6th of October University
Mechatronics Department
Fourth Level

MuCAD v3.0.0 User Manual

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MuCAD v3.0.0

Release Date: 15/12/2022

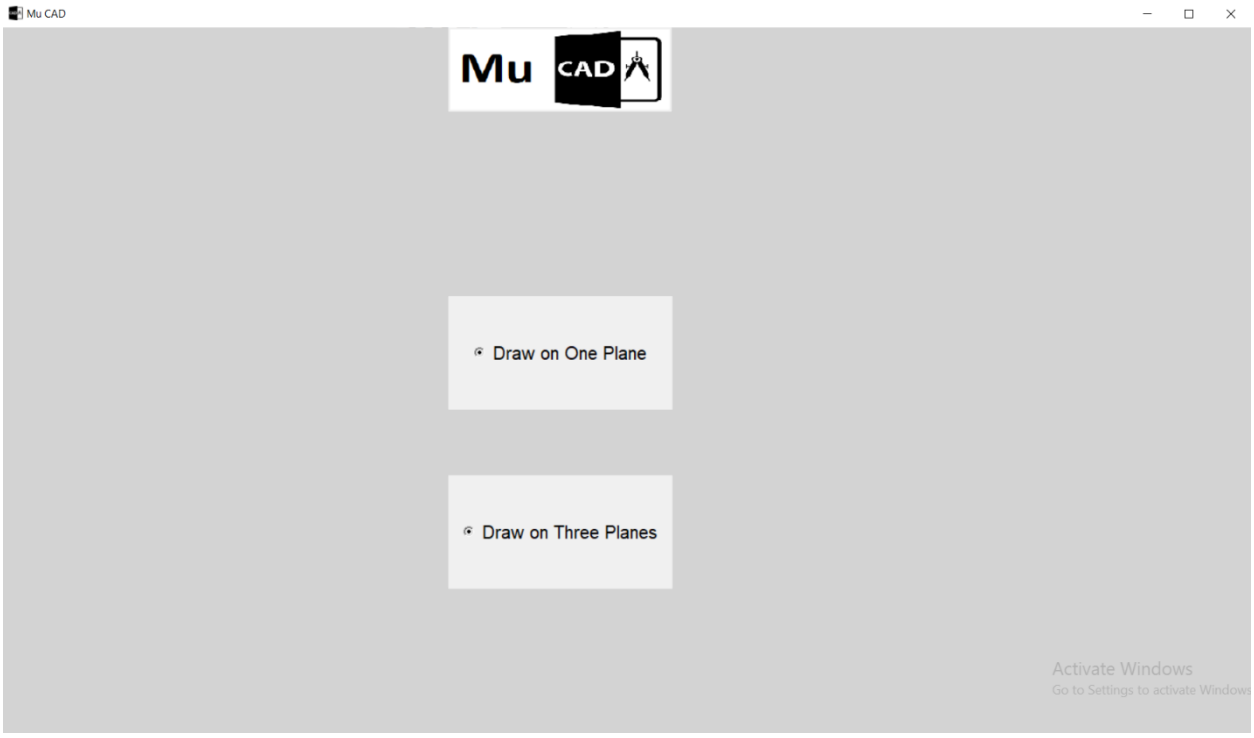
Contents

Updates

- One view is added besides the three orthographic planes (elevation, side, and top)
- 2D transformation is added (Rotate, Scale, and Translate)
- Extrude and Extrude Cut are added
- Data buffer is added to support other capabilities
- Extend the undo Buffer
- Export Dxf format besides the Gcode
- Drawing by mouse clicks rather than the input field entries

1. Plane Mode

In the beginning of the program, you can choose to draw on one orthographic plane or to choose to draw on three orthographic planes which are elevation, side, and top planes.

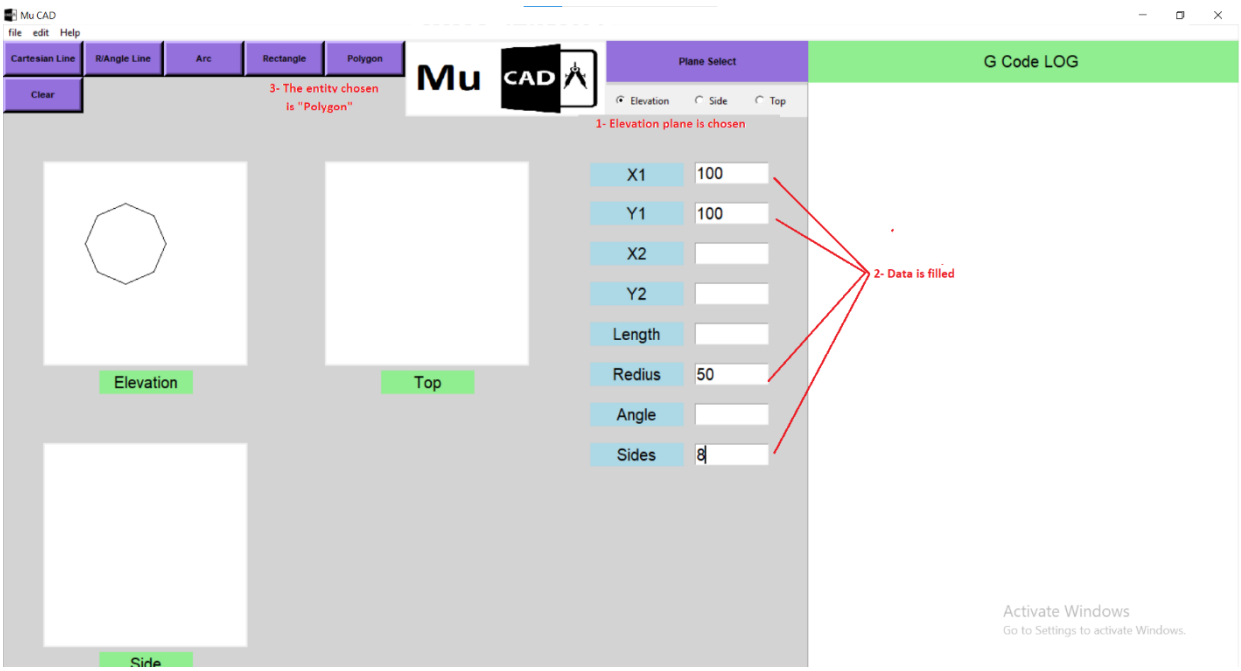


1.1 Three Orthographic Planes

Like the older versions, you can draw on three orthographic planes which are elevation, side, and top planes. All you have to do is to choose the plane to draw on and then, fill the data in the entry section and choose what you want to do (i.e. draw a line, arc, polygon, etc.)

- Draw Cartesian line: fill x1, y1, x2, y2
- Draw R/Angle line (Polar Line): fill x1, y1, Angle, Radius
- Draw Arc: fill x1, y1, Angle, Radius
- Draw Rectangle: fill x1, y1, x2, y2
- Draw polygon: fill x1, y1, Radius, Sides

Example: drawing a Polygon with eight sides (Octagon)



1.2 One Orthographic Plane

The rest of the manual is about this topic.

2. 2D Section

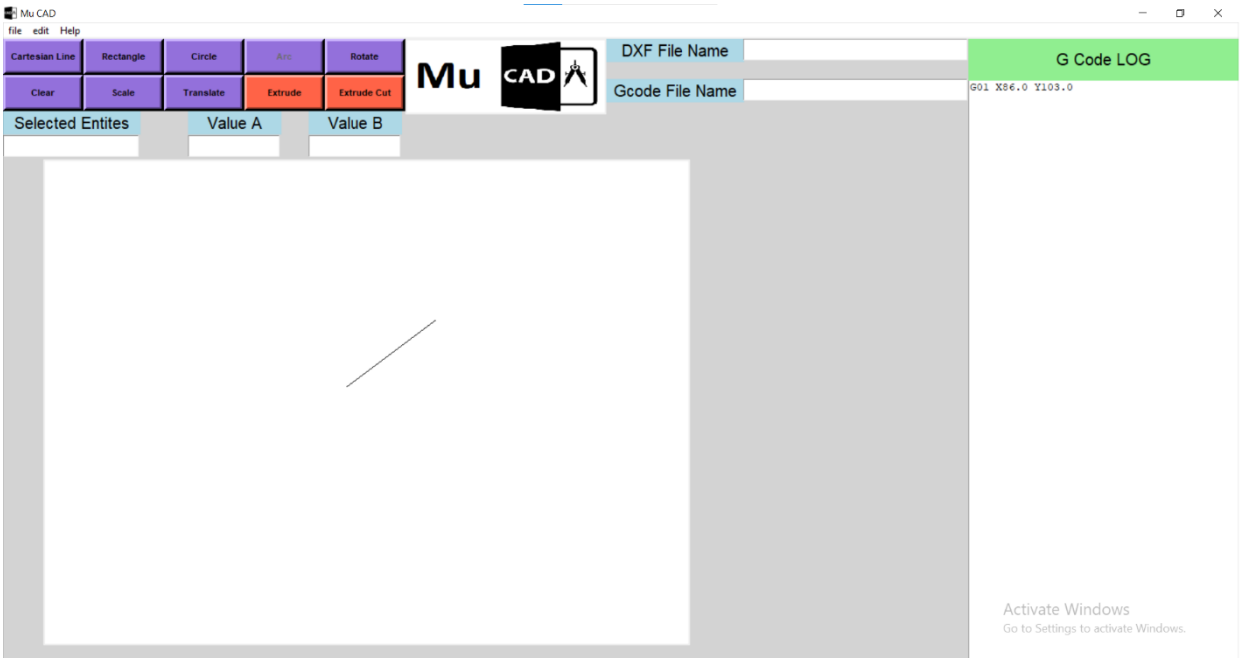
2D section contains line, circle, arc, and rectangle and rotations

2.1 Drawing a Cartesian line

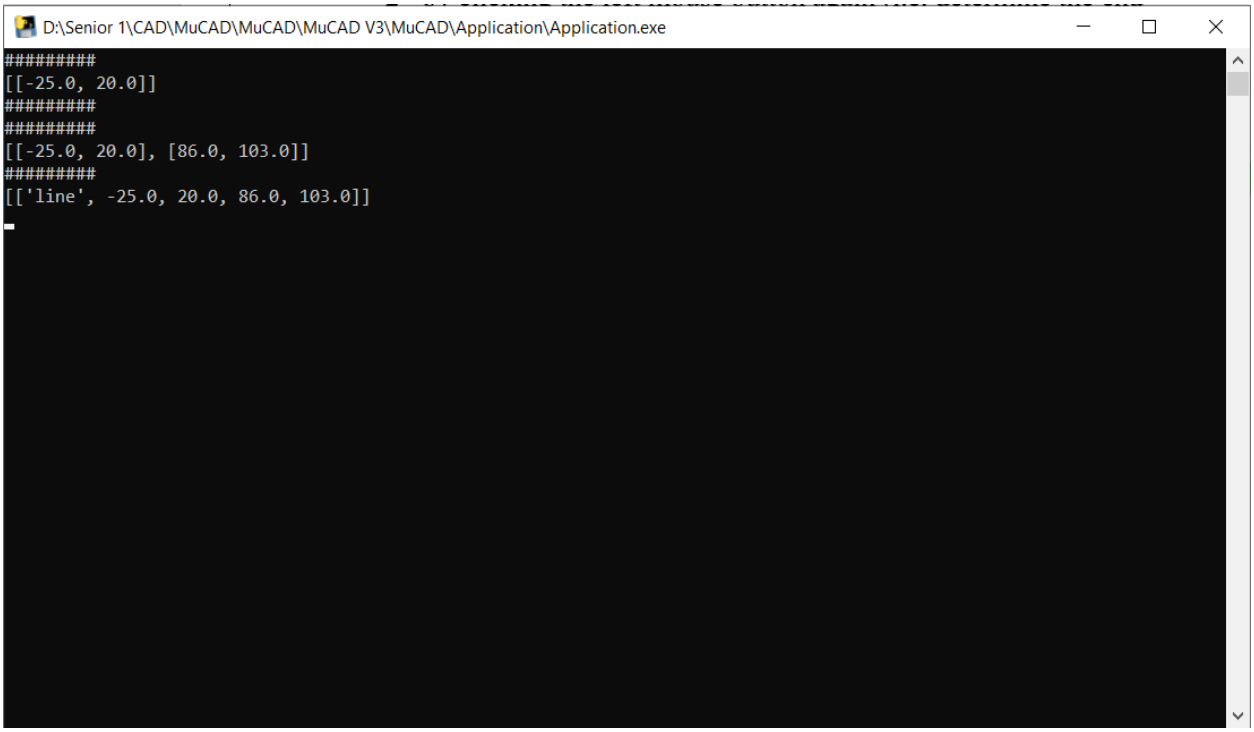
To draw a cartesian line you need start coordinates (x1, y1) and end coordinates (x2, y2).

Steps to draw a line:

1- by clicking the left mouse button (i.e. determine the start coordinates).
2- by clicking the left mouse button again (i.e. determine the end coordinates).
3- Lastly, click on Cartesian Line button.



NOTE: you can see the first coordinate and second coordinate and after the Cartesian line button is clicked the line is drawn and saved to the buffer in background command line window (CMD window).

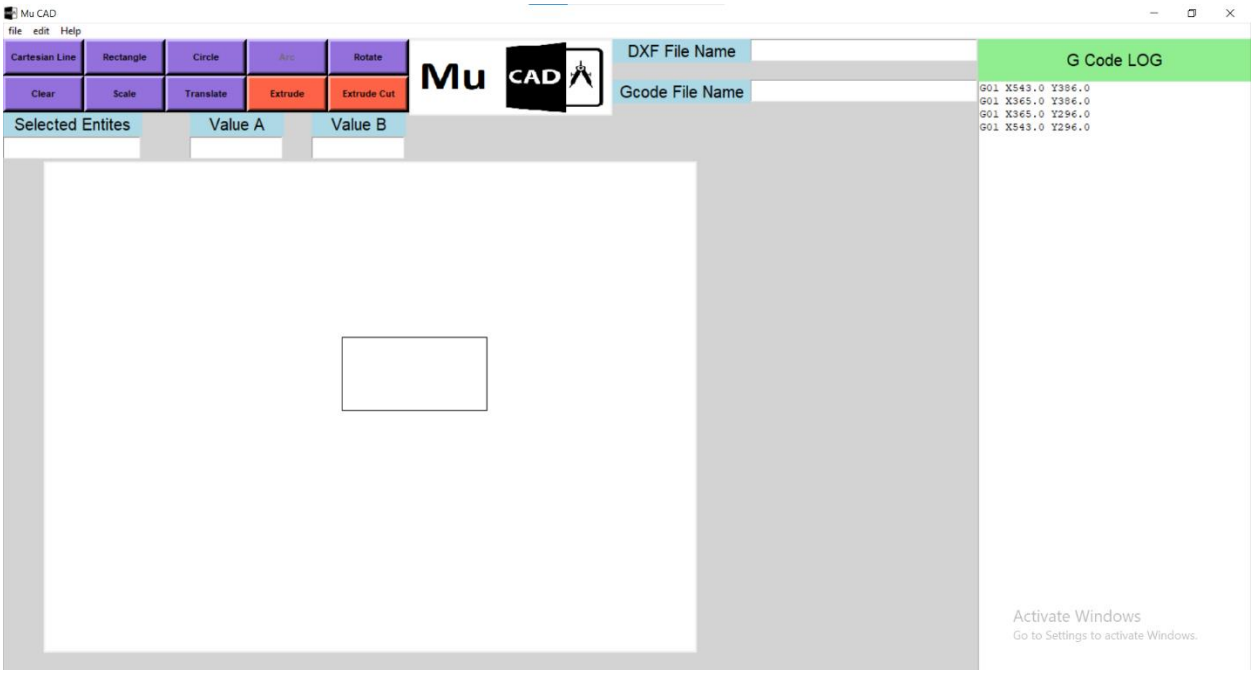


2.2 Drawing a Rectangle

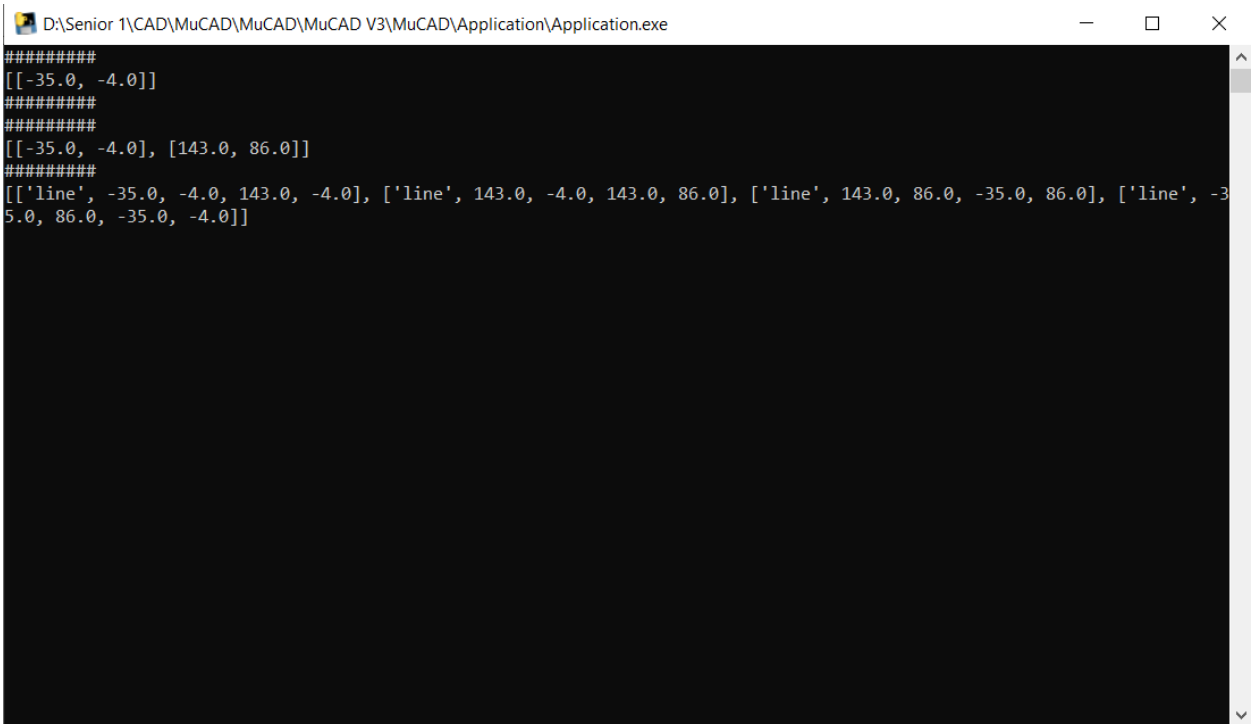
To draw a rectangle, you need start coordinates (x1, y1) and end coordinates (x2, y2). The rectangle is formed by four cartesian lines, so the rectangle is drawn by drawing a line which has coordinates of (x1,y1),(x2,y1), then another line with coordinates of (x2,y1),(x2,y2), then another line with coordinates of (x2,y2),(x1,y2), then another line with coordinates of (x1,y2),(x1,y1).

Steps to draw a line:

1- by clicking the left mouse button (i.e. determine the start coordinates).
2- by clicking the left mouse button again (i.e. determine the end coordinates).
3- Lastly, click on Rectangle button.



NOTE: you can see the first coordinate and second coordinate and after the Cartesian line button is clicked the four lines are drawn and saved to the buffer in background command line window (CMD window).

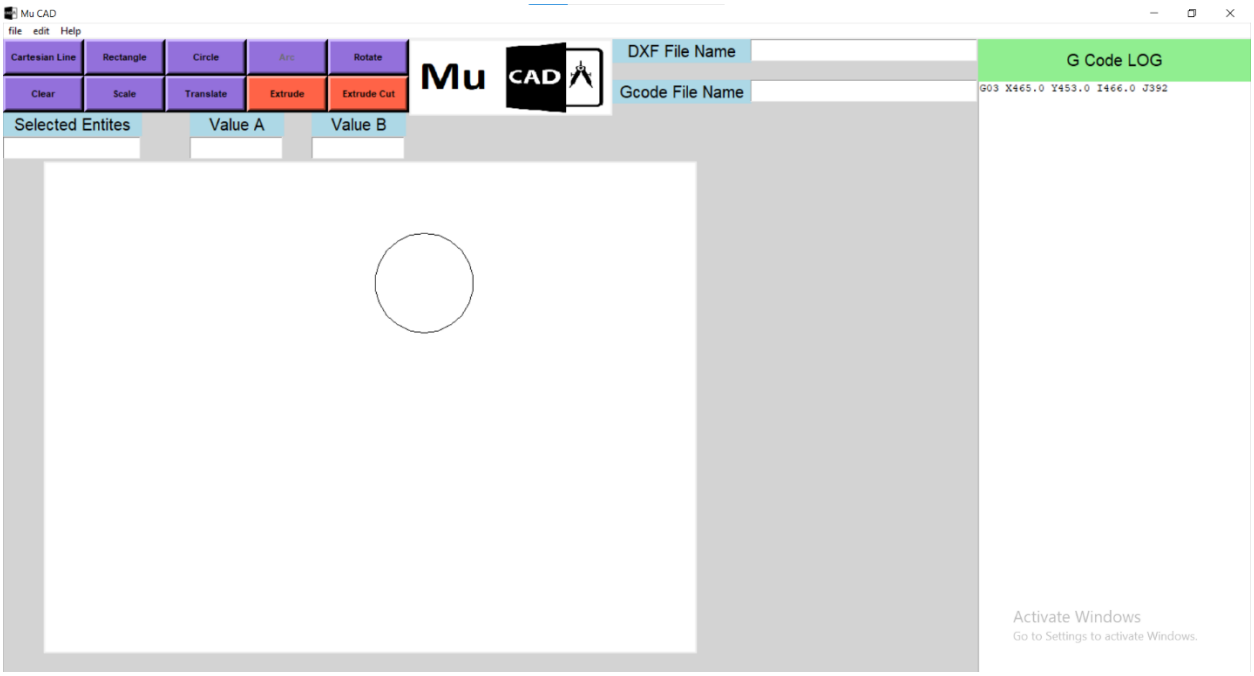


2.3 Drawing a Circle

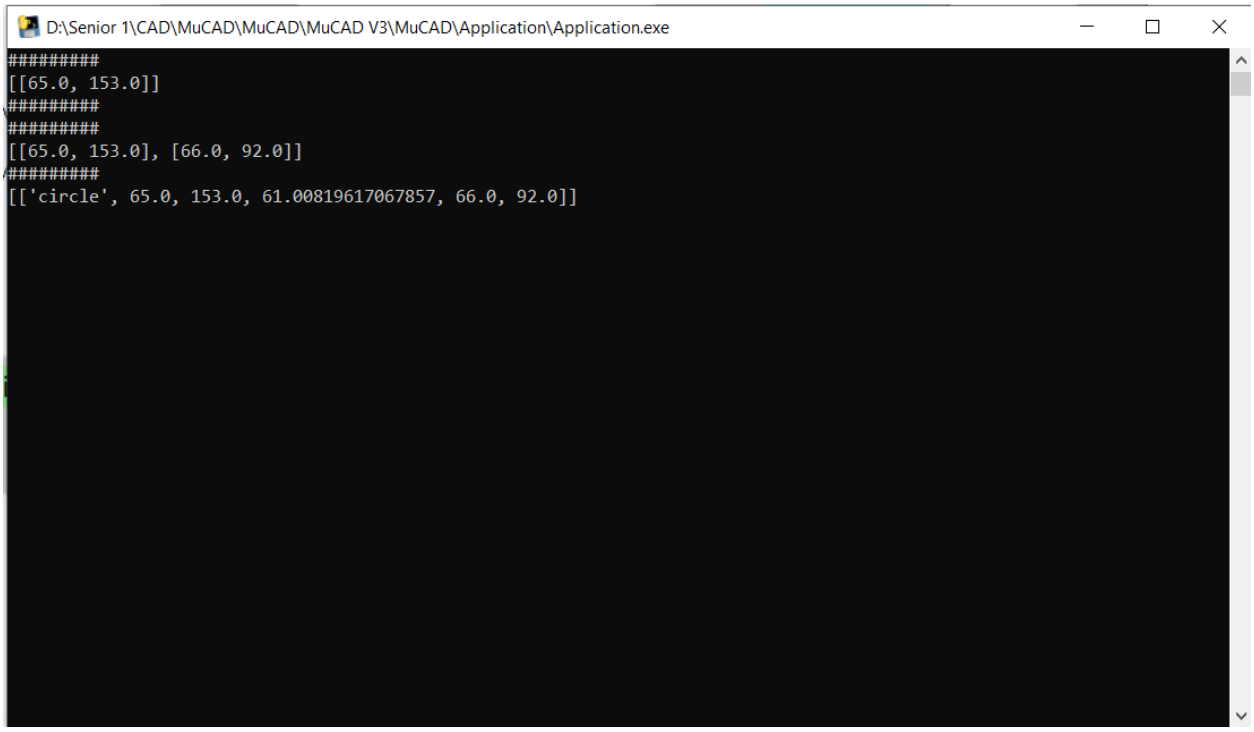
To draw a Circle, you need start coordinates (x1, y1) and end coordinates (x2, y2). The Circle is formed by start coordinate and the end coordinate, the difference between the two coordinates is the radius, and the second coordinate is the start point of the drawing.

Steps to draw a line:

1- by clicking the left mouse button (i.e. determine the start coordinates).
2- by clicking the left mouse button again (i.e. determine the end coordinates).
3- Lastly, click on Circle button.



NOTE: you can see the first coordinate and second coordinate and after the Circle button is clicked the circle is drawn and saved to the buffer in background command line window (CMD window).

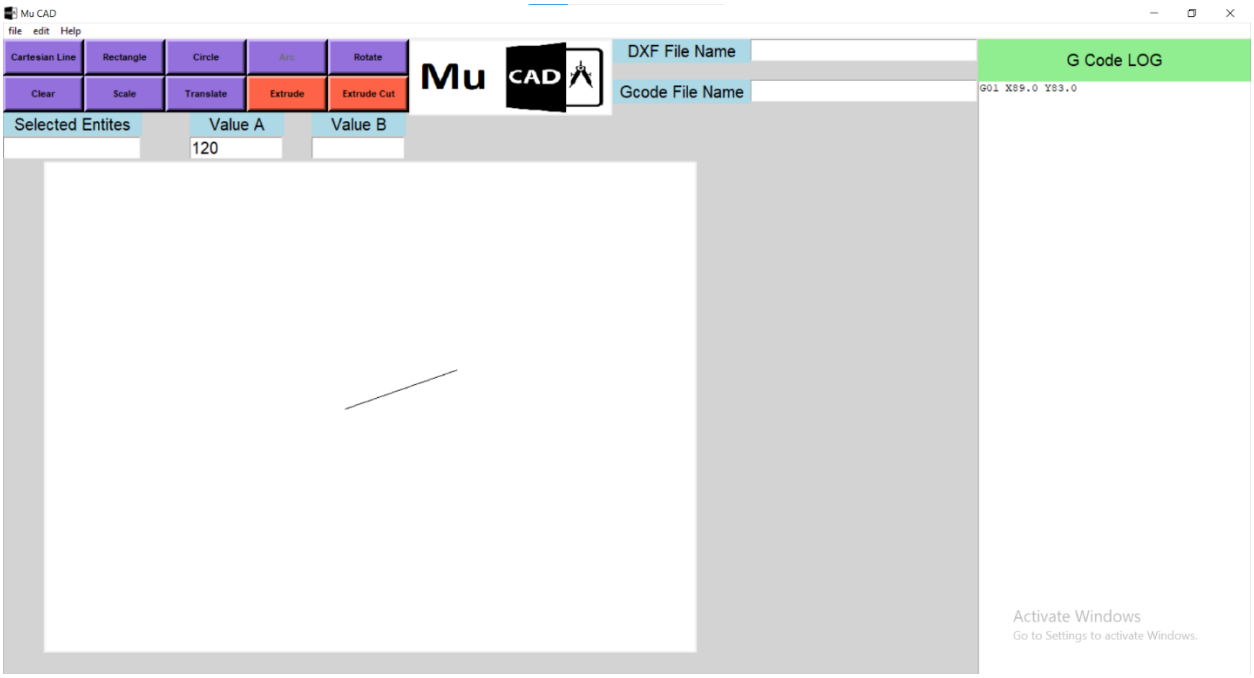


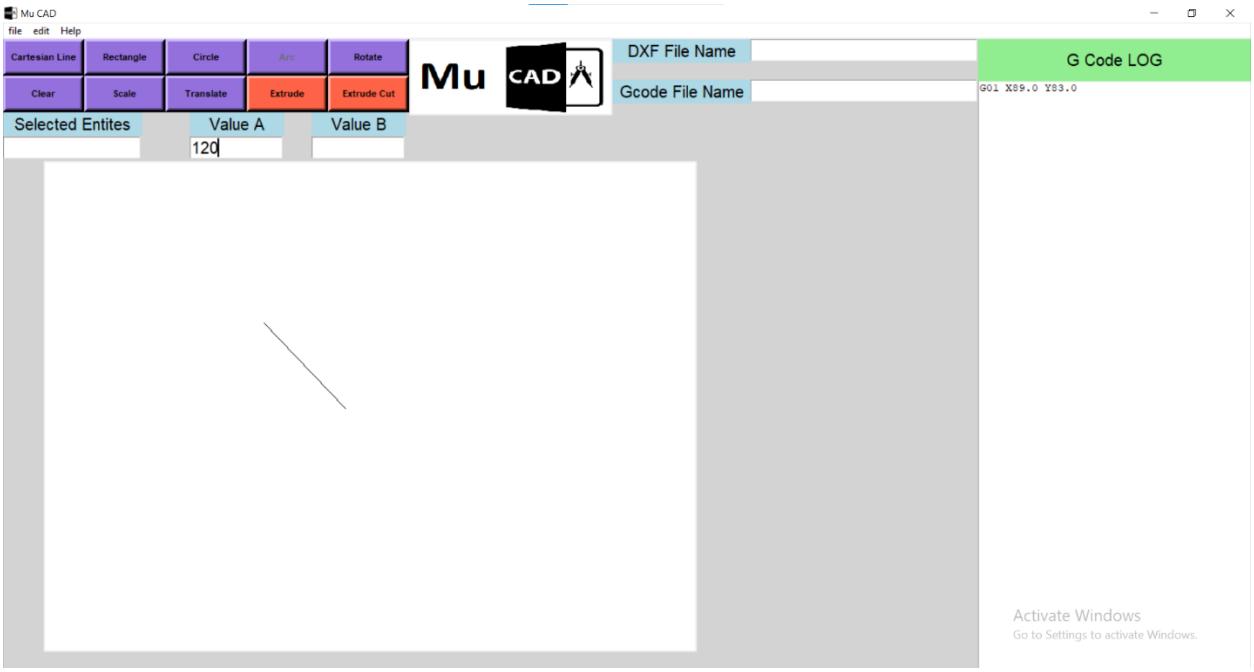
2.4 Drawing an Arc

This part is reserved and will be activated in the next bug fix version v3.0.1

2.5 Rotation

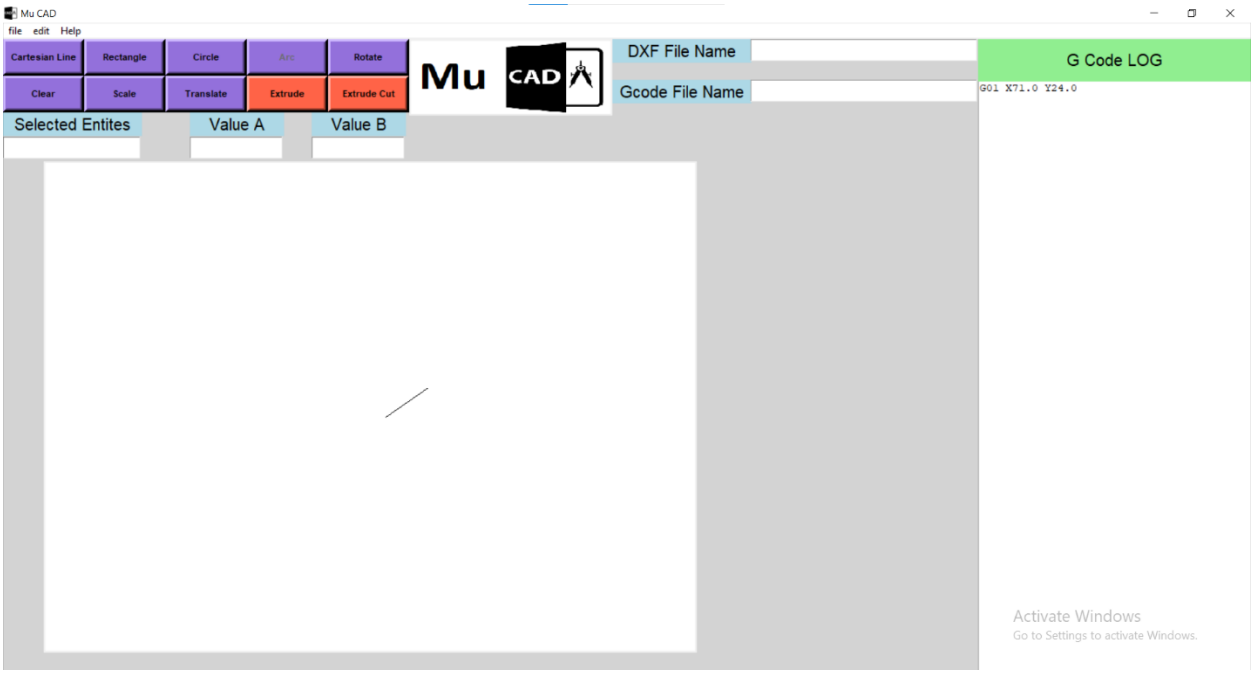
To rotate an entity, all you have to do is just to fill the rotation angle (i.e. Value A button) .and then press on Rotate button.

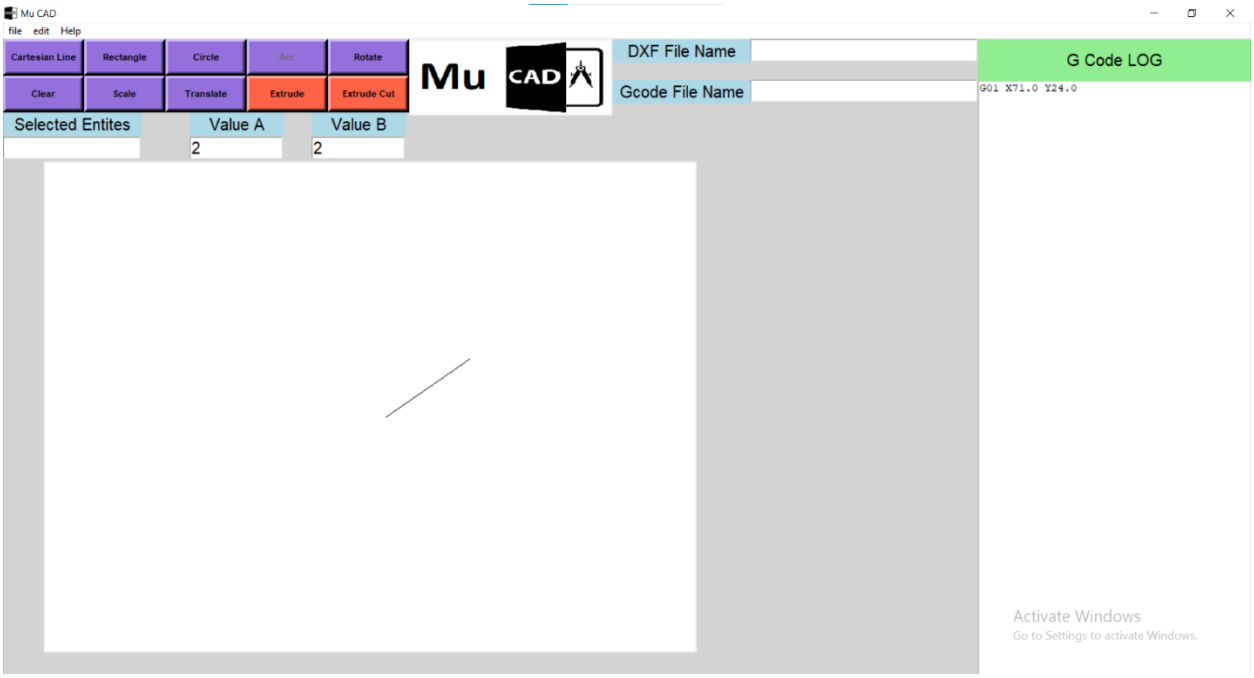




2.6 Scaling

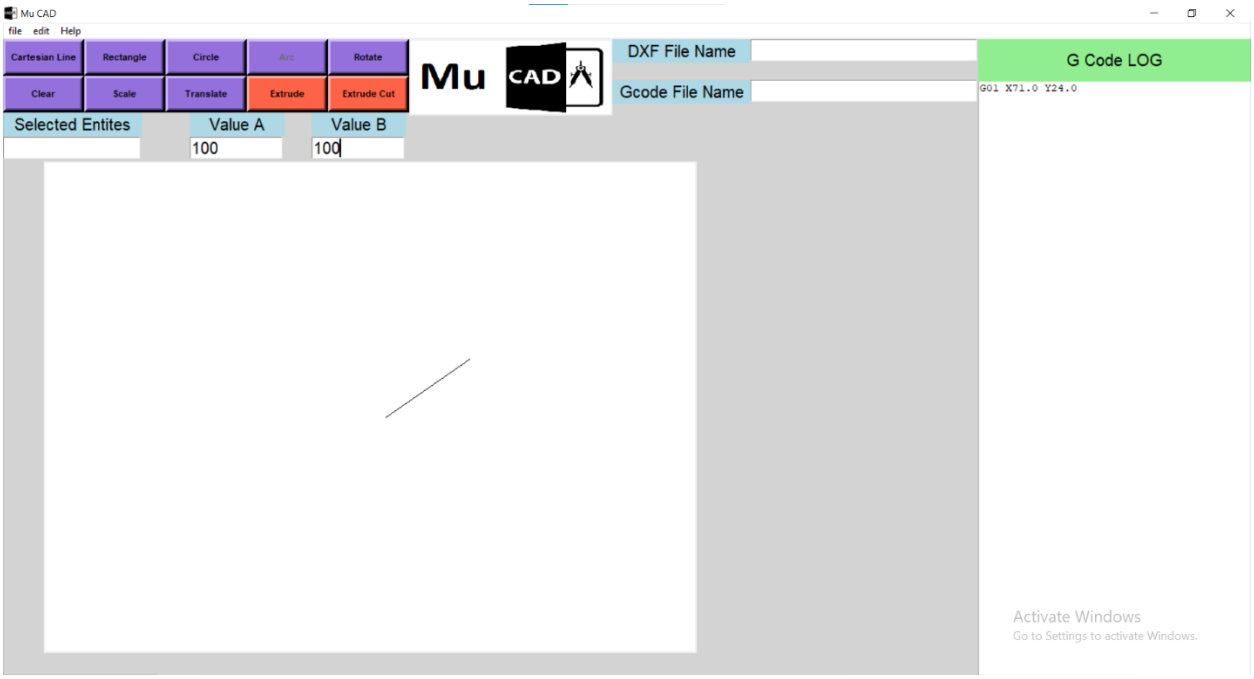
To scale an entity, all you have to do is just to fill the scale factor in the x-coordinate and the scale factor in the y-coordinate (i.e. Value A button and Value B button respectively) .and then press on Scale button.

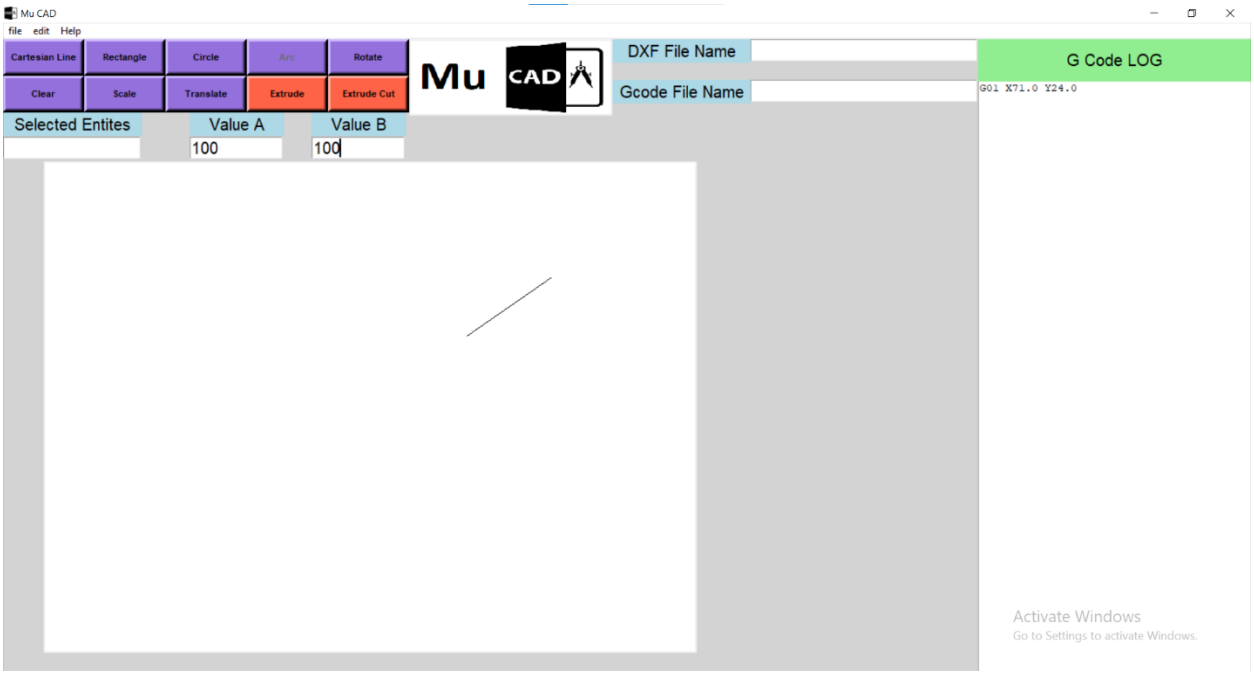




2.7 Translating

To translate an entity, all you have to do is just to fill the translate factor in the x-coordinate and the translate factor in the y-coordinate (i.e. Value A button and Value B button respectively) .and then press on Translate button.





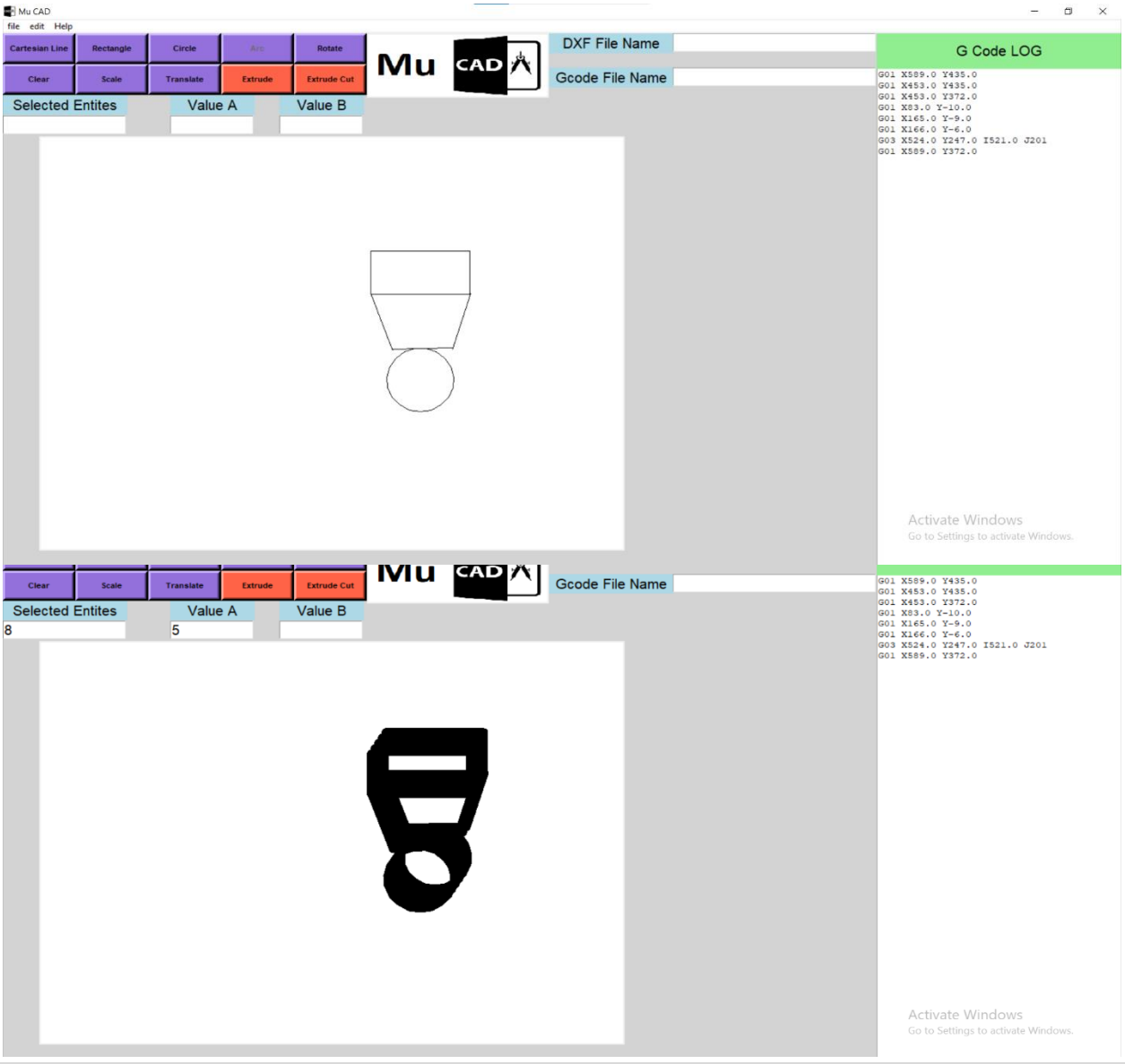
3. 3D Section

In this section, Extrude and Extrude Cut features is introduced. To view 2½D entities or 3D entities, you have to change the orientation (viewpoint), this is done automatically by the program when an extrusion is done.

3.1 Extrude/Extrude Cut

Steps to Extrude/Extrude Cut

1- Fill the "Selected Entities" field to choose how many entity you want to extrude or to extrude cut.
2- Fil the "Value A" field to choose the extrusion height
3- Press Extrude or Extrude Cut



4. Data and Exportation

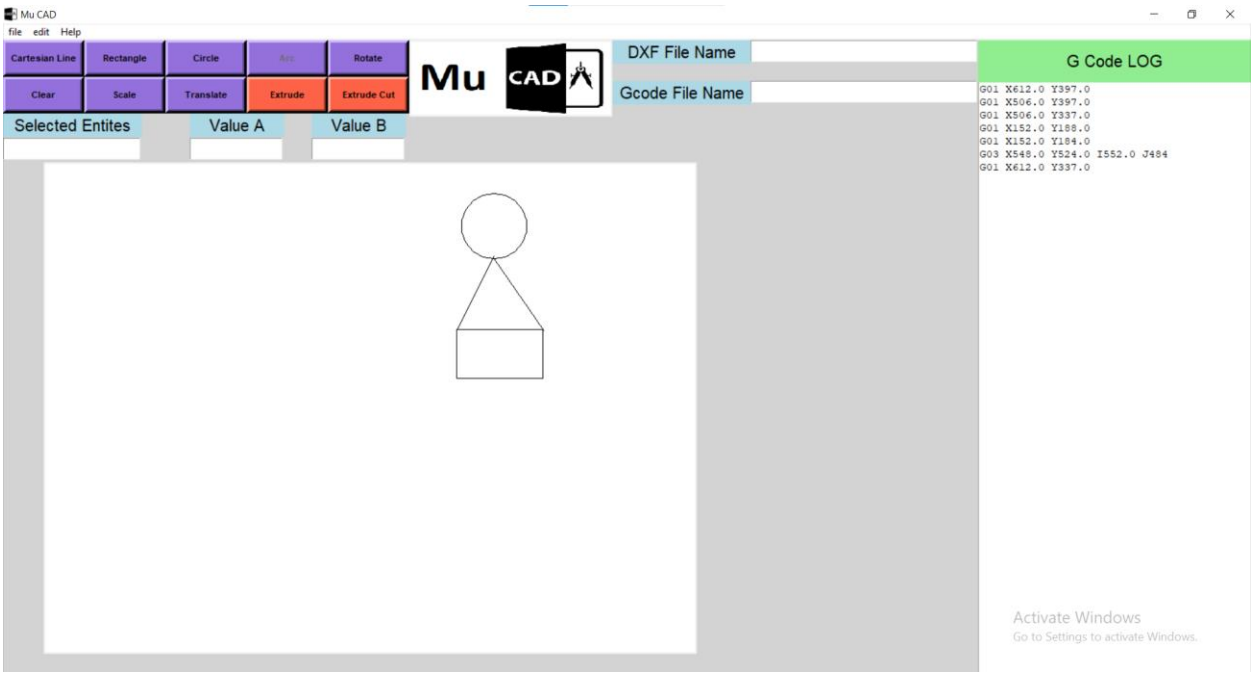
This the most important part of any program; because you need your data to export it to other programs like CAM or CAE or even to machine the part drawn on CNC Router, CNC Plasma, etc. the MuCAD v3.0.0 allow the user to export the data in form of dxf file and Gcode file.

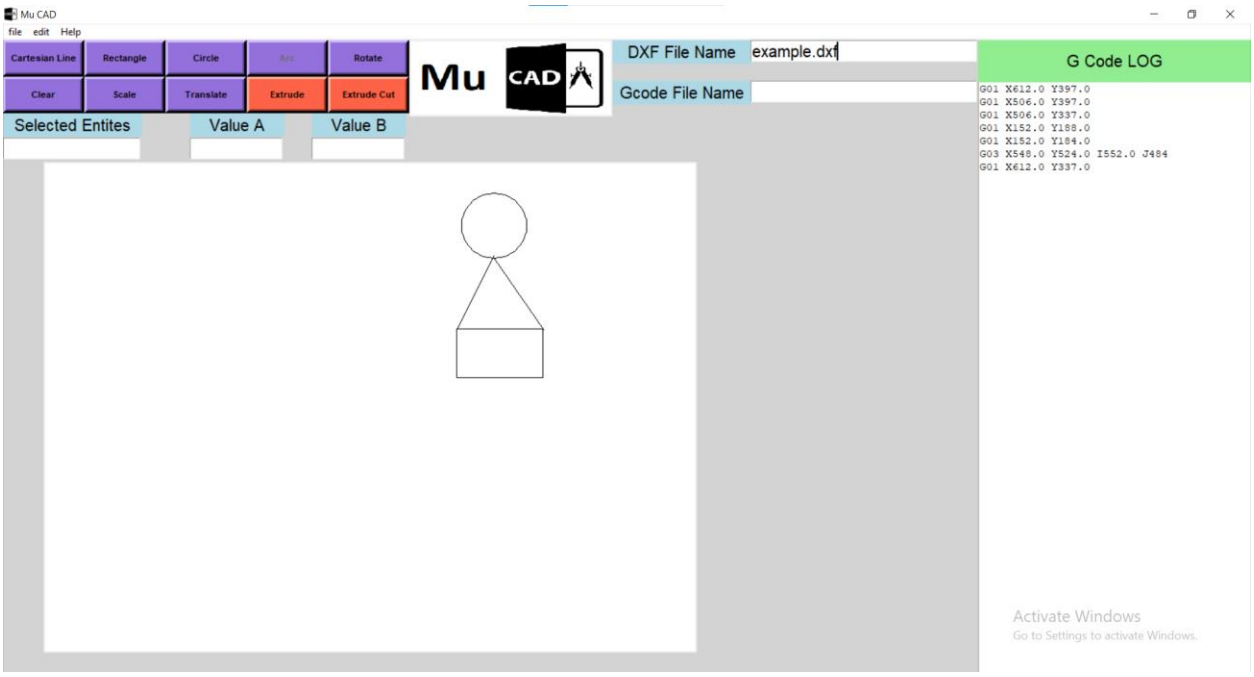
4.1 Dxf file

Dxf file is the neutral file format to change the data between CAD programs or to transport the file to other CAM, CAE programs, or to machine the part.

Steps to export dxf file

1- Fill the "dxf file name" field with an end of .dxf (e.g. file.dxf)
2- Open file menu
3- Press Export as DXF (the file is located on the file of the application folder)

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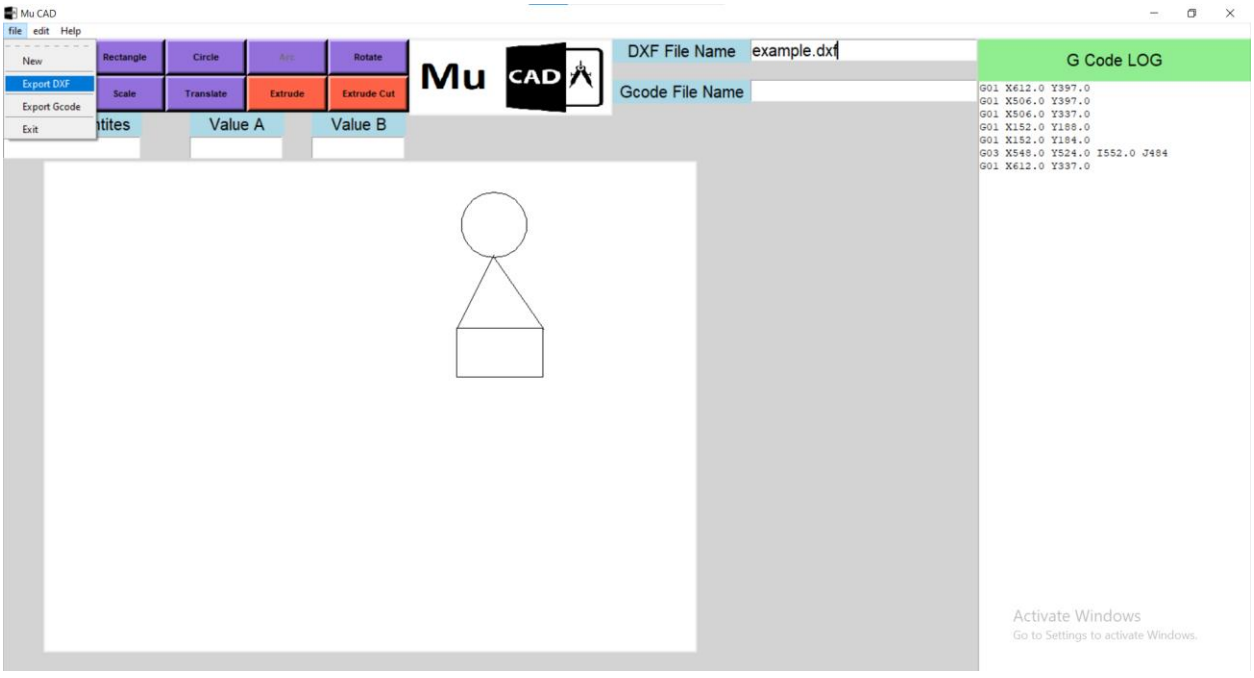
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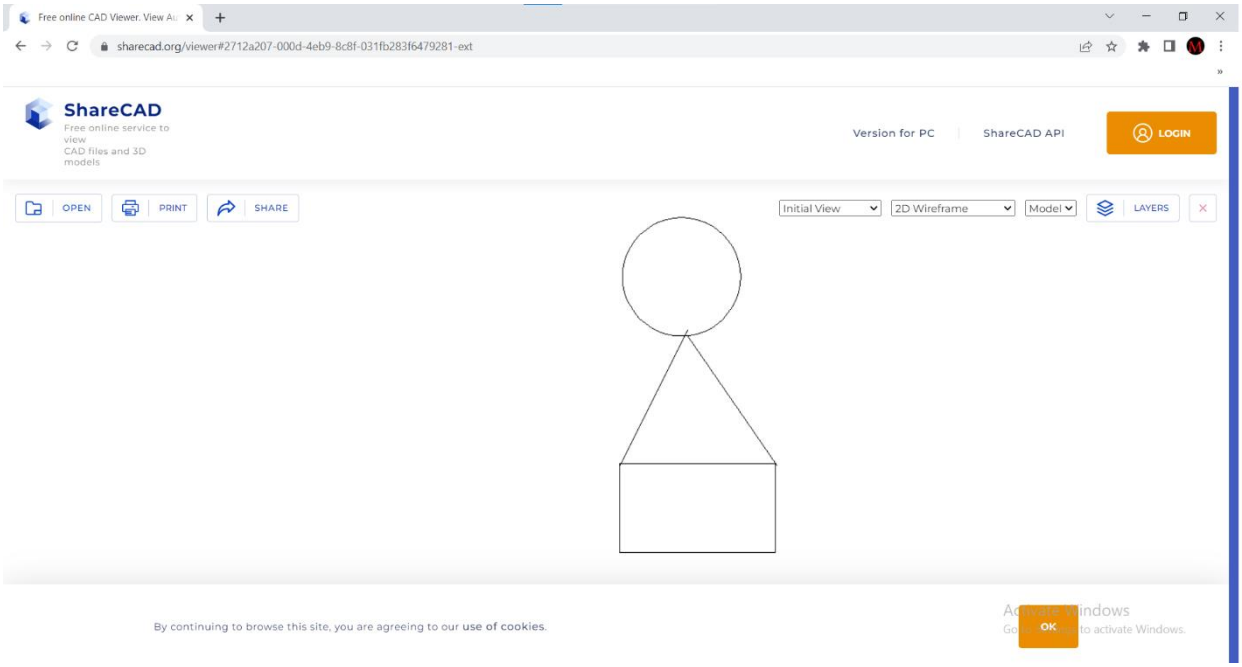
Example: Opening the output file

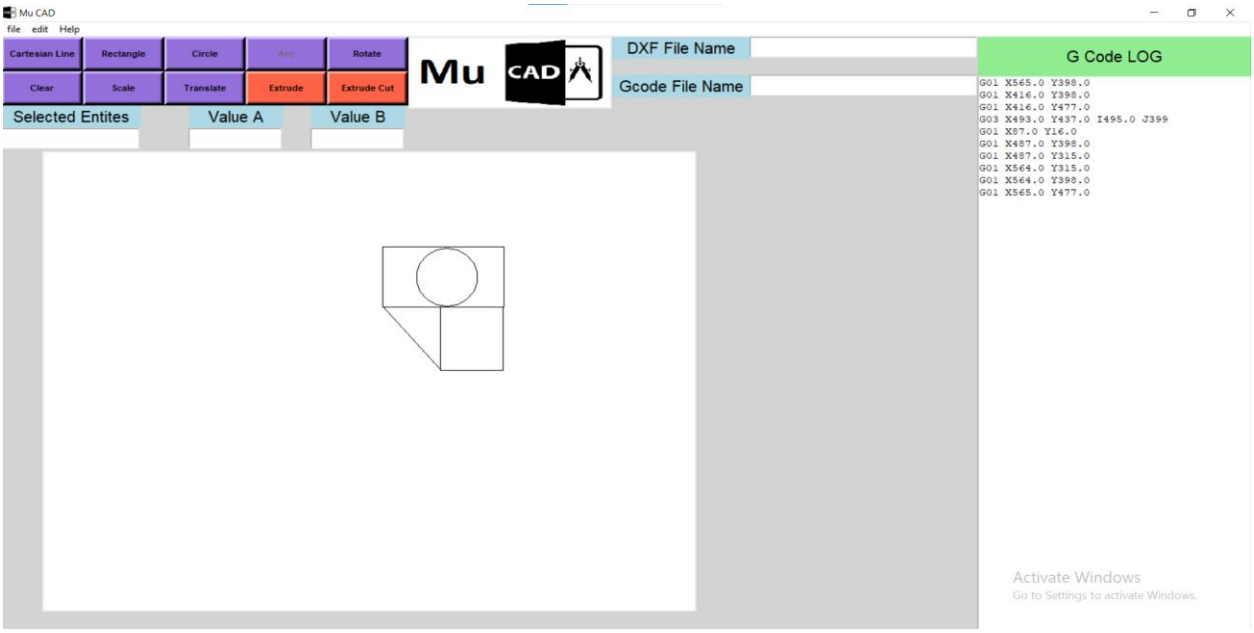


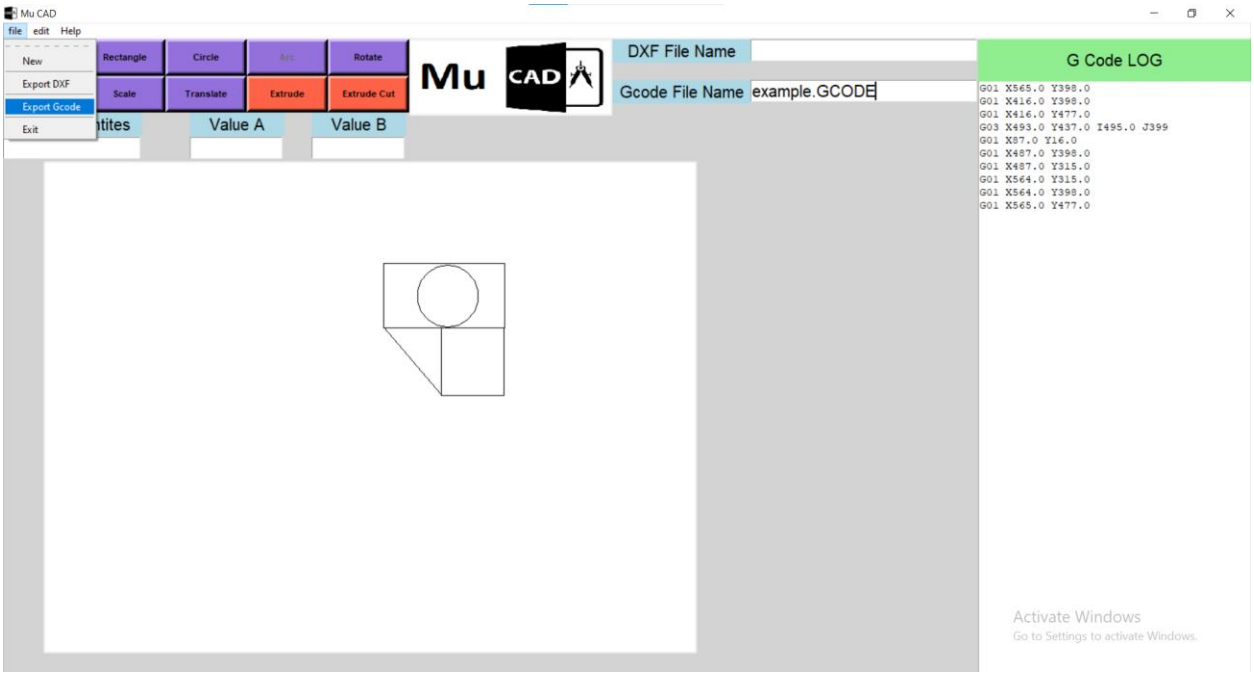
4.2 Gcode file

Gcode file is the an CNC file format to machine the part on CNC or to 3d print it on a 3d printer.

Steps to export Gcode file

1- Fill the “Gcode file name” field with an end of . GCODE (e.g. file.GCODE)
2- Open file menu
3- Press Export as GCODE (the file is located on the file of the application folder)

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G01 X416.0 Y477.0
G03 X493.0 Y437.0 I495.0 J399
G01 X87.0 Y16.0
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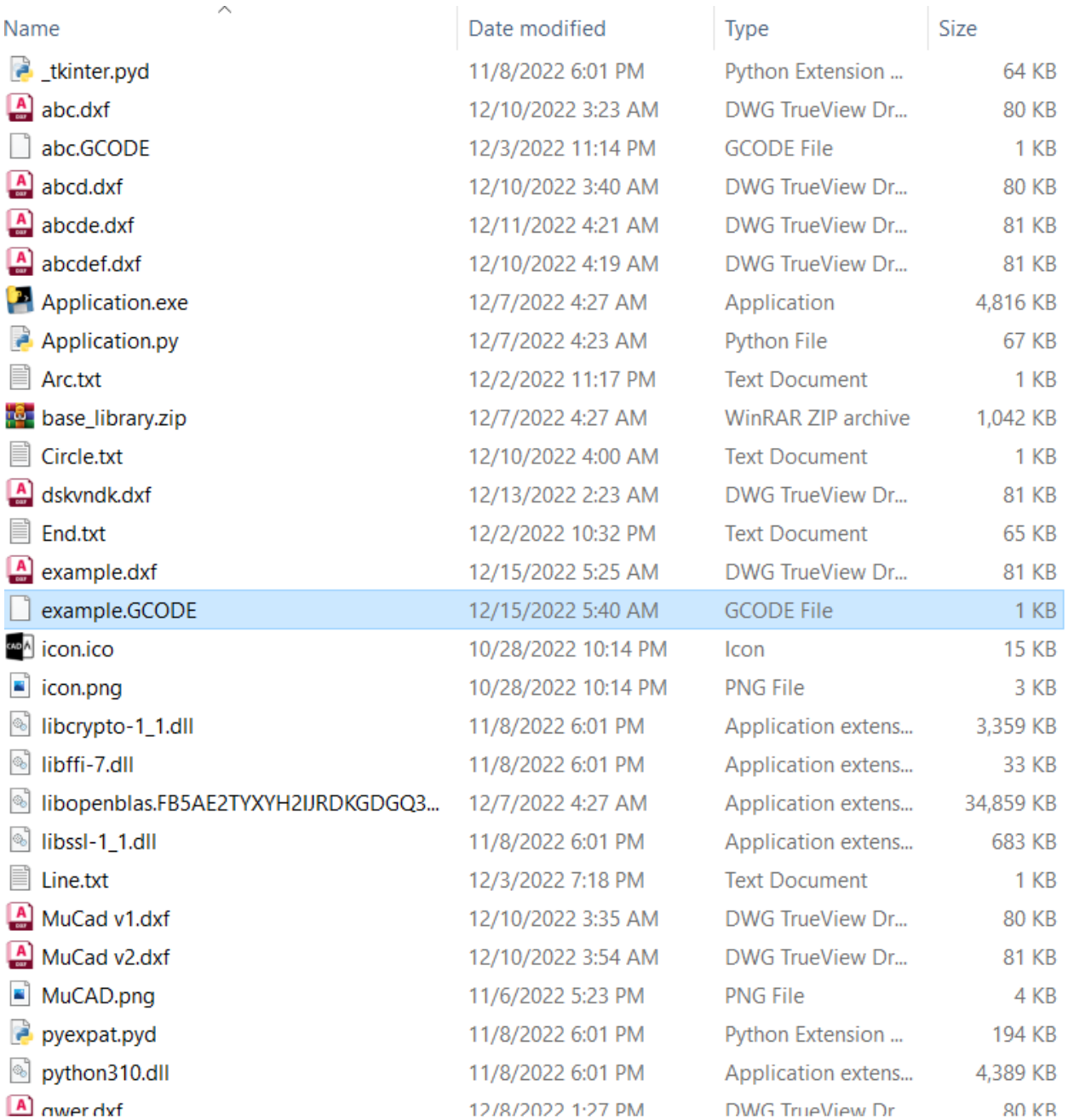

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