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A framework to develop geometric entities and printing 2D design in PencilCAD Application

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Abstract **-** The main aim of this system is to develop a framework of geometric entities and printing 2D design in PencilCAD application. The PencilCad is computer-aided design software that empowers architects, engineers, and construction professionals to create precise drawings . The Geometry Entities have shape and dimensions. The basic geometric modelling is 2D drawing. These drawings have lines, points, triangle, polygons, arcs , circles, rectangle, curves and ellipses. PencilCad software reduces the number of program coding and gives accurate dimensions for 2D drawings. The geometric entities are available in the dropdown menu which can be easily accessed by anyone. This software has been developed in the presentation format(slides) in which we can use multiple sheets. It is easy to understand hence it is user friendly. It saves time and yields better quality. Different types of engineers benefited from this CAD software development. It is mainly to draw precise engineering (civil/mechanical) drawing that would be used for construction/manufacturing. PencilCad software using JavaFX framework in Netbeans IDE platform for developing rich client applications. JavaFX is a set of graphics and media packages that enables developers to design, create and deploy client applications that operate consistently across diverse platforms. The Print API is used to print extremely fast and efficiently in this PencilCad Software.

Keywords **–** Geometric entities, Accurate Dimensions, 2D drawing, presentation format, JavaFX framework, Print API.

I.INTRODUCTION

CAD (Computer Aided Design) is the use of computer software to design and document the design process of a product. Technical drawing involves the use of graphical symbols such as points, lines, curves, planes, and shapes. Basically, it gives a detailed description of any element in graphical form. CAD allows engineers to design layouts and develop their work on a computer screen, print it, and save it for future editing.

One of the main advantages of CAD drawings is that the editing process is quick compared to manual methods. CAD reduces design time by enabling more precise simulation than building and testing physical prototypes.

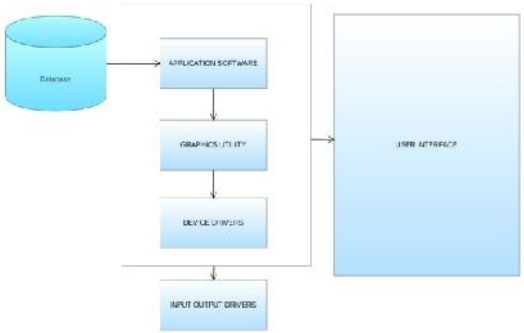

Fig. 1. Architectural Diagram of CAD software

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II. METHODOLOGY

- Geometric modeling involves using a CAD system to develop a mathematical description of the geometry of an object. The object can be displayed on a computer and used for generation drawings; continue for possible object analysis and production
- .Print geometric entities from CAD data structures using JavaFX (Application Programming Interface)print API.
- The API includes the following classes: Printer, PrinterAttributes, PrintResolution, PrinterJob, JobSettings,Paper, PaperSource, PageLayout.

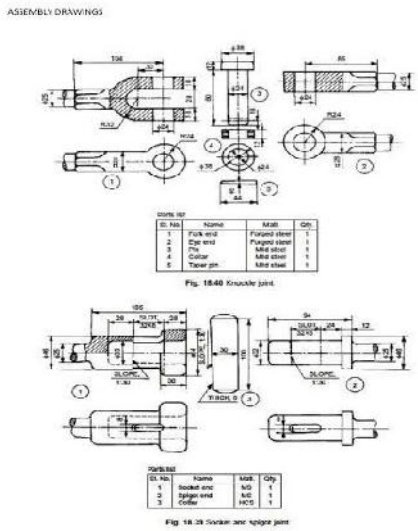

Fig. 2. Assembly Drawings

III. EXISTING SYSTEM

AutoCAD Software:

In existing system, it has a number of coding to draw a parallel line, perpendicular line, Angle line, Point tan line, Bisector line, etc. It is used to create precise engineering drawings but it is difficult to use. It needs training to use the software.

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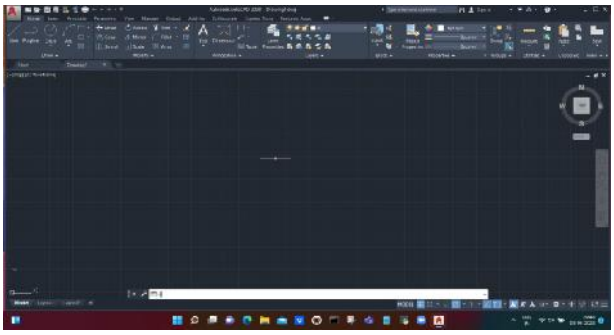
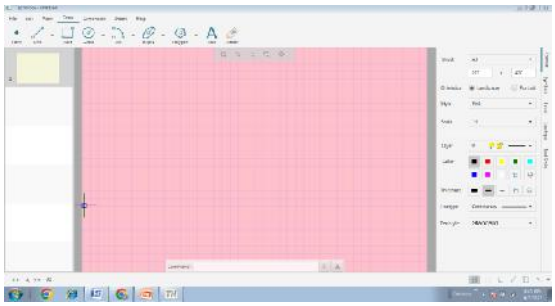


Fig.3. AutoCAD Software

IV. PROPOSED SYSTEM

- In proposed system, PencilCAD software reduces the number of program coding and gives accurate dimensions for 2D drawings. The geometric entities are available in the dropdown menu which can be easily accessed by anyone.
- The geometric framework will allow for greater flexibility in producing different outputs. The Print API is used to print extremely fast and efficient in this PencilCad Software.
- Powerpoint is easy to use , it does not require any training to use the software, anyone with basic computer knowledge can start using powerpoint and create presentations But, precise engineering drawing cannot be created in powerpoint format.
- But our proposed software has been developed in the powerpoint format in which we can use number of sheets. It is easy to understand hence it is user friendly. It saves time and yields better quality.



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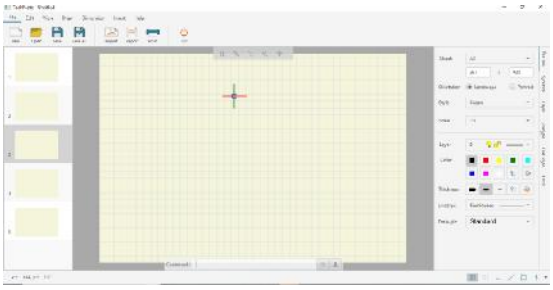

Fig.4. PencilCAD Software

V. PENCILCAD SOFTWARE ARCHITECTURE

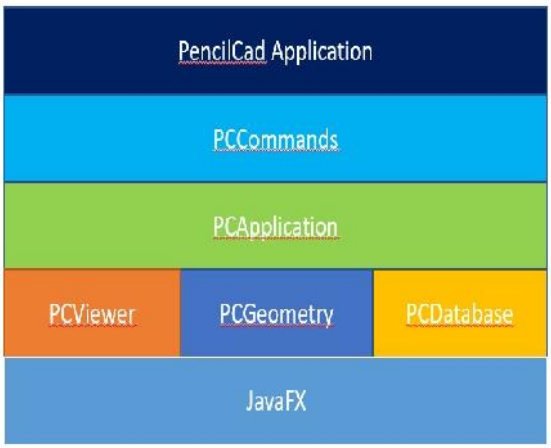

Fig.5. Architecture of PencilCAD Software

The PencilCAD database has the DbSymbolTable, it is used to store information about the occurrence of various entities such as variable names, function names, objects, classes, and interfaces. DbSymbolTable contains DbSheetTable, DbBlockTable, DbLayerTable, DbLinetypeTable, DbTextTable and DbHatchStyleTable.

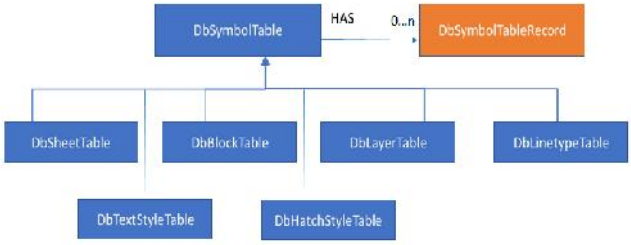

Fig.6. PCDatabase (TNTDatabase.jar)

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Geometric entities are drawing objects such as arcs, lines, ellipses, and circles represented graphically.

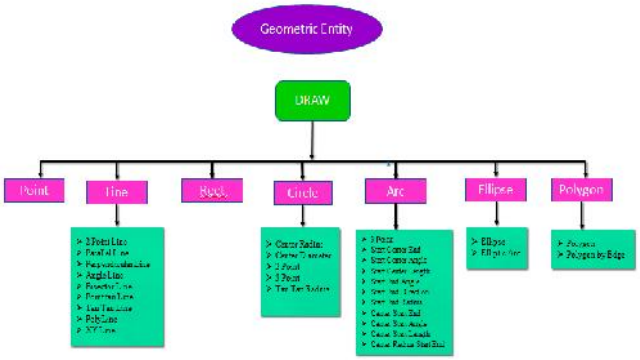

Fig.7. Representation of Geometric Entity

Drawing entity identifiers

Drawing Entity	Identifiers
Line	PCDbLine
Arc	PCDbArc
Circle	PCDbCircle
Ellipse	PCDbEllipse
Text	PCDbText
PolyLine	PCDbPolyLine

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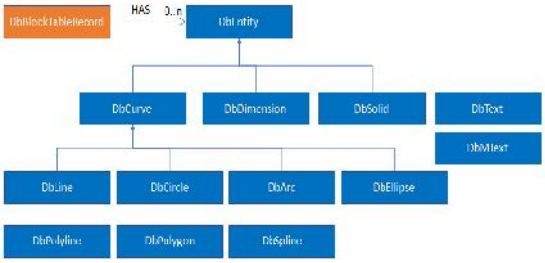

Fig.8. Diagram of PCDbEntity

VI. RELATED WORKS

Step 1:

Run the Geometric entities coding in netbeans

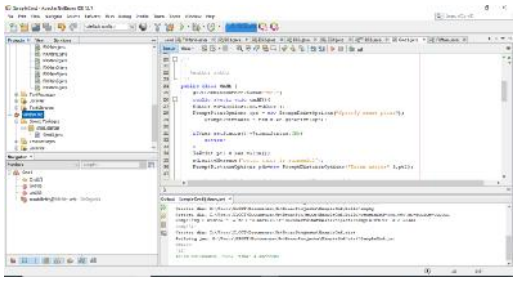

Fig.9. Output screen of the Geometric entities

Step 2:

Give the command for Line in PencilCAD Software

Fig.10. Command for Line

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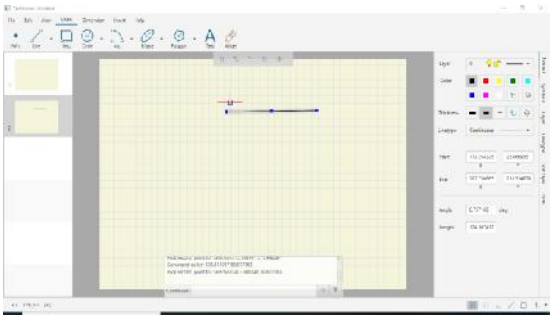

Fig.11. Draw the Line

Step 3:

Give the command for Circle in PencilCAD Software

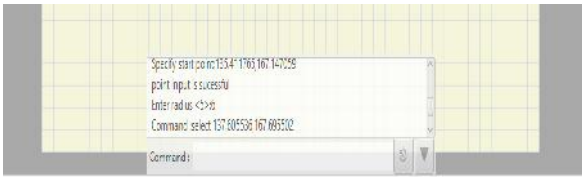

Fig.12. Command for Circle

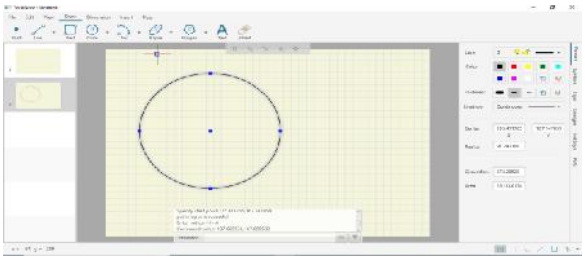

Fig.13. Draw the Circle

Step 4:

Draw some Engineering Graphics oriented diagrams

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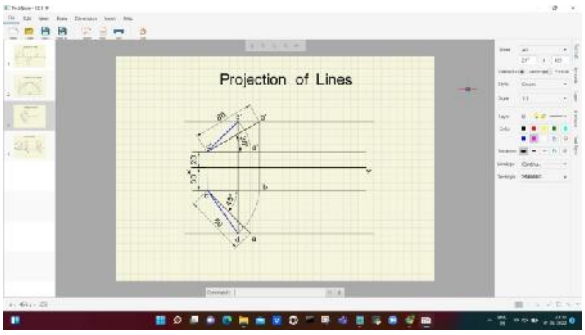

Fig.14. Draw the projection of Lines

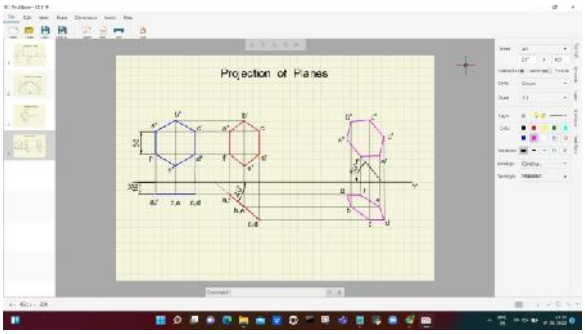

Fig.15. Draw the projection of planes

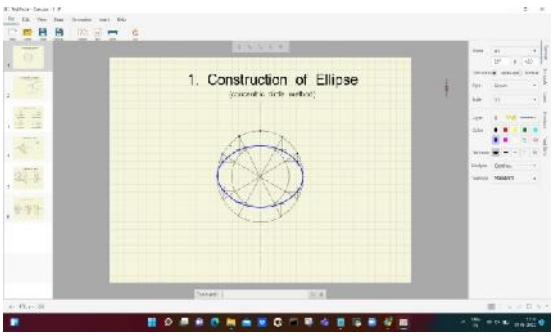

Fig.16. Draw the construction of Ellipse

Step 5:

Draw the construction oriented diagram

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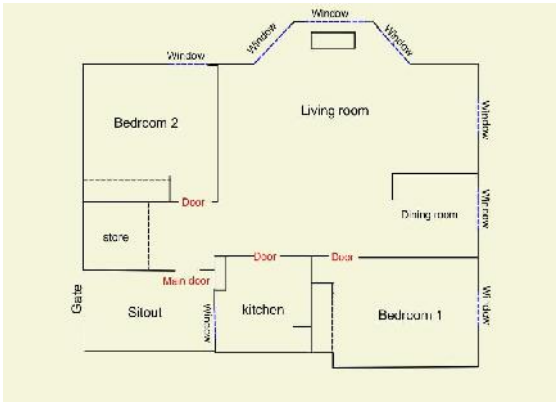

Fig.17. After Exporting the Construction diagram

Step 6:

Execute the sample programs for connecting the printers with PencilCAD software using JavaFX print API

Step 1: First we Open the netbeans IDE after that we create a New java project file.

Step 2: Then you Create the FXMain.java under created the Java package

- First we list of all printers

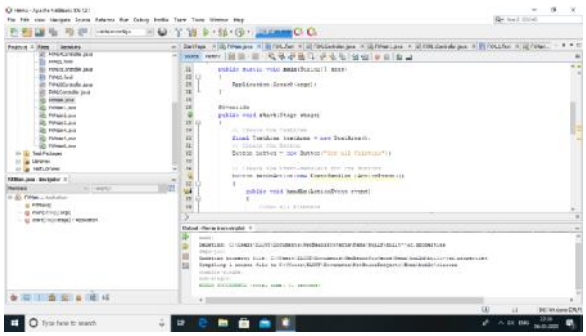

Fig.18. Listing available printers coding

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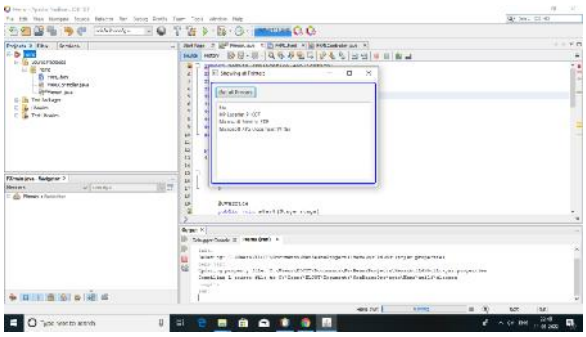

Fig.19. Output Display all printers with the JavaFX

print API

Step 3: Under the same package , Create the another one

new FXMain1.java

- Now Getting the default printer in your system.

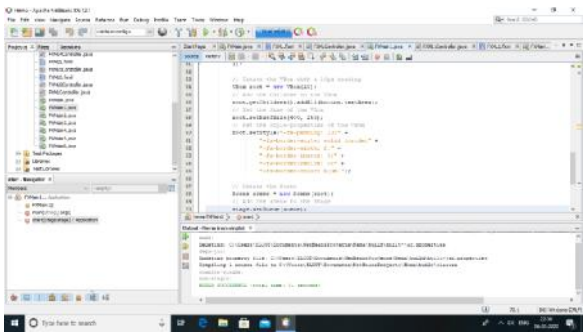

Fig.20. Getting the default printers coding

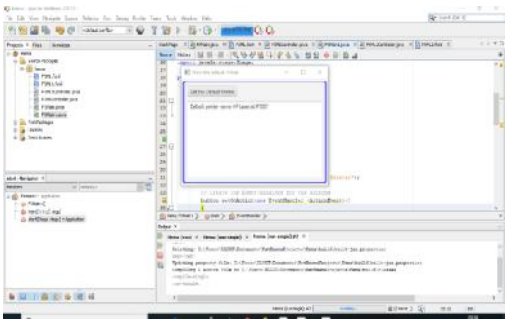

Fig.21. Get the default printer with the JavaFX

Step 4: Under the same package , Create the another one

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new FXMain2.java

- Next we print the nodes, After that it showing a text box where you can enter text

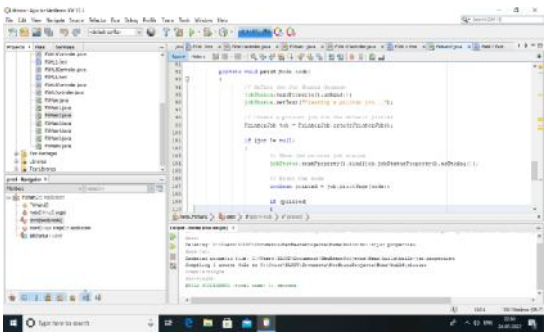

Fig.22. Printing Nodes Using Java coding

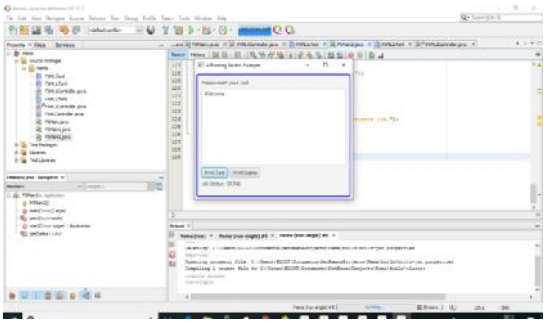

Fig.23. Output for Printing a node with the JavaFX

Step 5: Under the same package , Create the another one

new FXMain3.java

- After that Display the Page Setup

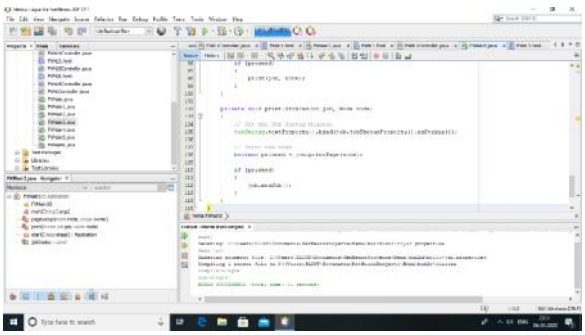

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Fig.24. Page setup coding

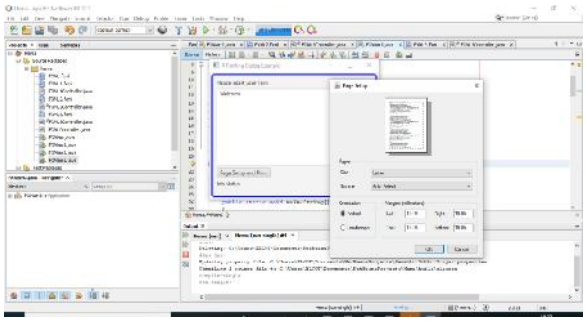

Fig.25. Output of the page setup with JavaFX

Step 6: Under the same package , Create the another one

new FXMain4.java

- Next display the print dialog

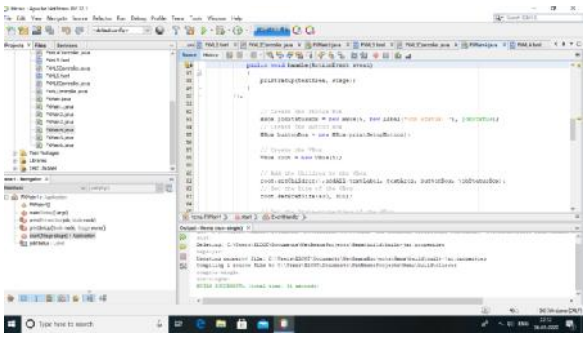

Fig.26. Display the print dialog Coding

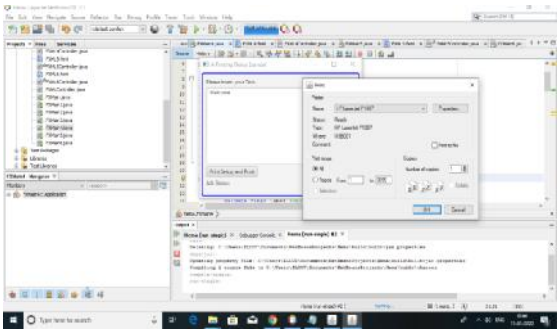

Fig.27. Output for display the Print dialog

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Step 7: Under the same package , Create the another one

new FXMain5.java

- Next we customize the printerjob setting
- After that it gives the all printer attributes

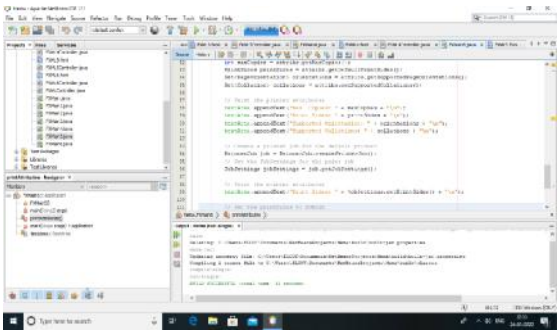

Fig.28. Customize the PrinterJob setting coding

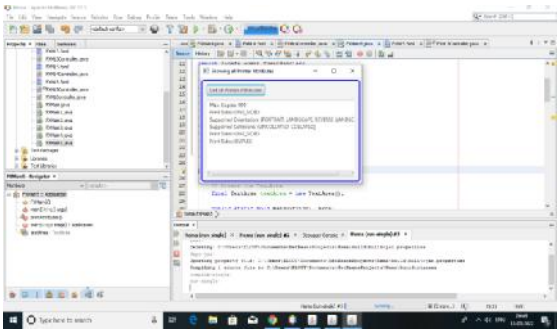

Fig.29. Output for Displaying all printer attributes

Step 8: Under the same package , Create the another one

new FXMain6.java

- Finally set the page layout

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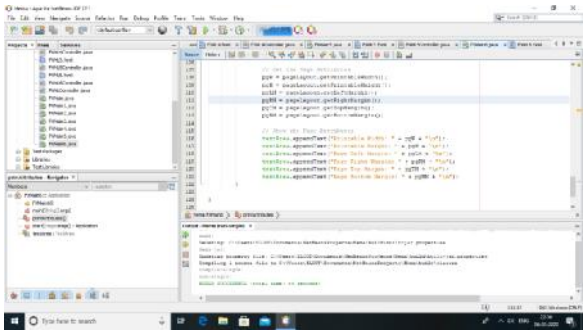

Fig.30. Set the page layout coding

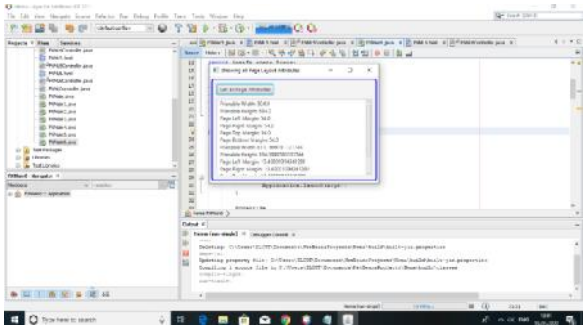

Fig.31. Output for Display all page layout attribute

Step 9: The JavaFX print API successfully executed using

the above programming.

VII. CONCLUSION

PencilCAD Software is one of the user friendly software anyone can easy to understand quickly. It is mainly designed for Construction and manufacturing oriented works and it gives the accurate dimensions for 2D drawings. The future enhancement of PencilCAD software will focus on Bluetooth printing, 3D printing and their frameworks .

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