SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

System Software mini project on

RAPA GRAPH EDITOR

Submitted to

TRISHALA DEVI . N

Submitted By

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Contents:

Problem definition:

Gnuplot is a command-line program that can generate two- and three-dimensional plots of functions, data, and data fits. It is frequently used for publication-quality graphics as well as education. The program runs on all major computers and operating systems (GNU/Linux, Unix, Microsoft Windows, Mac OS X, and others). It is a program with a fairly long history, dating back to 1986. Despite its name, this software is not distributed under the GNU General Public License (GPL), opting for its own more restrictive open source license instead.

In our project we given an input as any image file and we get the output as a graph .It may be either the 2D graph or 3D graph. Here we consider three types of chart to display the graph; they are PIE, BAR and LINE charts. Each one of these has its own properties. This project can be implemented in windows, LINUX and Mac operating systems.

1. Introduction

This is the project regarding the gnuplot 2D and 3D graphs. In this case we are displaying the results in the form of 2D and 3D graphs which will accept the input from the file. The input may be any type of image files. The path must be specified for selecting and displaying the graph. In our project majorly there are three types graph chart namely; PIE chart, BAR chart and LINE chart and each one of these are explained in following sub sections. Before that we have to understand what is GUI and what gnuplot is.

1.1. Graphical User interface

A Graphical User Interface (GUI, commonly pronounced gooey) is a type of user interface that allows users to interact with electronic devices using images rather than text commands. GUIs can be used in computers, hand-held devices such as MP3 players, portable media players or gaming devices, household appliances and office equipment. A GUI represents the information and actions available to a user through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation. The actions are usually performed through direct manipulation of the graphical elements.

The term GUI is restricted to the scope of two-dimensional display screens with display resolutions able to describe generic information, in the tradition of the computer science research at the PARC (Palo Alto Research Center). The term GUI is rarely applied to other low-resolution types of interfaces that are non-generic, such as video games (where HUD is preferred), or not restricted to flat screens, like volumetric displays.

1.2. GNU-plot graph editor

Gnuplot is a free program that plots 2D and 3D data. It is what I use now on my Linux machines to make publication quality scientific plots.

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frequently used for publication-quality graphics as well as education. The program runs on all major computers and operating systems (GNU/Linux, UNIX, Microsoft Windows, Mac OS X, and others). It is a program with a fairly long history, dating back to 1986. Despite its name, this software is not distributed under the GNU General Public License (GPL), opting for its own more restrictive open source license instead.

Gnuplot can produce output directly on screen, or in many formats of graphics files, including Portable Network Graphics (PNG), Encapsulated PostScript (EPS), Scalable Vector Graphics (SVG), JPEG and many others. It is also capable of producing LaTeX code that can be included directly in LaTeX documents, making use of LaTeX's fonts and powerful formulae abilities. The program can be used both interactively and in batch mode using scripts.

Gnuplot is used as the plotting engine of Maxima, and gret l, and it can be used from various languages, including Perl (via CPAN), Python (via Gnuplot-py and SAGE), Java (via jgnuplot), Ruby (via Ruby Gnuplot), and Smalltalk. gnuplot also supports piping. gnuplot is programmed in C.

1.3. Tools

1.3.1. Software tools:

- C++
- Java
- Shell programming.

1.3.2. Hardware tools:

Any hardware configuration which supports compilers like ***gcc and eclipse***

2. Charts

A chart is a graphical representation of data, in which "the data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart". A chart can represent tabular numeric data, functions or some kinds of qualitative structures.

1. The term "chart" as a graphical representation of data has multiple meanings.
2. A data chart is a type of diagram or graph that organizes and represents a set of numerical or qualitative data.
3. Maps that are adorned with extra information for some specific purpose are often known as charts, such as a nautical chart or aeronautical chart.
4. Other domain specific constructs are sometimes called charts, such as the chord chart in music notation or a record chart for album popularity.

Charts are often used to ease understanding of large quantities of data and the relationships between parts of the data. Charts can usually be read more quickly than the raw data that they are produced from. They are used in a wide variety of fields, and can be created by hand (often on graph paper) or by computer using a charting application. Certain types of charts are more useful for presenting a given data set than others. For example, data that presents percentages in different groups (such as "satisfied, not satisfied, and unsure") are often displayed in a pie chart,

but may be more easily understood when presented in a horizontal bar chart. [2] On the other hand, data that represents numbers that change over a period of time (such as "annual revenue from 1990 to 2000") might be best shown as a line chart.

2.1. Features of charts

A chart can take a large variety of forms; however there are common features that provide the chart with its ability to extract meaning from data.
Typically the data in a chart is represented graphically, since humans are generally able to infer meaning from pictures quicker than from text. Text is generally used only to annotate the data.

One of the more important uses of text in a graph is the title. A graph's title usually appears above the main graphic and provides a succinct description of what the data in the graph refers to.

Dimensions in the data are often displayed on axes. If a horizontal and a vertical axis are used, they are usually referred to as the x-axis and y-axis respectively. Each axis will have a scale, denoted by periodic graduations and usually accompanied by numerical or categorical indications. Each axis will typically also have a label displayed outside or beside it, briefly describing the dimension represented. If the scale is numerical, the label will often be suffixed with the unit of that scale in parentheses. For example, "Distance traveled (m)" is a typical x-axis label and would mean that

the distance travelled, in units of meters, is related to the horizontal position of the data within the chart.

Within the graph a grid of lines may appear to aid in the visual alignment of data. The grid can be enhanced by visually emphasizing the lines at regular or significant graduations. The emphasized lines are then called major grid lines and the remainder is minor grid lines.

The data of a chart can appear in all manner of formats, and may include individual textual labels describing the datum associated with the indicated position in the chart. The data may appear as dots or shapes, connected or unconnected, and in any combination of colors and patterns. Inferences or points of interest can be overlaid directly on the graph to further aid information extraction.

When the data appearing in a chart contains multiple variables, the chart may include a legend. A legend contains a list of the variables appearing in the chart and an example of their appearance. This information allows the data from each variable to be identified in the chart.

2.2. Types of charts

Majorly there are three types of Charts available in our project namely,

- ✓ PIE chart
- ✓ BAR chart
- ✓ LINE chart

Each one of these explained in the following sub sections.

2.2.1. PIE charts

A pie chart (or a circle graph) is a circular chart divided into sectors, illustrating proportion. In a pie chart, the arc length of each sector (and consequently its central angle and area), is proportional to the quantity it represents. When angles are measured with 1 turn as unit then a number of percent is identified with the same number of centiturns. Together, the sectors create a full disk. It is named for its resemblance to a pie which has been sliced. The size of the sectors is calculated by converting between percentage and degrees or by the use of a percentage protractor. The earliest known pie chart is generally credited to William Play fair's Statistical Breviary of 1801.

The pie chart is perhaps the most widely used statistical chart in the business world and the mass media. However, it has been criticized, and some recommend avoiding it, pointing out in particular that it is difficult to compare different sections of a given pie chart, or to compare data across different pie charts. Pie charts can be an effective way of displaying information in some cases, in particular if the intent is to compare the size of a slice with the whole pie, rather than comparing the slices among them.

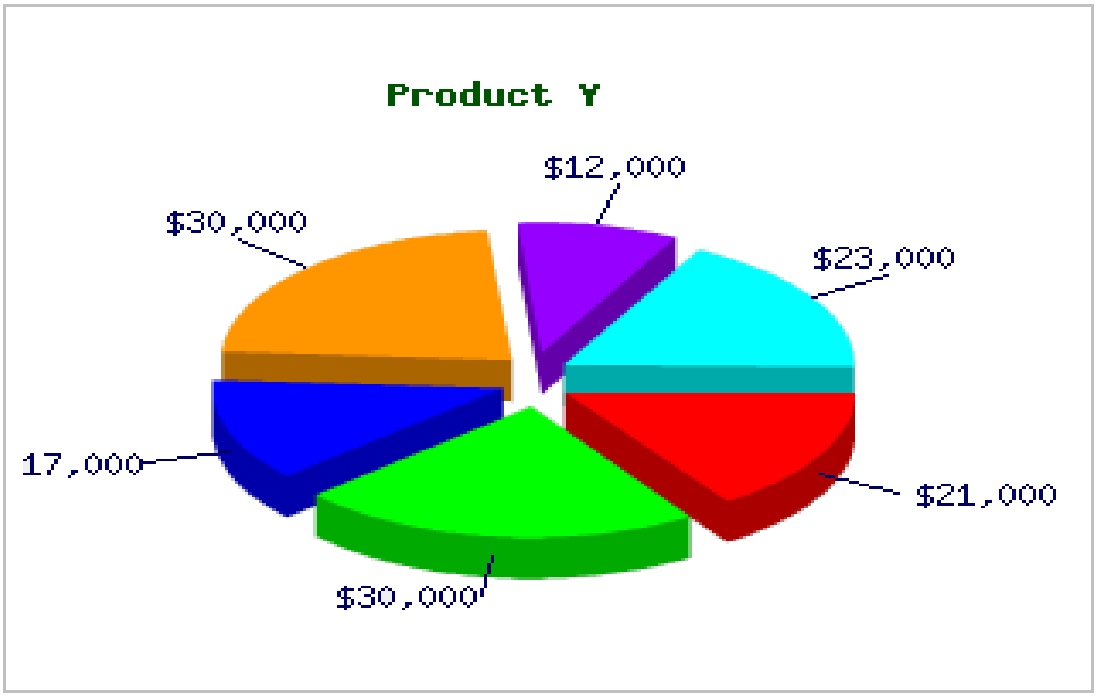


Fig.1 PIE chart

2.2.2. BAR charts

A bar chart or bar graph is a chart with rectangular bars with lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally. A vertical bar chart is sometimes called a column bar chart.

Bar charts provide a visual presentation of categorical data. Categorical data is a grouping of data into discrete groups, such as months of the year, age group, shoe sizes, and animals. In a column bar chart, the categories appear along the horizontal axis; the height of the bar corresponds to the value of each category.

Bar charts can also be used for more complex comparisons of data with grouped bar charts and stacked bar charts. In a grouped bar chart, for each categorical group there are two or more bars. These bars are color coded to represent a particular grouping. For example, a business owner with two stores might make a grouped bar chart with different colored bars to represent each store: the horizontal axis would show the months of the year and the vertical axis would show the revenue. Alternatively, a stacked bar chart could be used. The stacked bar chart stacks bars that represent different groups on top of each other. The height of the resulting bar shows the combined result of the groups.

A bar chart is very useful for recording certain information whether it is continuous or not continuous data. Bar charts also look a lot like a histogram; however bar charts have spaces between columns (unlike histograms) as values are independent of each other.

The first bar graph appeared in the 1786 book The Commercial and Political Atlas, by William Play fair (1759-1823). Play fair was a pioneer in the use of graphical displays and wrote extensively about them.

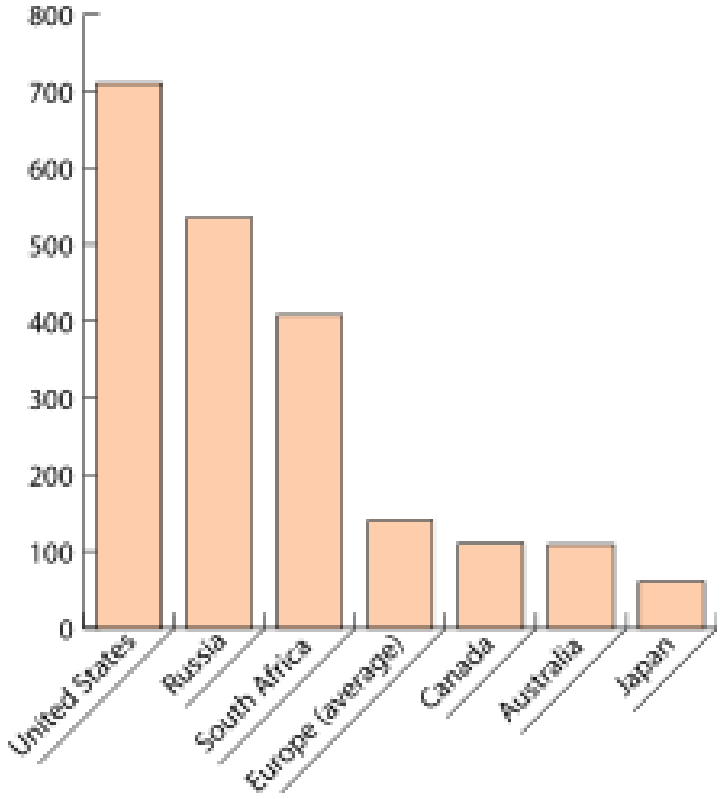


Fig.2 BAR chart

2.2.3. LINE chart

A line chart or line graph is a type of chart which displays information as a series of data points connected by straight line segments. It is a basic type of chart common in many fields. It is an extension of a scatter graph, and is created by connecting a series of points that represent individual measurements with line segments. A line chart is often used to visualize a trend in data over intervals of time. A time series thus the line is often drawn chronologically.

Fig.3 LINE chart

3. Implementation

3.1. User Interface using C++

Algorithm:

Step 1: Start

Step 2: Read the data input file using an entry box widget, Proceed only if the file exists

Step 3: Get the graph title, labels and range (optional)

Step 4: Show the results and on clicking the apply button Generate temporary files ***output.txt, attr.txt and type.txt***

Step 5: **Stop**

3.2. Chart generation using Java

Algorithm:

Step 1: Start

Step 2: Initialize the windows into drawing mode.

Step 3: Read the files ***output.txt*** and ***attr.txt*** as input to this Module.

Step 4: Read the coordinates (or data in case of pie chart) And draw the charts with proper resolution ranges and Labels taken from ***attr.txt***

Step 5: On bar chart and pie chart show 3d chart options

Step 6: On 3d chart request show the 3d image of the Corresponding chart

Step 7: On the exit export the displayed image to .jpeg or .jpg format.

Step 8: Stop

4. Snapshots

Start Page:

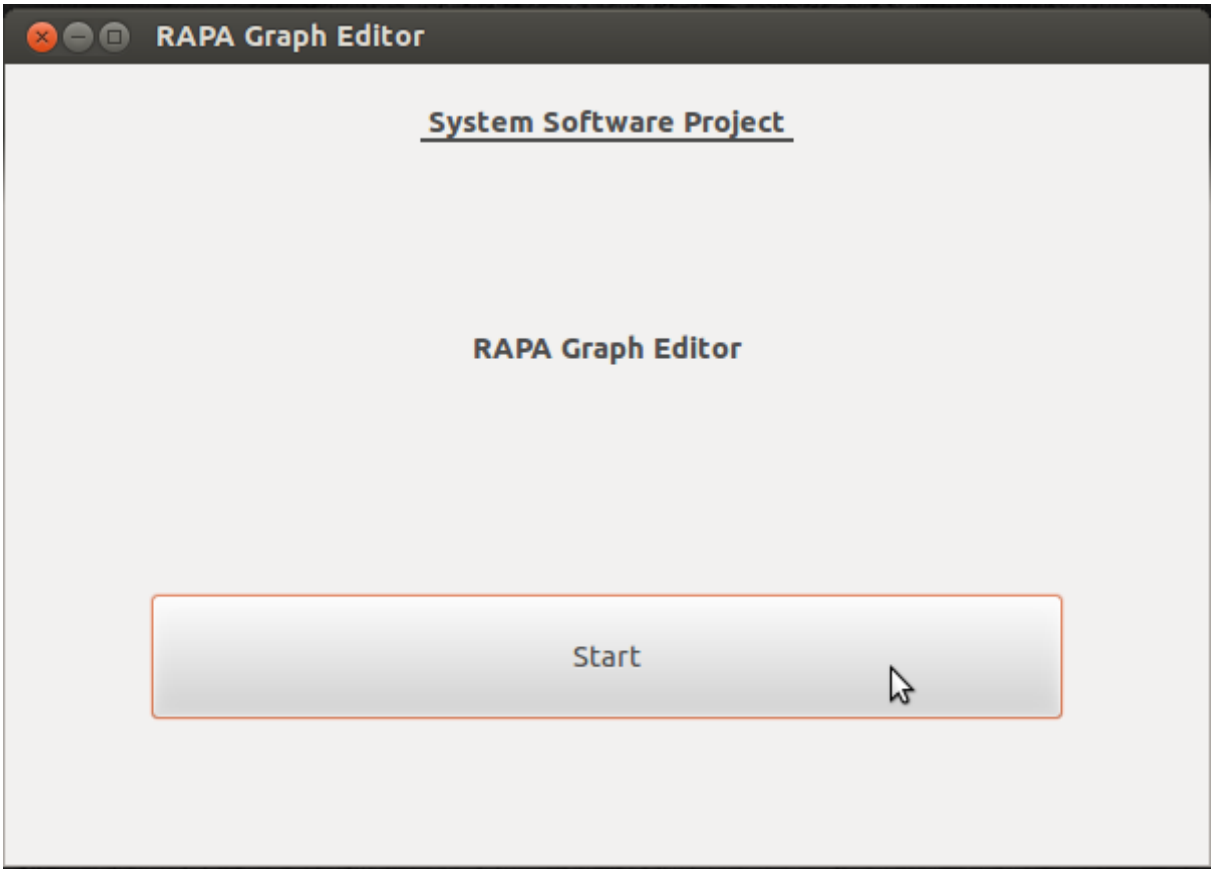
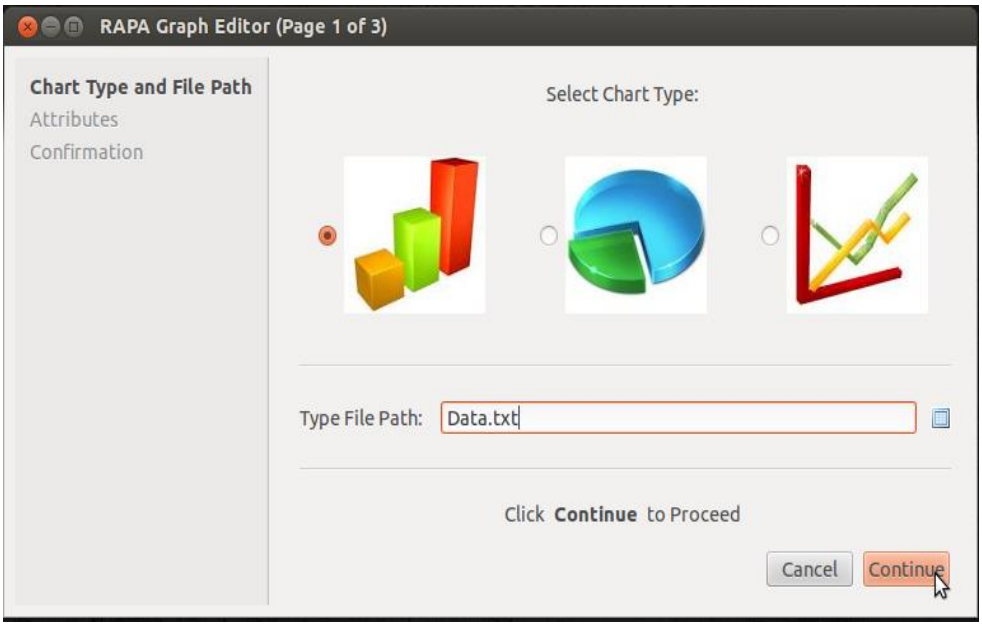
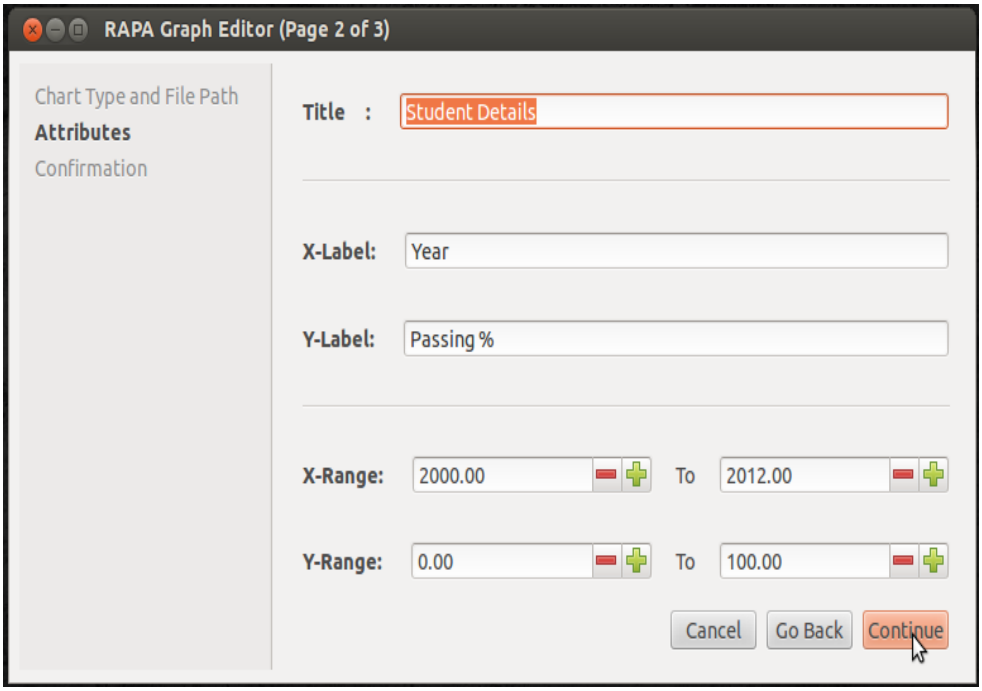


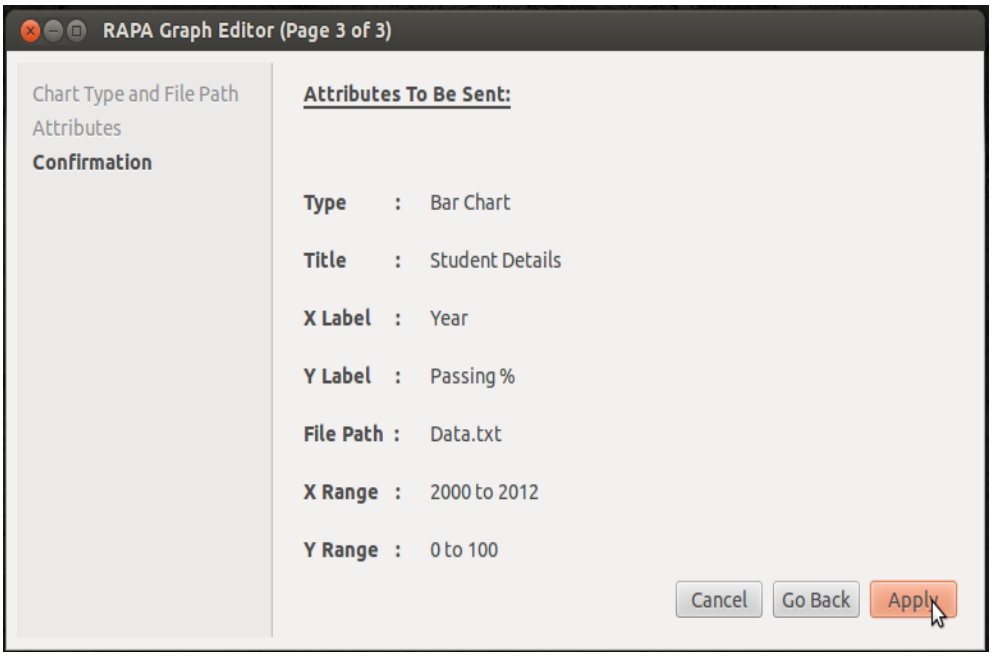
Chart Type:



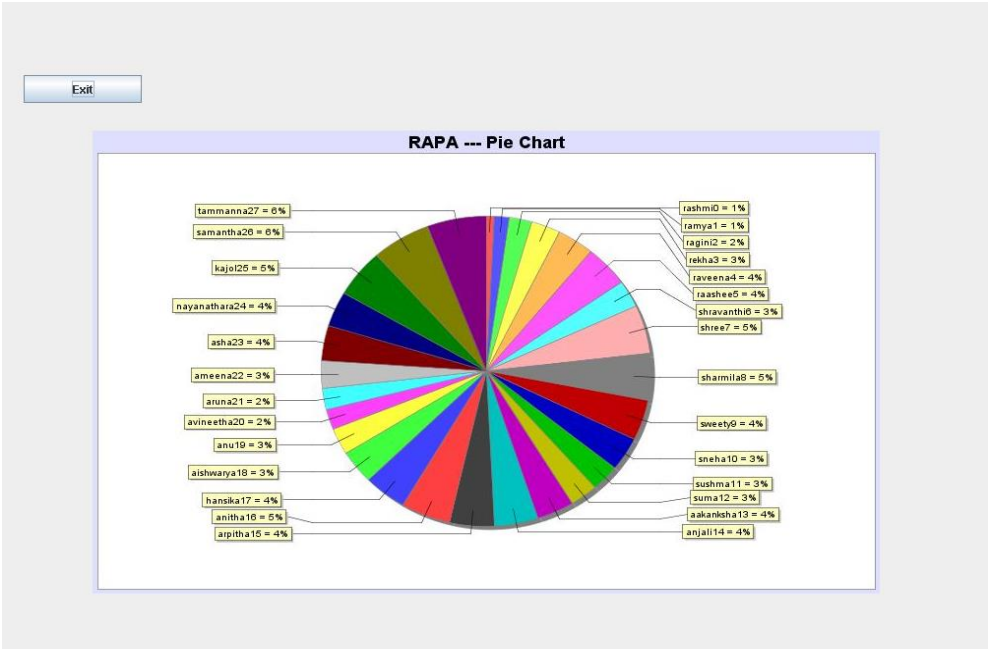
Input values:



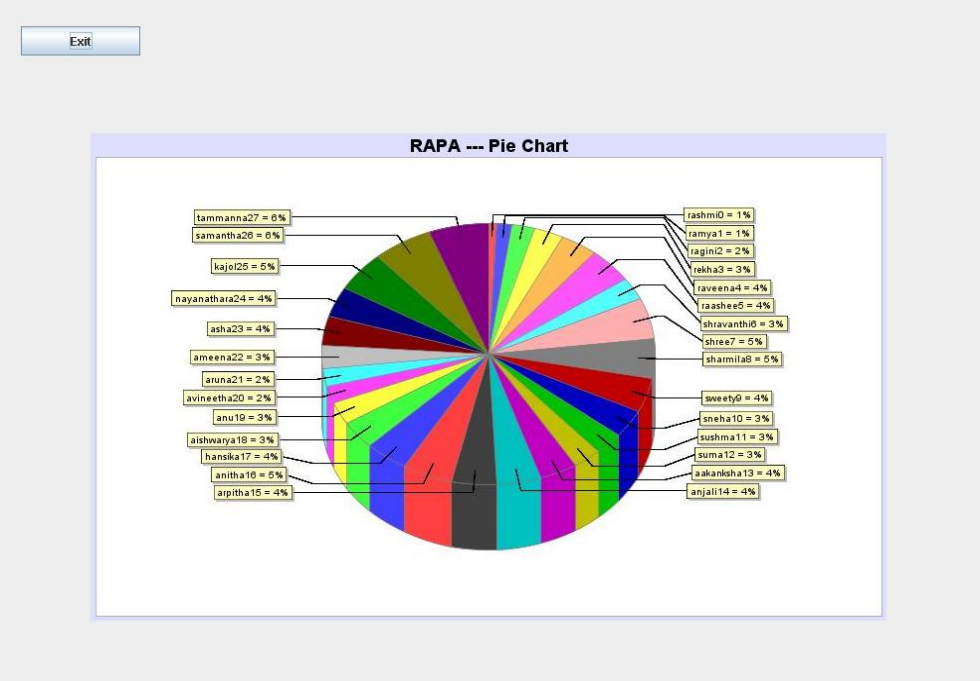
Output values:



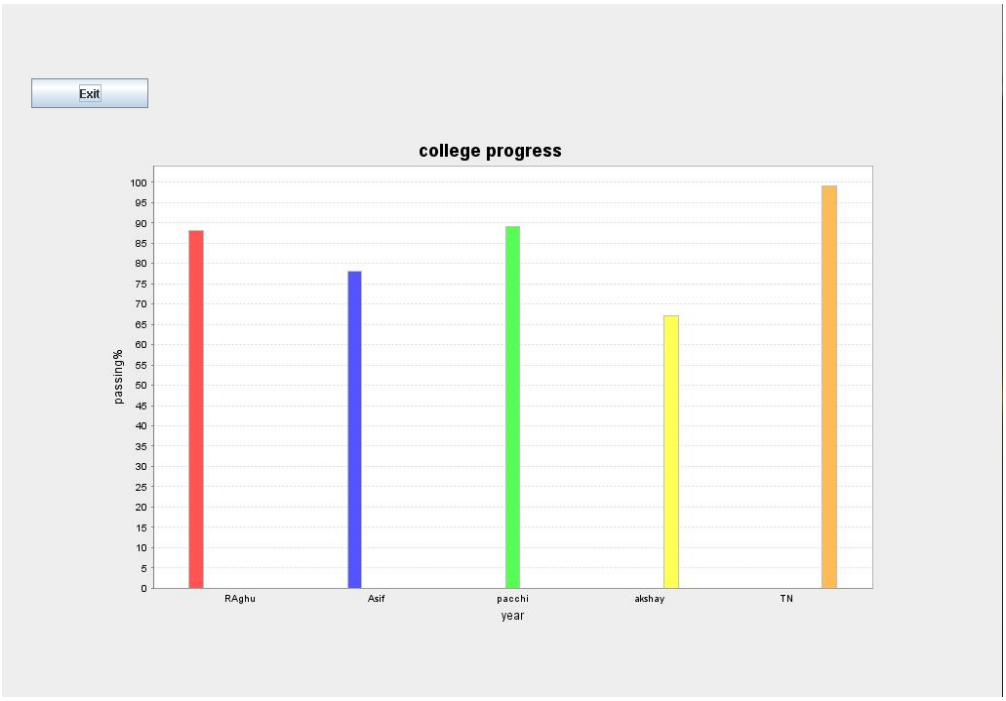
Pie diagram:



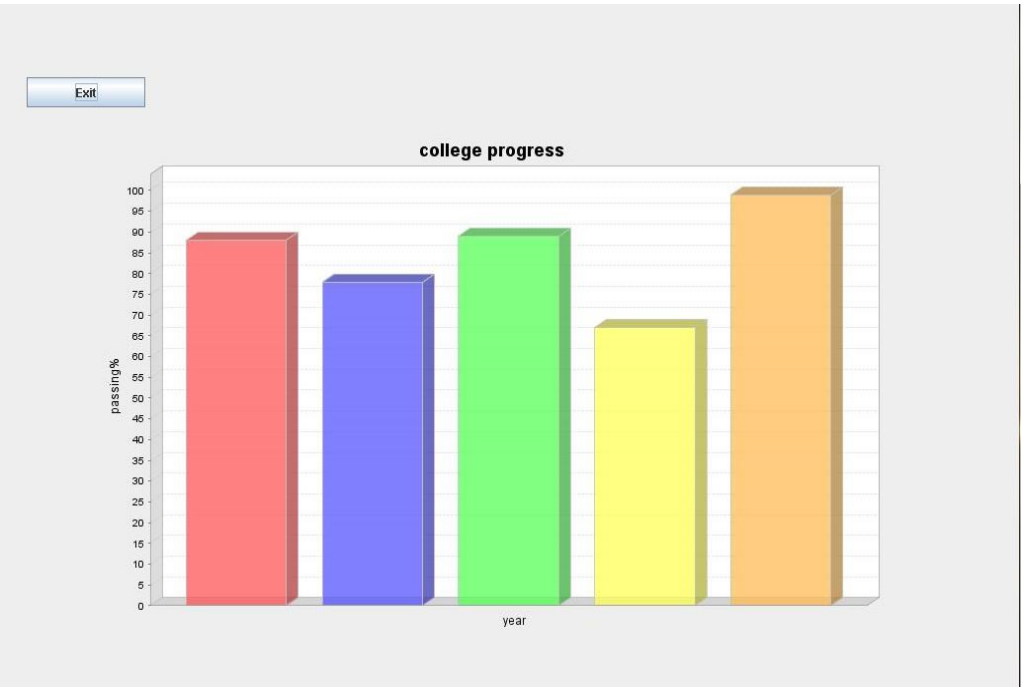
3D Pie chart:



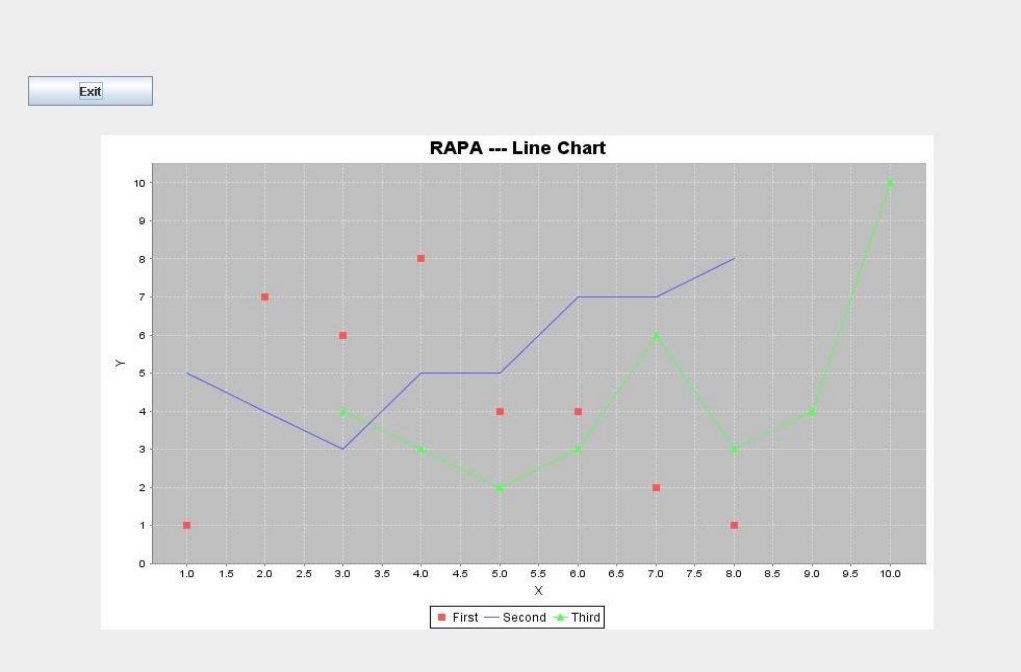
Bar chart:



3D Bar chart:



Line Chart:



5. Conclusion

Our software RAPA Graph Editor replicates few of the functionalities of the GNUPLOT that includes bar chart, line chart and pie charts. Gnuplot is generally invoked in the command line but our software is a GUI one that can use in both Windows and Linux with less modifications and tools installed. The tools required mentioned in the report.

References

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3. **Shell programming:**
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4. **Latex tutorials:**
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