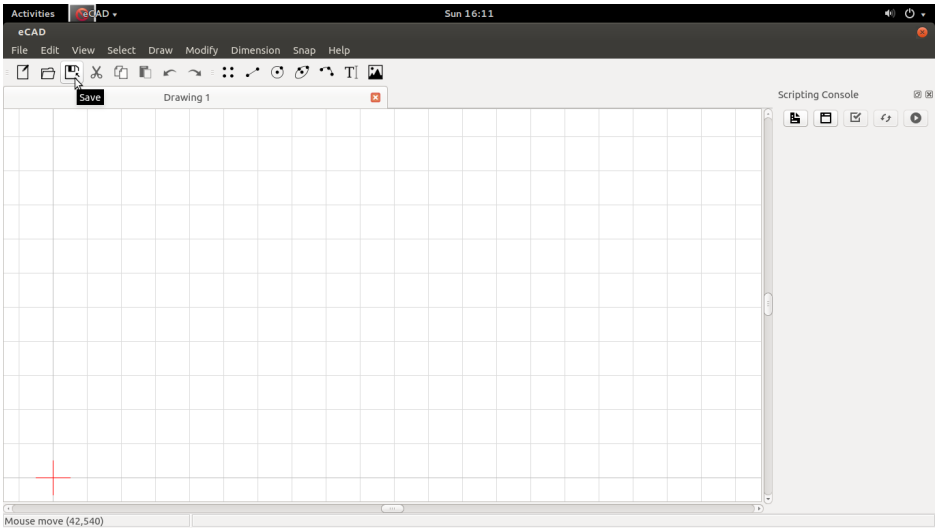
Click File then Save



A dialog box will open then click save.

2. **From Toolbar**: Click on the icon in the toolbar to save the file a dialog will open then click save to save he file.

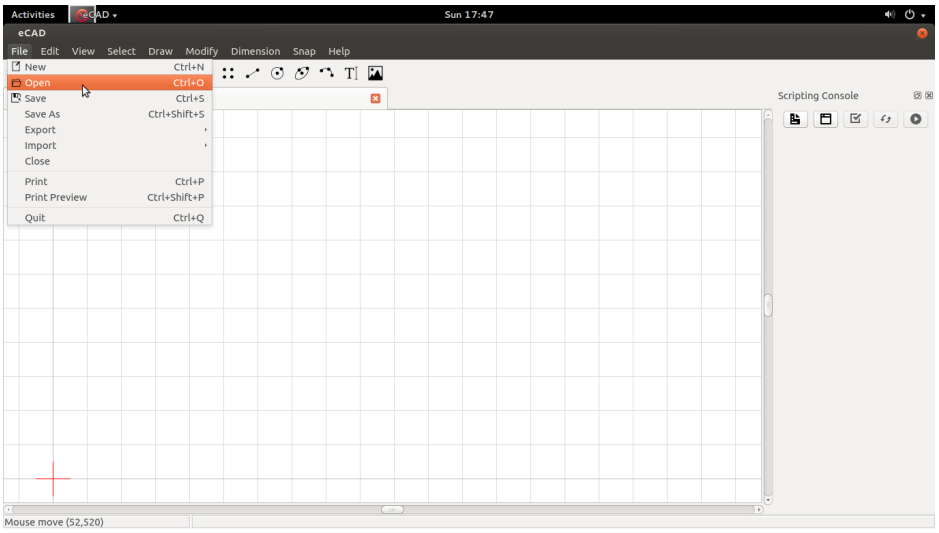
3. **From Shortcut**: Press Ctrl+S to save the file.



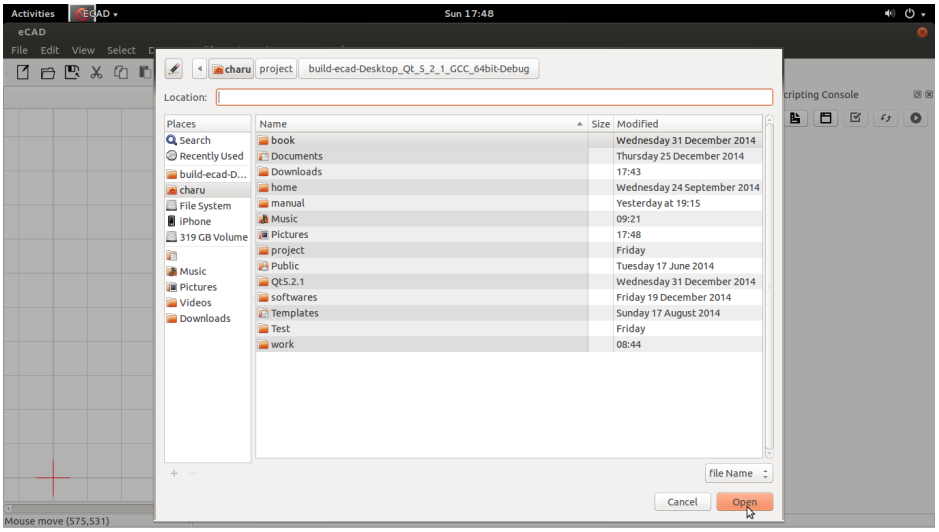
4.3 Opening a Document

We can open the Drawing from menu bar, tool bar or by using shortcut.

1. **From File Menu**:

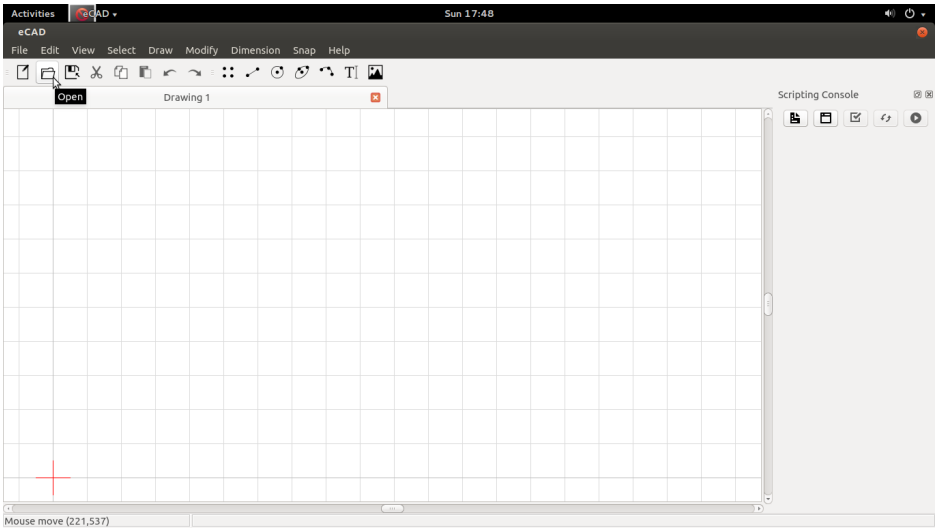


Click File then Open



A dialog box will open then click open.

2. **From Toolbar**: Click on the icon in the toolbar to open the file a dialog will open then click open to view the file.



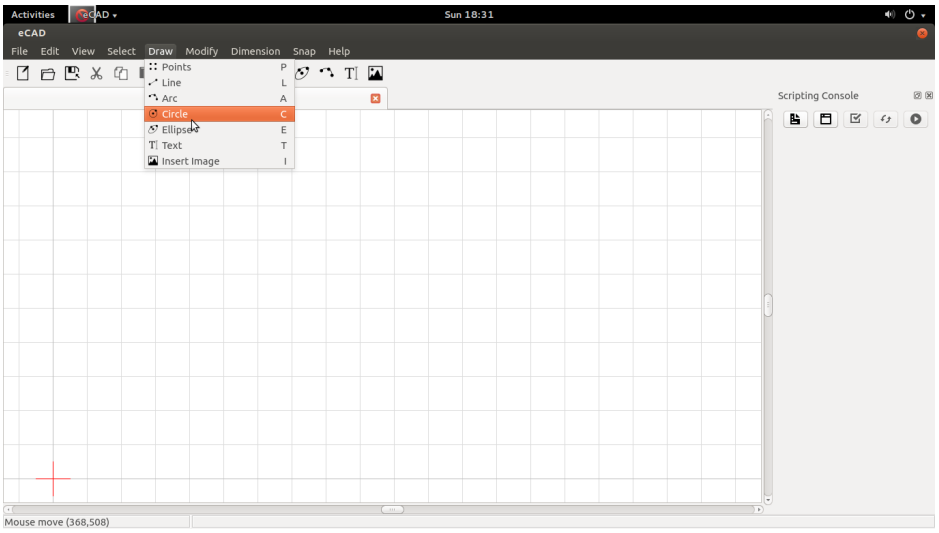
3. **From Shortcut**: Press Ctrl+O to open the file.

5 Creating Entities

There are various ways in eCAD to draw entities. One can draw entities using draw menu, toolbar, shorcuts or commands. Each way is explained in detail as follows:

5.1 Draw Menu

We can draw the each entity using draw menu whether its point, line, circle, arc, ellipse, text or image. The way for each entity is described below.



1. **Point**
   - Click on point in Draw menu
   - Then click anywhere on working space
   - This will create the point at that location.
2. **Line**
   - Click on line in Draw menu
   - Then click first point on working space.
   - Set the second point of line.
   - This will create the line at two points.
3. **Arc**
   - Click on arc in Draw menu
   - Click the start point of the arc
   - Then second click will create any point on the arc
   - Third click will create the end point of the arc
   - This will create our arc
4. **Circle**
   - Click on circle in Draw menu

- Then click on working area, this will create center point of arc
- Second click will create any point on the circle and using first and second click radius of circle is calculated
- This will create a circle.

5. **Ellipse**
   - Click on point in Ellipse menu
   - Then click on graphics view this will create a center point of ellipse
   - After second click minor radius is calculated
   - After third click major radius is calculated
   - Finally ellipse is calculated
6. **Text**
   - Click on text in Draw menu
   - Then click anywhere on working space
   - This will create a text box in which we can enter the text
7. **Image**
   - Click on image in Draw menu
   - A dialog box will open, select an image to be inserted in it.
   - Then set the image where you want to set.

5.2 Toolbar

Also we can draw the entities using the toolbar. The entities are in standard toolbar.

1. **Point**

   - Click on above icon in toolbar
   - Then click anywhere on working space
   - This will create the point at that location.
2. **Line**

- Click on above icon in toolbar
- Then click first point on working space.
- Set the second point of line.
- This will create the line at two points.

3. **Arc**

- Click on above icon in toolbar
- Click the start point of the arc
- Then second click will create any point on the arc
- Third click will create the end point of the arc
- This will create our arc

4. **Circle**

- Click on above icon in toolbar
- Then click on working area, this will create center point of arc
- Second click will create any point on the circle and using first and second click radius of circle is calculated
- This will create a circle.

5. **Ellipse**

- Click on above icon in toolbar
- Then click on graphics view this will create a center point of ellipse
- After second click minor radius is calculated
- After third click major radius is calculated
- Finally ellipse is calculated

6. **Text**

   - Click on above icon in toolbar
   - Then click anywhere on working space
   - This will create a text box in which we can enter the text

7. **Image**

   - Click on above icon in toolbar
   - A dialog box will open, select an image to be inserted in it.
   - Then set the image where you want to set.

5.3 Shortcuts

We can even create the entities using the shorcut keys.

1. **Point**
   - Press P.
   - Then click anywhere on working space
   - This will create the point at that location.
2. **Line**
   - Press L
   - Then click first point on working space.
   - Set the second point of line.
   - This will create the line at two points.
3. **Arc**
   - Press A
   - Click the start point of the arc
   - Then second click will create any point on the arc
   - Third click will create the end point of the arc
   - This will create our arc
4. **Circle**
   - Press C
   - Then click on working area, this will create center point of arc

- Second click will create any point on the circle and using first and second click radius of circle is calculated
- This will create a circle.

5. **Ellipse**
   - Press E
   - Then click on graphics view this will create a center point of ellipse
   - After second click minor radius is calculated
   - After third click major radius is calculated
   - Finally ellipse is calculated
6. **Text**
   - Press T
   - Then click anywhere on working space
   - This will create a text box in which we can enter the text
7. **Image**
   - Press I
   - A dialog box will open, select an image to be inserted in it.
   - Then set the image where you want to set.