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Author(s): Cleland, Timothy James

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User Guide for the Plotting Software for the Los Alamos National Laboratory Nuclear Weapons Analysis Tools Version 2.0

Timothy Cleland

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Distribution: Via Electronic Media

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User Guide for the Plotting Software for the Los Alamos National Laboratory Nuclear Weapons Analysis Tools Version 2.0

Timothy Cleland

Abstract

The Los Alamos National Laboratory Plotting Software for the Nuclear Weapons Analysis Tools is a Java™ application based upon the open source library JFreeChart. The software provides a capability for plotting data on graphs with a rich variety of display options while allowing the viewer interaction via graph manipulation and scaling to best view the data. The graph types include XY plots, Date XY plots, Bar plots and Histogram plots.

User Guide for the Plotting Software for the Los Alamos National Laboratory Nuclear Weapons Analysis Tools Version 2.0

Introduction

The Los Alamos National Laboratory (LANL) Plotting Software is a plotting package that is used by the Nuclear Weapons Analysis Tools. Users of the Nuclear Weapons Analysis Tools may be shown data plotted in graphs using this software, and may wish to display their own data in similar graphs. This user guide is provided to assist the user of these tools in using the graphing capability provided.

The LANL Plotting software is written entirely in the Java™ language and uses the open source library JFreeChart as its basis. It can be executed on any computer with a suitable Java runtime environment (JRE). The application has been tested on Windows 7 and 10 computers running Java™ 1.8. It has been tested on Mac OS X computers with Java 1.8. While it has not been tested on Linux computers, it will probably run on those machines also.

The rest of this user guide explains how to use the LANL Plotting Software.

Software Distribution DVD

The LANL Plotting Software is a supporting application in the Los Alamos National Laboratory (LANL) Nuclear Weapon Analysis Tools. The software may be ordered from the Defense Threat Reduction Information Analysis Center (DTRIAC) at Kirtland AFB. Please contact Janet Ortiz at 505-846-9420 or JANET.ORTIZ_CONTRACTOR @abq.dtra.mil. If Janet is not available, then call 505-853-1789, or send an email to: dtriac@abq.dtra.mil. Ask to be put on distribution for the LANL Nuclear Weapon Analysis Tools. The thirteen applications comprising the analysis tools will be shipped on a DVD. Figure 1 shows the directory structure of the distribution DVD.

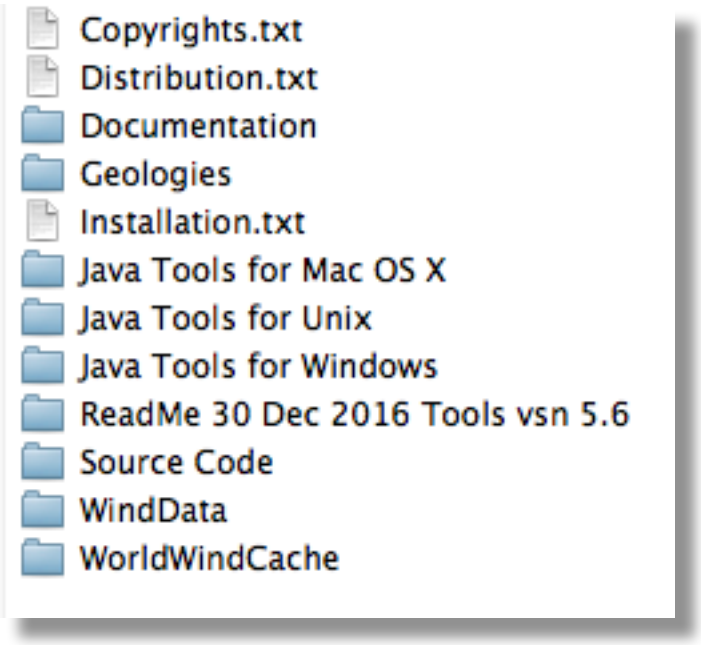

Figure 1: Distribution DVD Contents

Copyrights and Distribution

The copyrights.txt file has copyright information on software written by non-LANL authors that is included with the open source libraries, or that is included directly in the source code. The Distribution.txt file has the limited distribution caveats for the software. The software is Official Use Only, because it is Export Controlled as critical technology. Note: The plotting software by itself, when separated from the rest of the LANL Nuclear Weapon Analysis Tools, is releasable to the public with unlimited distribution. The plotting software is in the library/plotting folder for each operating system.

Overview of the Software

The LANL Plotting Software has four main types of graphs, 1) the XY Plot, 2) the Bar Plot, 3) the Histogram Plot, and 4) the Date XY plot. The user interfaces for each of these graph frames consists of an array of menu commands. These will be explained and illustrated for each graph type.

The XY Plot

The XY Plot consists of 2-dimensional data plotted on the X and Y axes (see Figure 1). The default display behavior is for the X axis (or domain axis) to be on the horizontal and for the Y axis (range axis) to be the vertical. However, as we will show shortly, the axes can be reversed so that the range can be the vertical axis and the domain the horizontal axis.

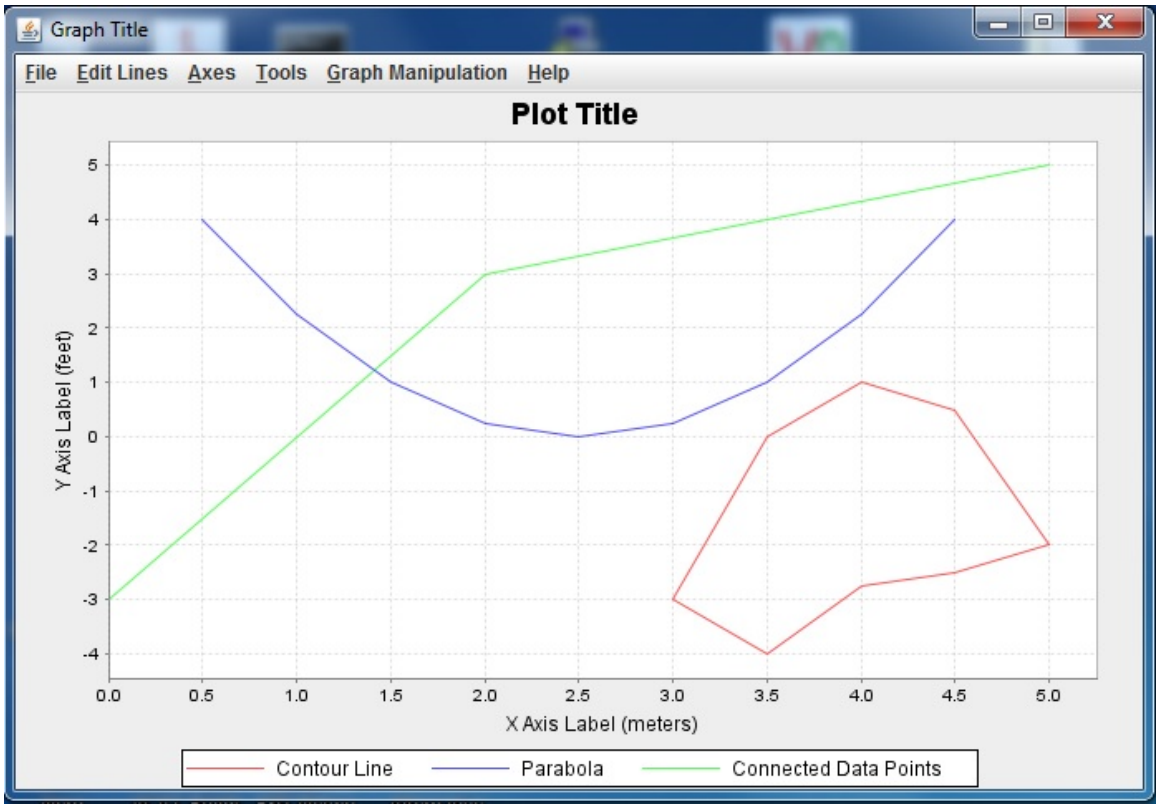

Figure 2: This is the XY Plot tool with some example data plotted.

File Menu

The File menu handles input and output operations for the graph. It may be accessed by using the menu bar or shortcut key combination *Alt+f* (Windows), or *Control+Option+f* (Macintosh). Selection of a save or import menu item brings up a standard file chooser window for your operating system that will allow the user to navigate through the file system and select or define a file for the operation. In the exporting or saving case, if the file already exists, a warning message asking to confirm that the file should be overwritten is displayed.

Export to PNG...

When this menu item is selected, a file save dialog will open allowing the user to select a directory and enter a file name to save the plot in the Portable Network Graphics (PNG) format with the ".png" file extension.

Export to JPG...

When this menu item is selected, a file save dialog will open allowing the user to select a directory and enter a file name to save the chart in the JPEG (Joint Photographic Experts Group) format with the ".jpg" file extension.

Print...

This option selection will display the page set up window (See Figure 3.). This window presents options for the style and look of the chart page being printed as well as selection of the printer for the job. After the OK button is clicked in Fig. 3, the standard dialog will show to select the print options. The plot will be scaled to print on a full page of paper.

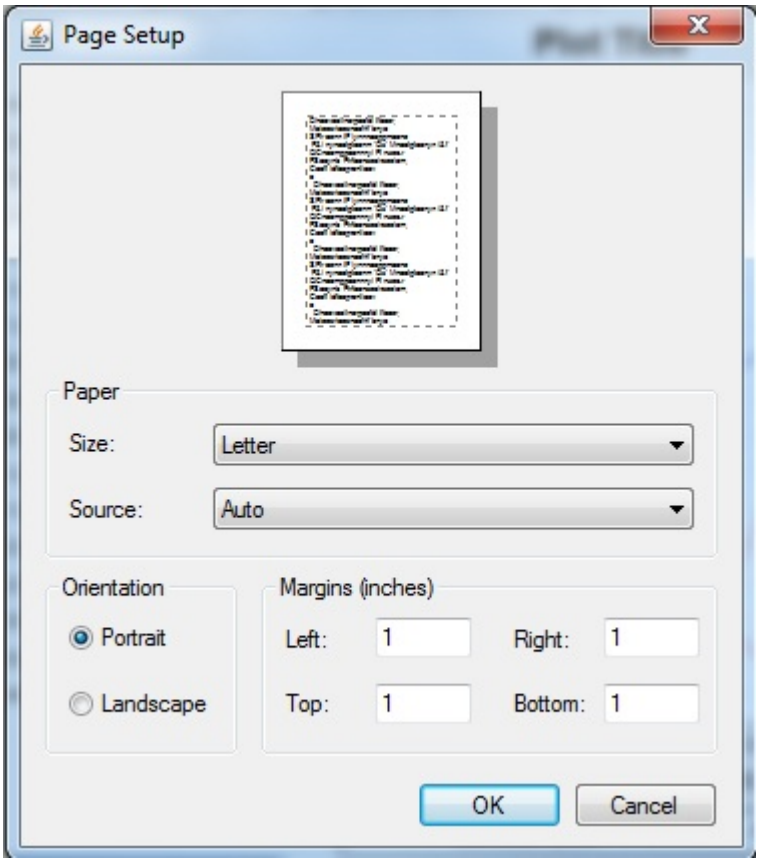

Figure 3: Page Setup dialog obtained when using the *Print*… option.

Save as Text

The Save as Text menu item has two submenus for saving the entire chart, or saving just one line of the chart to a text file.

Save Chart...

Selection of this submenu opens a standard file save dialog for your operating system that allows the user to navigate through the file system and to choose an existing file or to create a new file to save the chart to. For better readability, the file will contain information of the main features and leaves out certain details such as tick size, background color, and some others. If these attributes are important, the user may use the Export Chart... submenu of the Export menu.

Chart Text File Format: Below is an example file showing the format of the saved chart. This is the same format required when importing a chart from text (see below).

```
Graph Title
Plot Title

This result was written at: Sun Apr 02 15:26:04 MDT 2017

Total number of lines is 2
Maximum number of values in a column is 9

X Axis Name is X Axis Label (meters) and   X Axis Type is 0 ( Linear )
X Axis Range: low is 0.275 and high is 5.225
Y Axis Name is Y Axis Label (feet) and   Y Axis Type is 0 ( Linear )
Y Axis Range: low is -4.4 and high is 4.4
Axes orientation is VERTICAL

X axis marker list has 0 markers:
The marker values are:

Y axis marker list has 0 markers:
The marker values are:

Name of the line #0 is Contour Line
Name of the line #1 is Parabola


         x                y                x                y
  3.000E00        -3.000E00         5.000E-01         4.000E00
  3.500E00         0.000E00          1.000E00         2.250E00
  4.000E00         1.000E00          1.500E00         1.000E00
  4.500E00        5.000E-01          2.000E00        2.500E-01
  5.000E00        -2.000E00          2.500E00        1.000E-02
  4.500E00        -2.500E00          3.000E00        2.500E-01
  4.000E00        -2.750E00          3.500E00         1.000E00
  3.500E00        -4.000E00          4.000E00         2.250E00
  3.000E00        -3.000E00          4.500E00         4.000E00
```

The first two lines of this file are the name of the chart and name of the plot. Next, the time that the file was saved is shown. The total number of curves on the chart and the maximum length of data arrays corresponding to these curves are on the following two lines. The number of lines on the chart is given next.

The axes names, their type (Linear, Logarithmic, or Probability) as well as orientation (VERTICAL or HORIZONTAL) is written on the next three lines. The vertical orientation means that the vertical axis (y axis) represents the values of the function, and the horizontal axis (x axis) represents the independent variable. A horizontal orientation means the axes are switched: the y axis holds the independent variable and the x axis contains the value of the function. The next group of lines describes the labels placed on the plot: their quantity, their names and x, y coordinates.

The following two groups of lines list the markers of the x and y axes with their coordinates (values) on the axes. An x axis marker is a vertical line that crosses the x axis at a point called the marker value. Y axis markers are horizontal lines also described by their values on the y axis. The names (or legend names) of the curves are listed in the next group of lines. The rest of the file is the x and y values organized in columns representing the lines in the chart.

Save a Line...

When this sub-menu item is chosen, the user is presented with the list of all chart line names. Any one of these lines may be selected for saving to a text file. After the name is selected, a standard file save dialog will open so that the user can save the line to a text file.

Below is an example file showing the format of a saved line. This is the same format required when importing a line from text (see below).

```
 Contour Line

 This result was written at: Sun Apr 02 21:09:08 MDT 2017

 Number of value pairs is 9

 X Axis Name is X Axis Label (meters)     Y Axis Name is Y Axis   Label
(feet)

                x                y
          3.000E00         -3.000E00
          3.500E00          0.000E00
          4.000E00          1.000E00
          4.500E00         5.000E-01
          5.000E00         -2.000E00
          4.500E00         -2.500E00
          4.000E00         -2.750E00
          3.500E00         -4.000E00
          3.000E00         -3.000E00

 The Line Color is java.awt.Color[r=255,g=85,b=85]
 The Line Thickness is java.awt.BasicStroke@d1a007c0
```

Import from Text

This operation imports data from a text file, and recreates a chart, or adds a line to a chart. It has two submenu options: Import Text Chart and Import Text Line. After a chart or line is saved in a text file, the user can view the file in a text editor and edit the file. If a “mistake” is made in editing the text, the file may not import properly, and it may cause the software to throw an exception, or to lock up.

Import Text Chart...

Selecting this submenu opens a standard file dialog to choose the file to import. Once the file is selected, a new chart is created from the text file.

Import Text Line...

Selecting this submenu allows the user to choose a text file describing a line. Once the file is selected, the line is added to the chart. Note that the software does not check the units for the line. The user must ensure that the units of the imported line match the chart units.

Export

When a chart or line is exported, it is saved to a file in a special Java™ format called a "serialized" object. This file format has a lot of special characters, and is not human readable. When a chart or line is imported, the software reads the serialized format, and restores the line or chart. If any character is edited or changed in an exported file, the import of the line or chart will probably fail. Also, if the plotting software is updated to a new version it may not import charts and lines exported in an earlier version. Finally, the Java™ Runtime Environment may not be able to import charts and lines saved with different runtime environment versions. The user may want to use a ".obj" file extension for this type of file, to make the file readily identifiable in the file browser.

Export Chart...

Selecting this submenu allows the user to choose a directory and file name to export the serialized chart to.

Export a Line

Upon a selection of this option, the user is presented with a list of the chart line names. When a line from the list is chosen, a file chooser window appears that prompts to define a file for saving the serialized line data.

Import

These menu items are used to restore the information saved during the serialized export operations. They recreate a chart or a line exported to a file in the serialized format. When a line is imported to a chart, the user must ensure that the line being restored and the chart it is restored to have the same units.

Import Chart...

Selecting this submenu opens a file dialog to choose the file to import. Once the file is selected, a new chart is created from the serialized object file.

Import a Line...

Selecting this submenu allows the user to choose a file containing a line of data. Once the file is selected, the line is added to the chart. Note that the software does not check the units for the line. The user must ensure that the units of the imported line match the chart units.

Close

The last submenu of the file menu closes the chart window.

Edit Lines Menu

This menu gives the user a number of choices for editing the chart lines. It may be accessed by using the menu bar or shortcut key combination *Alt+e* (Windows), or *Control+Option+e* (Macintosh). When a line is changed, the legend and the submenu list of line names is automatically updated as needed.

Delete All Lines...

The choice of this item brings up a warning window requesting a confirmation of this action to prevent inadvertent erasing of all the lines on the chart. If the deletion is confirmed by the user, all lines on the chart will be cleared.

Delete a Line

Selecting this submenu will show the list of the line names. When a line name is selected, a confirmation window will ask if the user wants to delete the line. If the deletion is confirmed, the line is deleted from the chart.

Copy a Line

This choice of the selected line in the submenu list copies that line so that it can be pasted into another chart.

Paste a Line

This submenu item action pastes a copied line to the chart. The user needs to ensure the compatibility of the pasted line with the chart. The axis units must match for the chart to make sense.

Cut a Line

This option removes the submenu-selected line from the chart and copies it, so it can be pasted into another chart.

Change a Line Color

This selection allows the user to change a line's color by selecting the line from the submenu list. Doing so will bring up a color chooser window (see Figure 4) and the new color can be selected from the pallet.

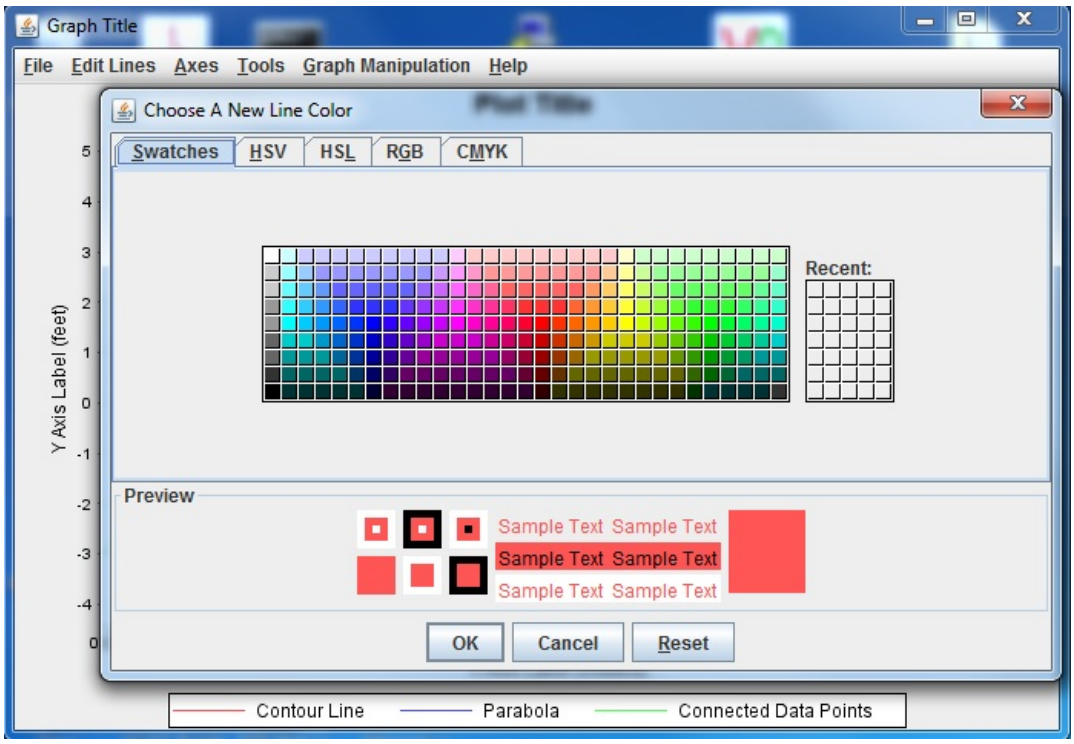

Figure 4: Color pallet brought up when changing a line color. Select the desired color and click "OK".

Change Line Type

Selecting this menu item for a given line in the submenu list brings up a pull-down menu that will allow you to choose a different line type than the default thin, solid line (see Figure 5). **Note:** due to a bug in the JFreeChart code, changing the line type to a different line type may cause the line to disappear during zooming operations. Selecting Auto Scale both axes under the Graph Manipulation menu will cause the line to reappear.

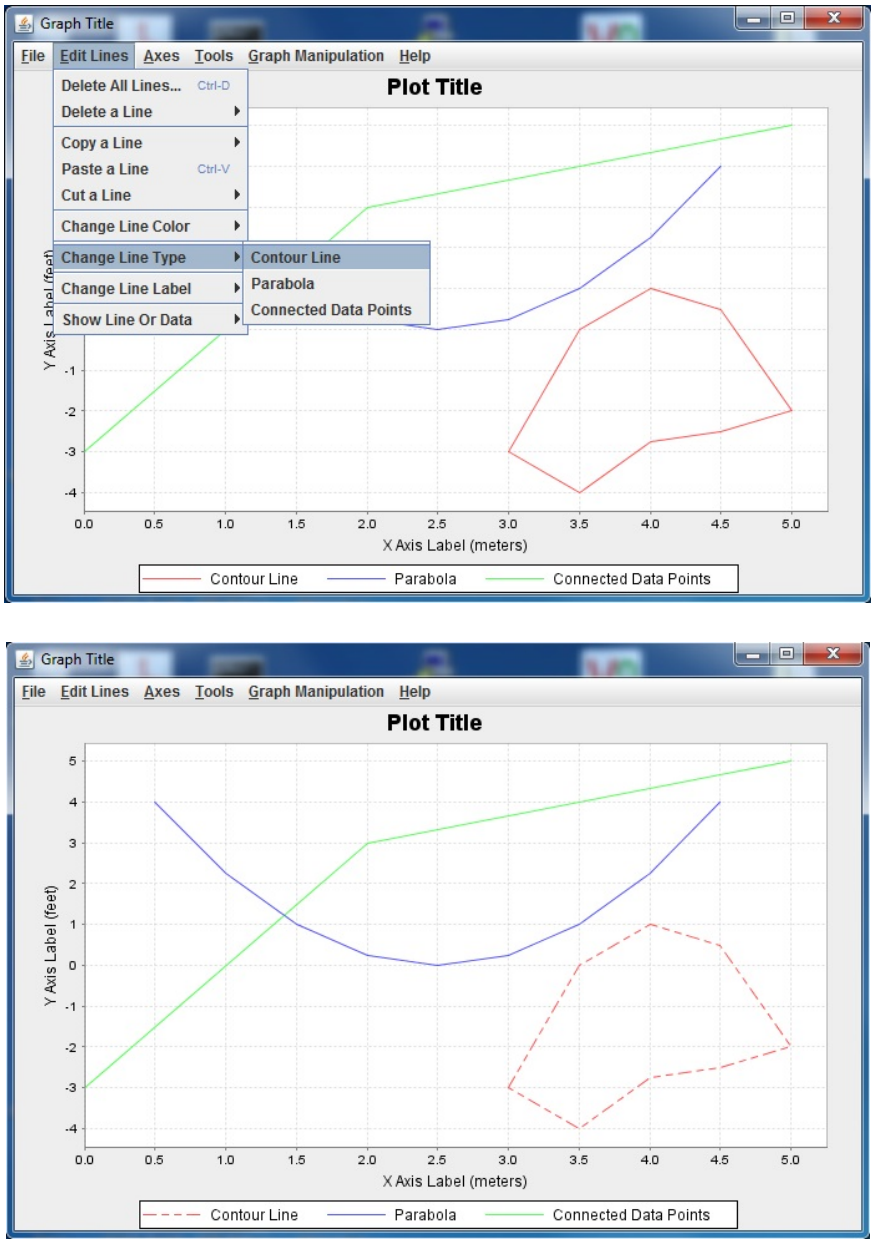

Figure 5: Changing a line type. Here the Contour Line has been selected and changed to a dashed line via the popup line-type selector (not shown).

Change Line Label

This submenu allows you to change the legend name for a line in the chart. Selecting this option will bring up a popup frame showing the current line label. The user can edit the label and click “OK” to change it. The name will be changed in the legend and in all the submenus that show the list of line names.

Show Line or Data

This submenu allows you to toggle back and forth between showing the data as a connected line or as the individual data points. If a line is currently being shown as a connected line, selecting that line from the submenu list will toggle it to show just the data points and vice versa.

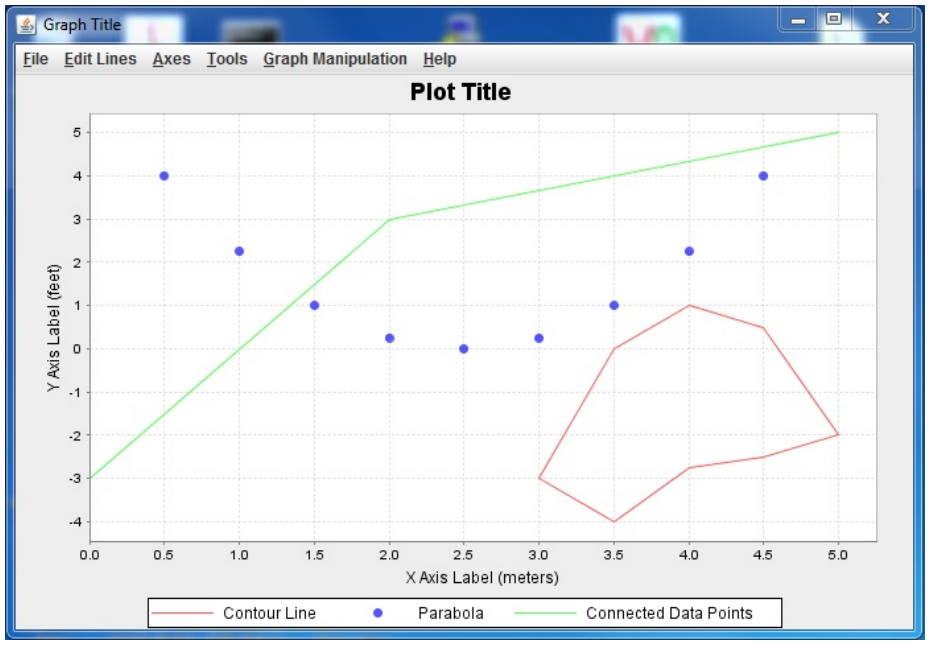

Figure 6: Here the Parabola line has been toggled via the Show Line or Data option to show data only.

Axes Menu

This menu is used to make changes to the default axes settings. It may be accessed by using the menu bar or shortcut key combination *Alt+a* (Windows), or *Control+Option+a* (Macintosh).

Select Axis Type

This option allows switching between linear, logarithmic and probability scaling for either the x or the y axis (which show up as submenu options when this option is highlighted). The logarithmic axis labels are in exponential format, e.g. 1e0, 1e1, etc. The probability scale is derived from the inverse normal distribution function. The advantage of the probability scale is that samples that are approximately normally distributed fall on a straight line on such a graph. Furthermore, if the X-scale is logarithmic, a lognormal distribution would be a straight line.

When selecting a logarithmic axis type, if the data you're plotting (or the axis scale marks, see remarks below) contains values less than or equal to 0.0, the program will return the following error popup:

Figure 7: Attempting to convert to a log axis when you have values less than or equal to 0.0 will result in this warning.

This can be remedied by rescaling the data by hand (for example, by saving the line as text then editing the line file with rescaled values, then re-importing the new line. See the **File Menu** section) then retrying. If this error occurs even though your data contains all strictly positive values, then the axis currently displayed may contain values less than or equal to 0.0. To get around this, temporarily zoom in (or otherwise rescale, see **Graph Manipulation Menu** section) the axis that contains the offending values until all the axis values are strictly positive, then try the option again.

Reverse Axes

Selecting this submenu shows the independent variable values (domain) on the vertical (y) axis and the function values (range) on the horizontal (x) axis (See Figure 8 for the submenu, and Figure 9 for a reversed axis plot). Selecting this menu item again will restore the axes to their original location.

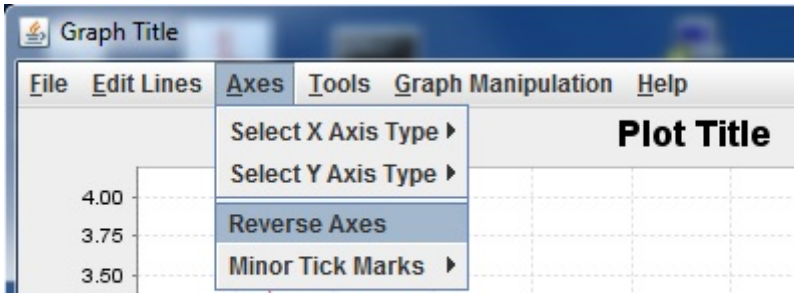

Figure 8: The Reverse Axes menu option

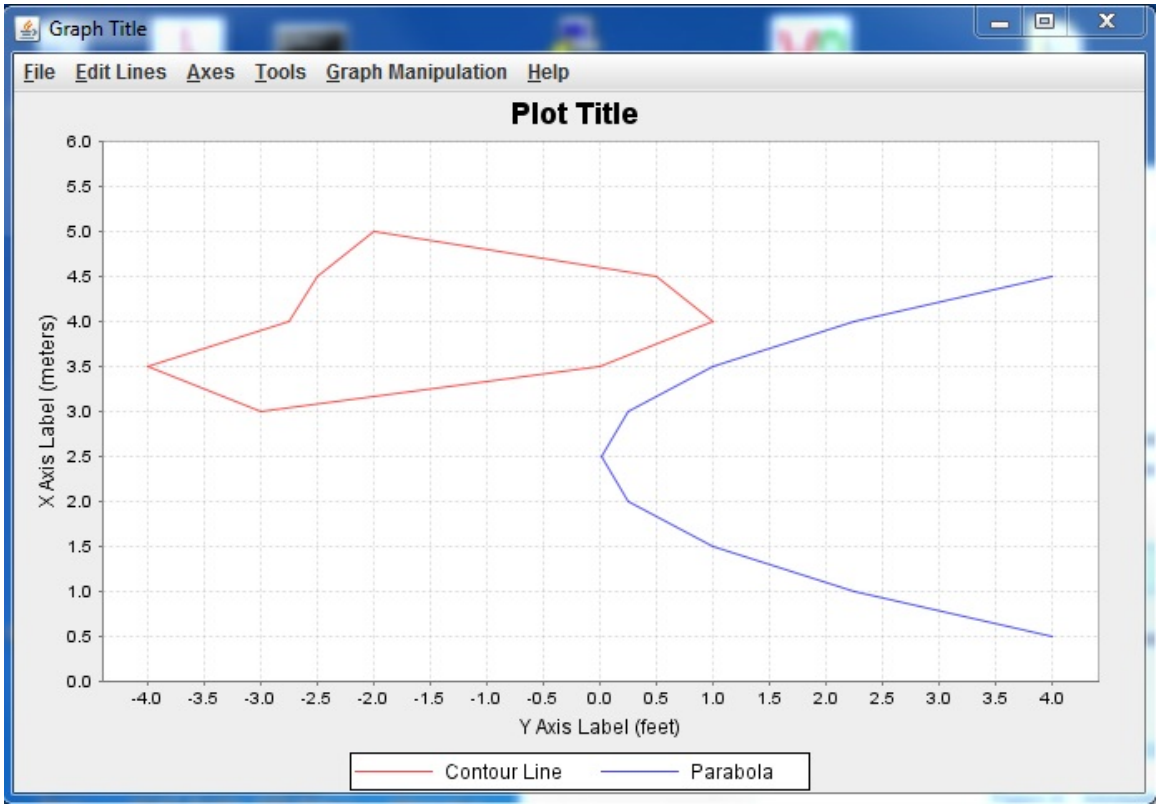

Figure 9: The resultant graph after reversing the axes.

Minor Tick Marks

The default axis marking is to have only the major tick marks present, but if the user desires to see a set of minor tick marks between the major ticks on one or both axes, this option can be selected bringing up a submenu of numbers between 0 and 10. Selecting 0 or 1 effectively turns the minor tick marks off.

Tools Menu

The tools menu comprises a series of check box options as well as other submenus that allow for the manipulation of the labels and markers. It may be accessed by using the menu bar or shortcut key combination *Alt+t* (Windows), or *Control+Option+t* (Macintosh). There is also a choice to restore the plot to its original condition, when it was first drawn.

Show Data Points

Checking this box will display the data points for the chart lines (see Figure 10). The data points may be shown by themselves or on top of lines if the Show Lines menu is checked.

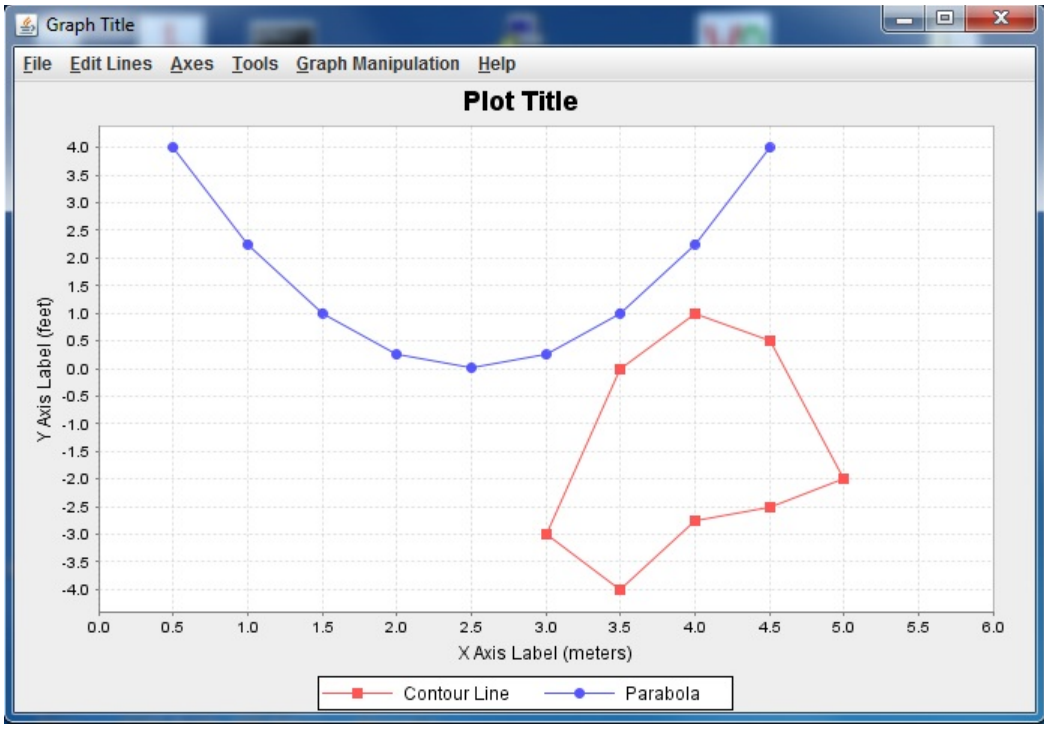

Figure 10: The result of invoking Show Data Points.

Hide Data Points

This submenu selection will eliminate the display of the separate data points from the chart. The data in this case is presented as smooth lines, and the Show Lines box will be checked automatically.

Show Lines

The data points are connected with straight line segments when this box is checked.

Hide Lines

When this box is checked, the lines connecting consecutive data points are not drawn on the chart (See Figure 11). With selection of this box the data will be represented by the separate data points, and the Show Data Points submenu will be checked automatically.

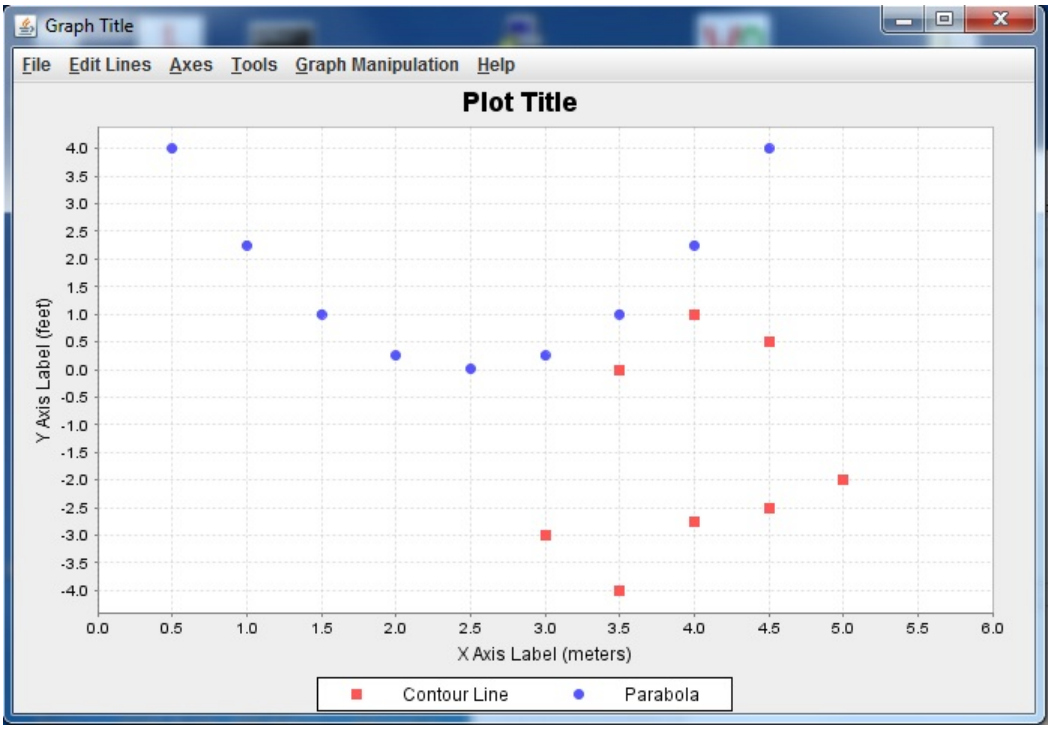

Figure 11: The result of invoking Hide Lines.

Show Legend

This check box shows the legend of line names and types. The legend contains the user-provided names of the lines/point-sets. The default position of the legend bar is at the bottom center of the chart.

Hide Legend

Selecting this submenu will hide the legend.

Show Click Coordinates

The click coordinates are the coordinates of a point on the plot that has been clicked on with the mouse. When this submenu is selected, the x and y coordinates of the point are displayed along with dashed crosshairs (See Figure 12). The point coordinates are shown until another point is clicked.

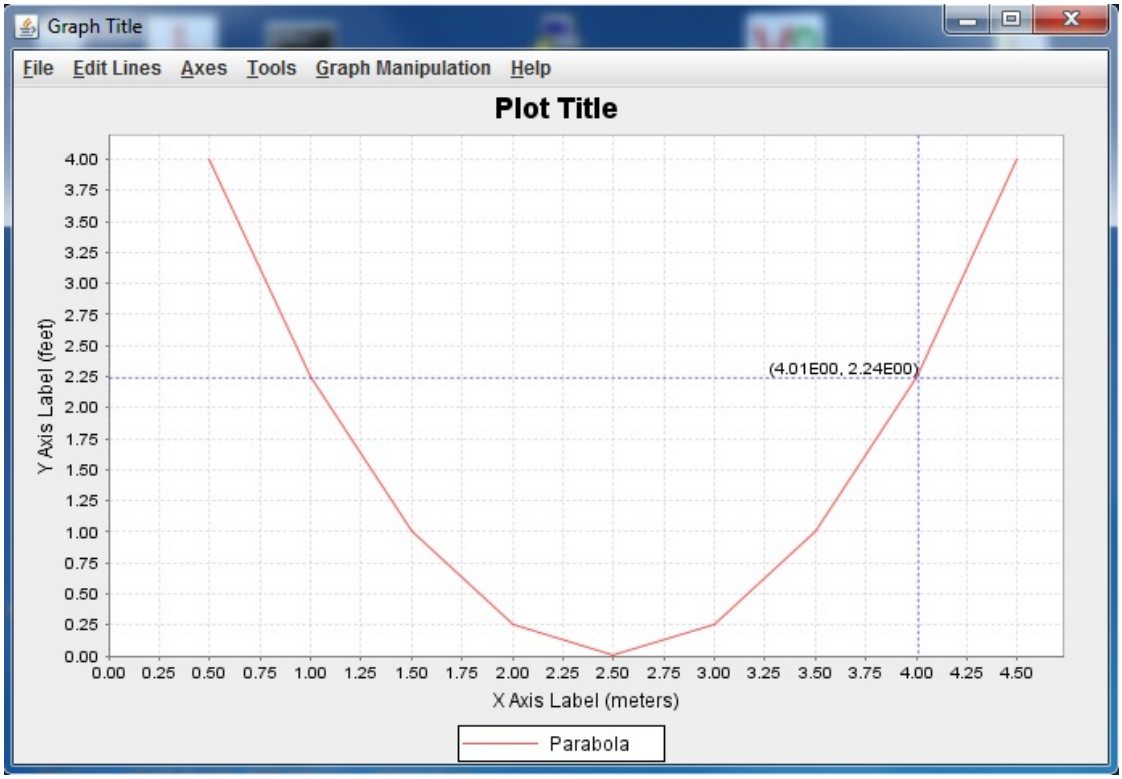

Figure 12: With the Show Click Coordinates option, clicking on the graph displays the x and y lines corresponding to the clicked point. To remove these lines, use the Hide Click Coordinates option.

Hide Click Coordinates

Selecting this submenu hides the crosshair lines and coordinates.

Move Legend Horizontally

This submenu enables the user to move the legend bar horizontally to one of three positions: Right, Center, and Left relative to the plot area.

Right

The choice puts the legend bar in the rightmost position on the current vertical level. (See Figure 13)

Center

This choice centers the legend bar on the current vertical level.

Left

This choice places the legend bar in the leftmost position on the current vertical level.

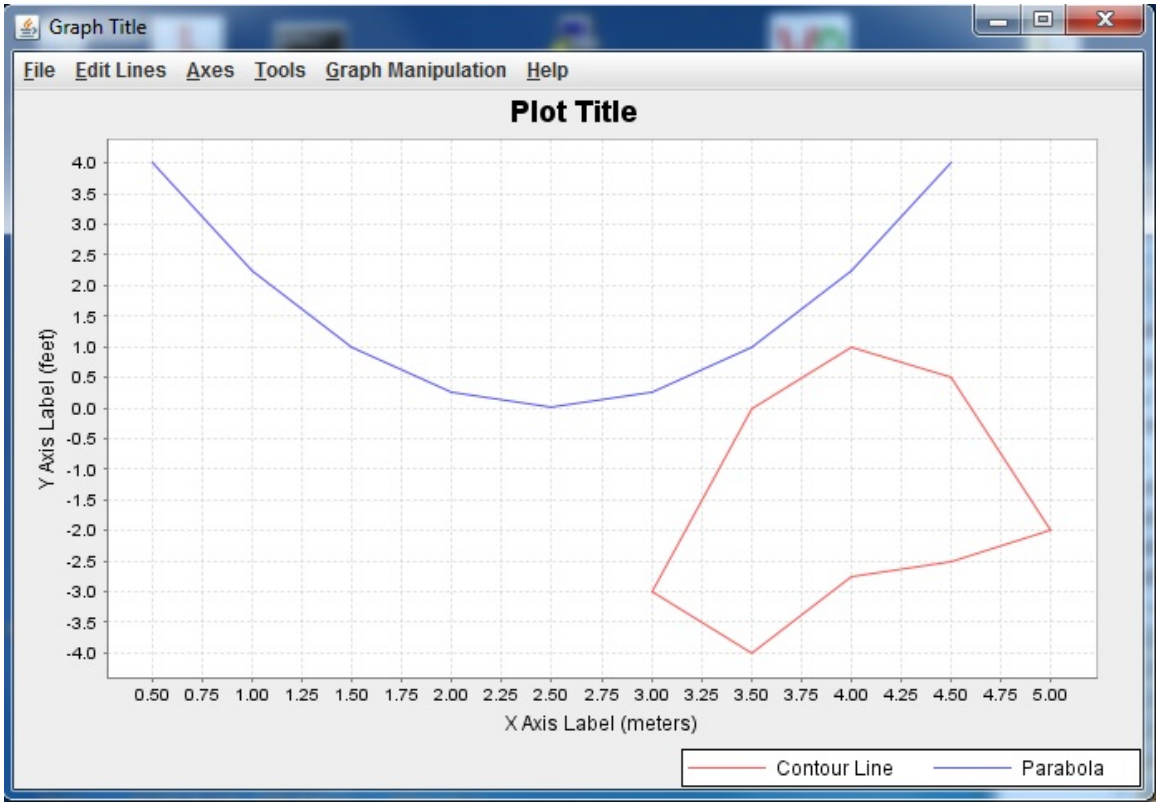

Figure 13: Moving the legend to the right (default position is in the center).

Move Legend Vertically

This option enables the user to change vertical position of the legend bar Up or Down to one of two locations: just above or just below the plot. The horizontal position of the bar remains the same.

Up

This selection moves the legend bar to the top of the chart if it was at the bottom of the chart, otherwise no action is taken. (See Figure 14.)

Down

This selection moves the legend bar to the bottom of the chart if it was at the top of the chart, otherwise no action is taken.

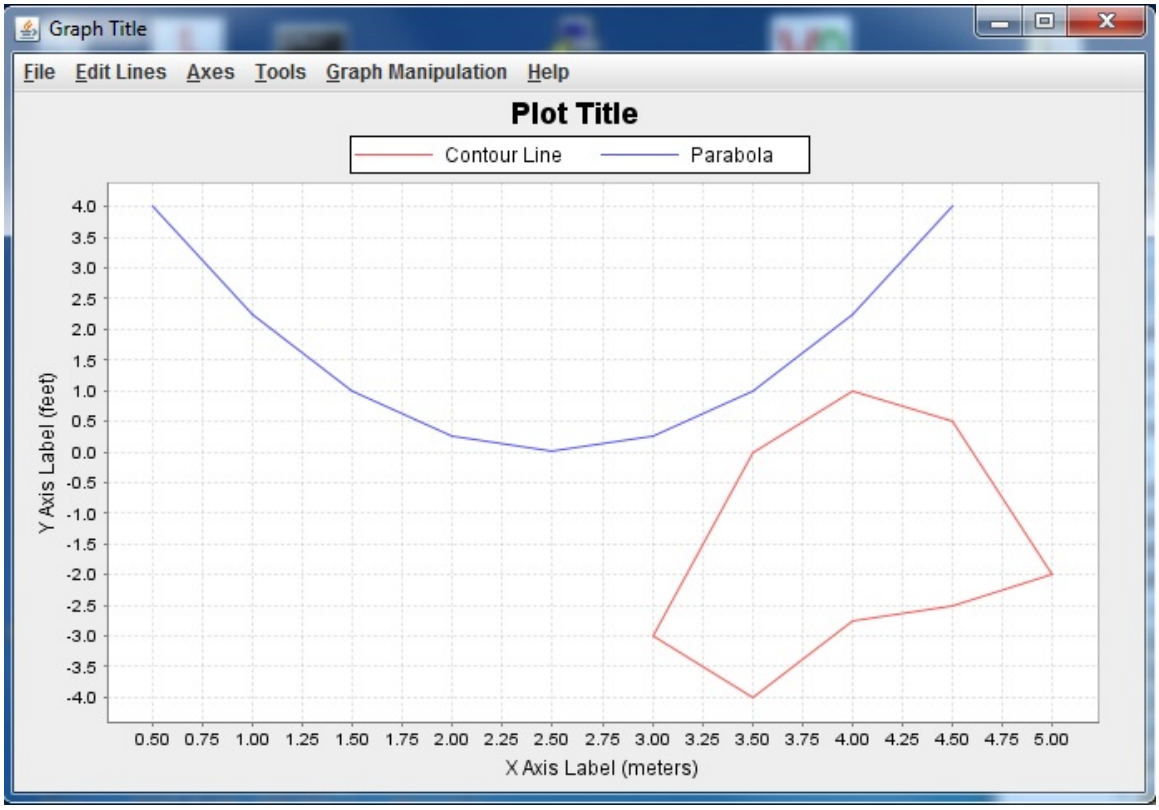

Figure 14: Moving the legend up (default position is on bottom).

Labels

This submenu has the following choices: Add Label..., Change Label, Remove Label, and Clear All Labels... These submenus manipulate the labels that are text strings that can be placed anywhere in the plot area.

Add Label...

This selection allows the user to put a new label on the chart. It shows a dialog window with three fields: two for the x and y coordinates of the new label middle point, and one for the label text (see Figure 15). Initially, the text field for the label is empty and the number fields display the coordinate center of the plot. The coordinates are expressed in units of the corresponding axes. The user may overwrite these coordinates to place the label at a desirable position on the plot. The coordinate values must be in the range of their axes. If a coordinate falls outside of this interval, an out of range message will appear when the Done button is pressed. In this case, the user needs to correct the value and press the Done button again. The Cancel button closes the dialog window without adding a label. Figure 16 shows the graph with two labels added.

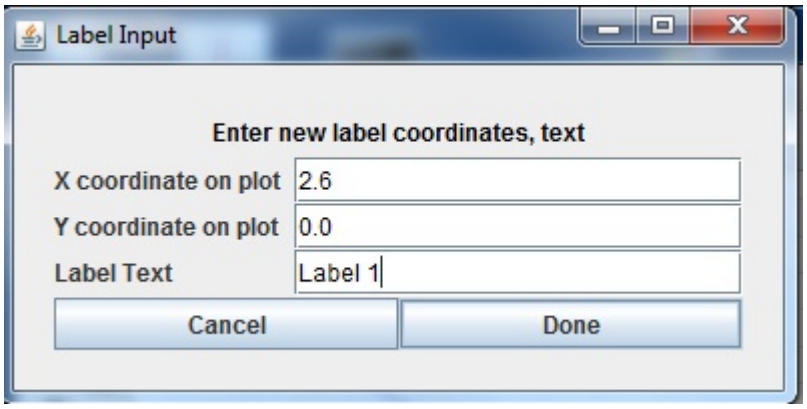

Figure 15: The Label Input popup frame used to add or change a label on the graph.

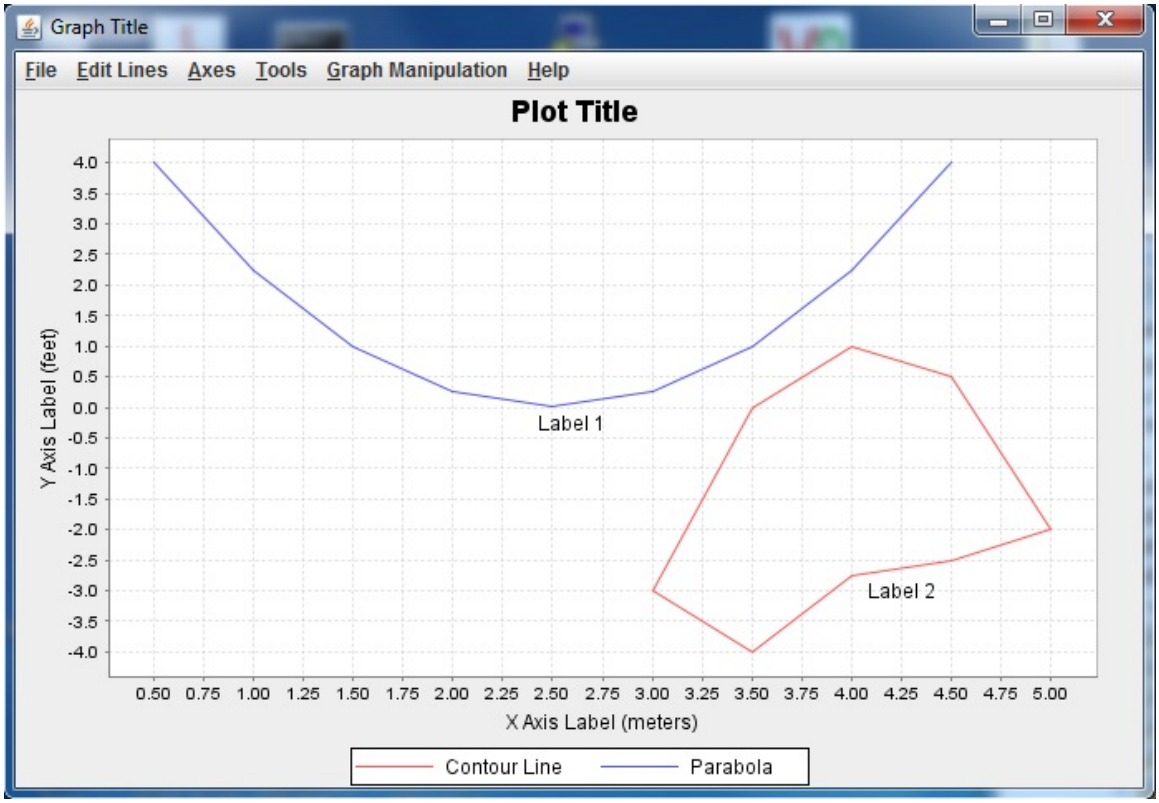

Figure 16: Graph with labels added

Remove Label

This submenu selection displays the list of the chart labels. Choosing one of them removes this label from the plot after your intention is confirmed using a confirmation dialog.

Clear All Labels...

Selecting this menu item will display a warning asking the user to confirm that all of the labels on the chart should be deleted. After the confirmation, all labels are eliminated from the plot.

Markers

This submenu allows the user to manage axis markers for the x and y axes. The markers are horizontal or vertical lines that are drawn on the plot and defined by an axis coordinate. Manipulation of the markers is done for each axis separately with the submenu options X Axis Markers and Y Axis Markers. Selecting either of these menu items shows submenus to add a marker, remove a marker, or clear all markers.

Add Marker...

When this submenu is selected, a dialog will be shown to enter a new marker. (See Figure 17.) After entering the coordinate and pressing the Done button, the marker will be displayed on the plot. (See Figure 18.)

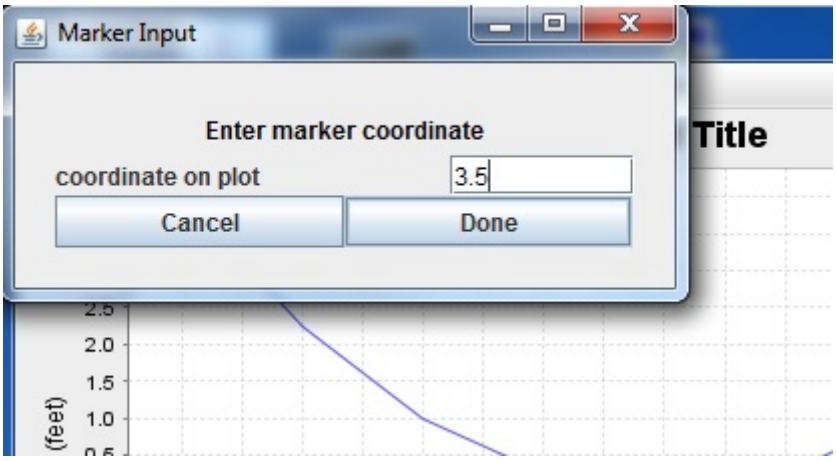

Figure 17: The Marker Input dialog popup.

Remove Marker

Any marker of an axis may be selected from the list of the axis markers for removal. The user will be asked to confirm the removal.

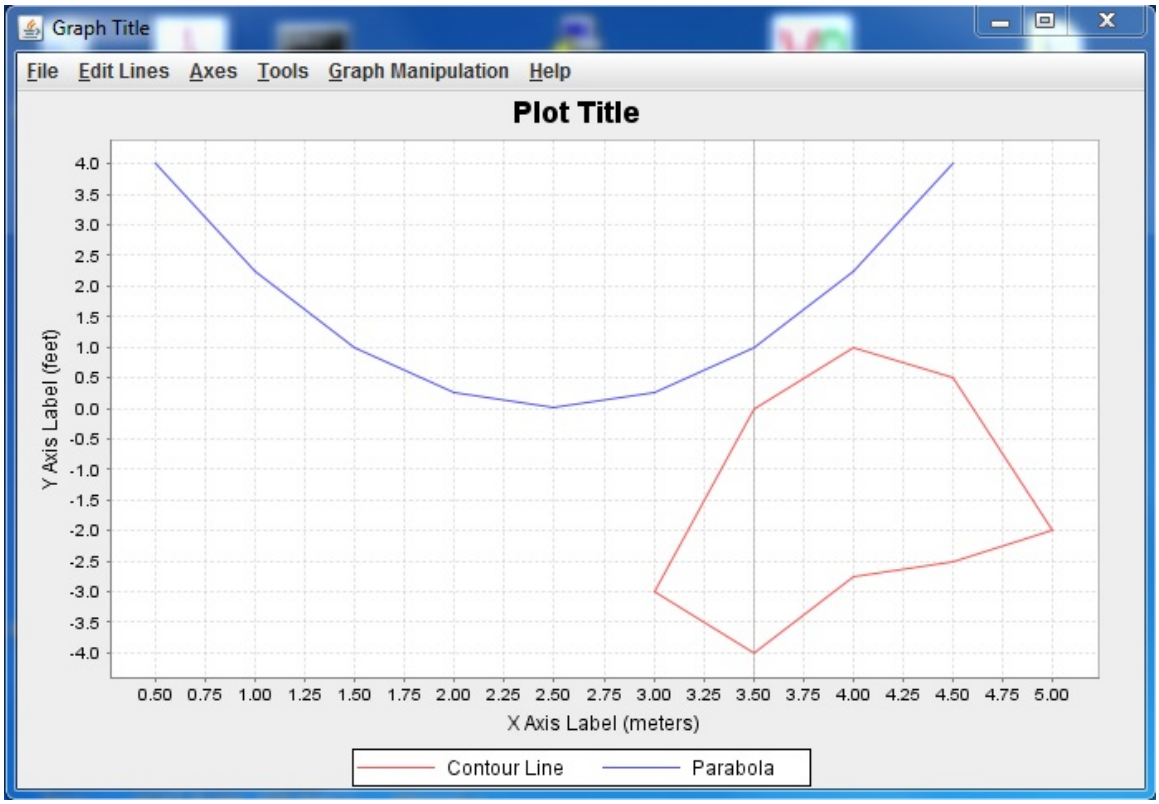

Figure 18: Marker added at the value x = 3.5.

Clear All Markers...

The user can remove all markers from an axis. The user will be asked to confirm the removal of all of the markers.

Restore Original Chart...

The last sub-menu in the tools menu gives the user an option to erase all changes made to the chart in a current session. On selection of this option a message asking the user to confirm this decision will appear.

Graph Manipulation Menu

This menu controls graph properties, the graph size, and zooming options. It may be accessed by using the menu bar or shortcut key combination *Alt+g* (Windows), or *Control+Option+g* (Macintosh). There are a variety of zooming options in the Graph Manipulation menu: zooming in or out both axes at the same time, or zooming only one axis, or using automatic scaling of one or both axes. **Note:** the right mouse click in the plot area pops up a menu with choices of ***Properties***, ***Print***, and ***Zoom*** that are similar to those invoked from the File and Graph Manipulation menus. The **Save as** option from this menu gives an opportunity to save the chart as a PNG file.

Edit graph properties

This selection opens a dialog window (see Figure 20) with three tabs: Title, Plot, and Other. The same dialog can be opened by right-clicking on the chart (see Figure 19) and selecting “Properties...”

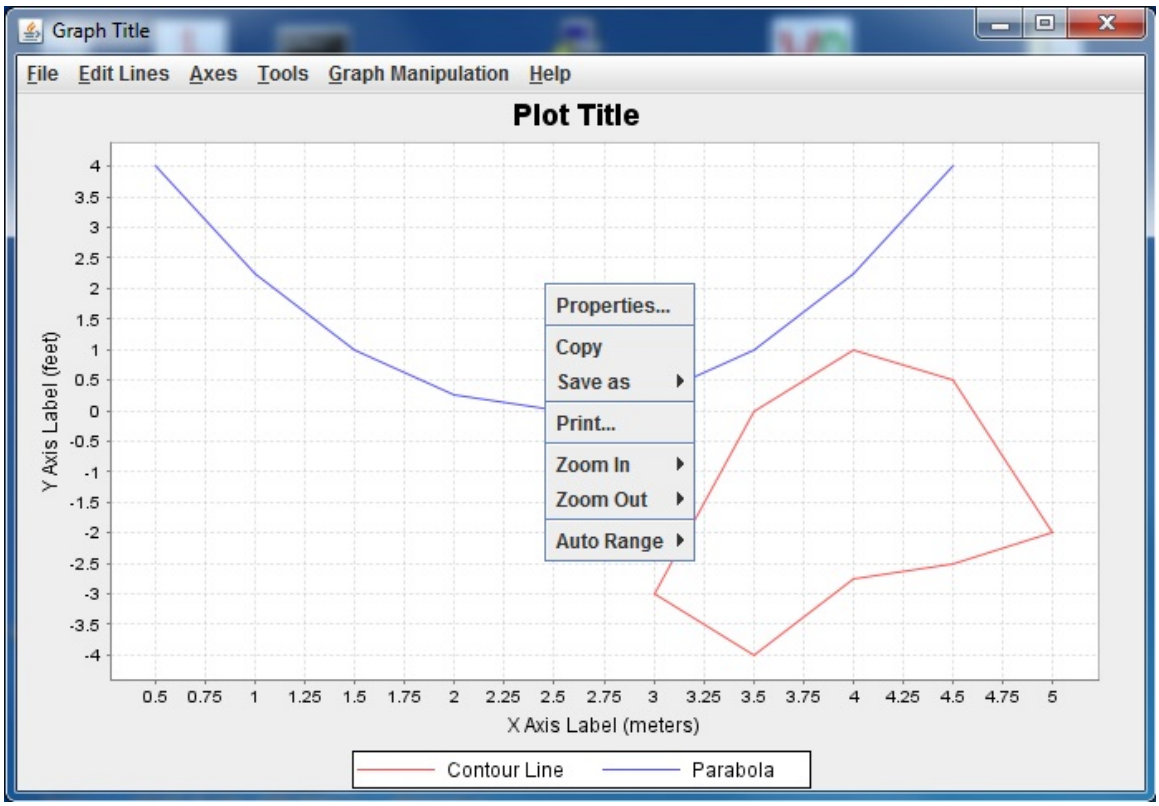

Figure 19: The right click menu. By right-clicking on the graph the options under the Graph Manipulation Menu can be more convenient.

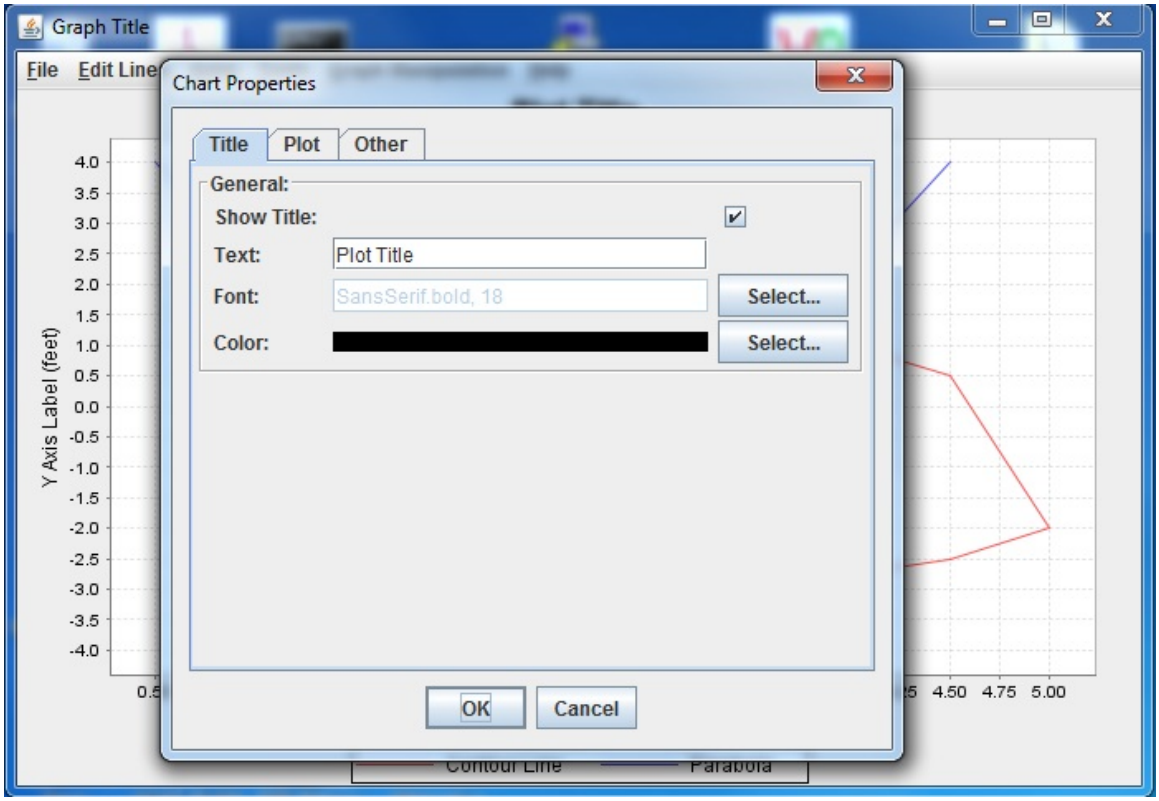

Figure 20: The Chart Properties dialog which appears when selecting "Edit graph properties" from the Graph Manipulation Menu or by right clicking and selecting "Properties..."

Title

The title tab (see Figure 20) handles the look of the graph title: text, font, and color.

Plot

The plot tab (see Figure 21) is responsible for the overall plot appearance, its outlines, background, and orientation.

Domain and Range Axes

The Domain and Range Axis sub-tabs allow the user to customize the chart axes. The user can change the label of an axis in the Label line; select a new font or a new color. The Ticks tab at the bottom of this window (see Figure 22) gives a choice of showing or hiding tick labels and the marks. The ranges of the axes (minimum and maximum values) may be changed when the Range Axis tab is selected. If the Auto-adjust range box is clicked on, they display extreme axis coordinates of the plot. If this box is clicked off, the values may be changed.

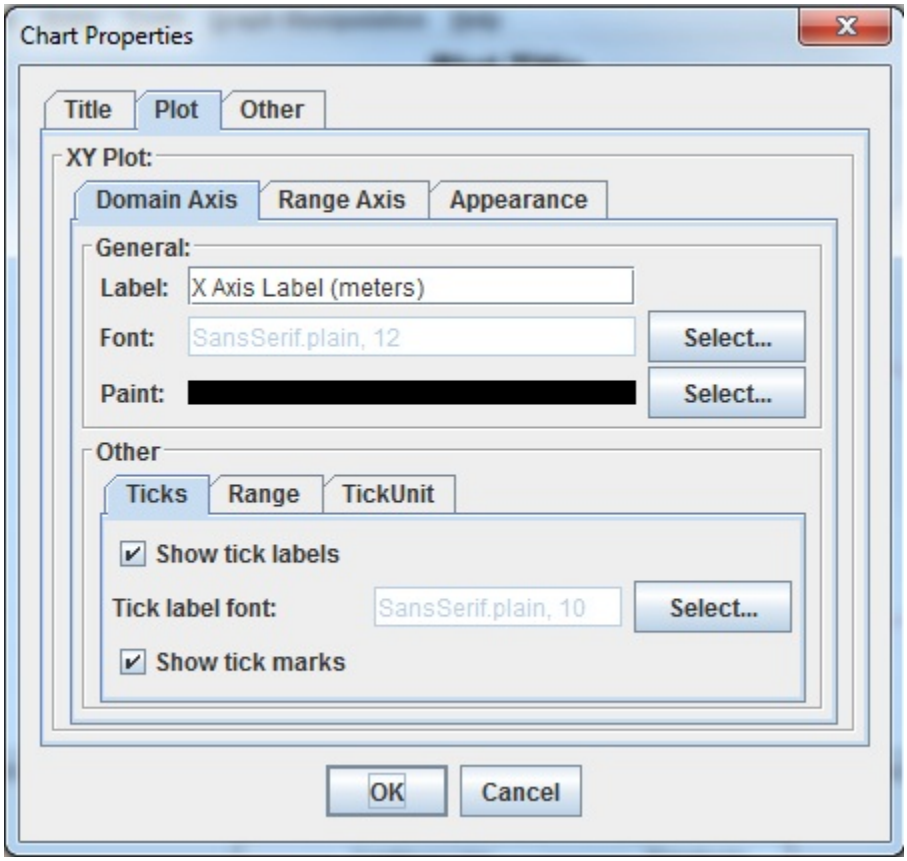

Figure 21: The Plot tab on the Chart Properties Editor

Appearance

This tab controls outline stroke, outline and background paint, and the plot orientation. Changing the Orientation has the same effect as selecting the Axes: Reverse Axes menu item.

Other

The implementation of the Other tab (see Figure 22) allows choosing a background color and checking the Draw anti-aliased box. No editors are implemented for changing series paint, series stroke, series outline paint, and series outline stroke in this window. When the background paint select button is pressed, the user is presented with a new window showing a color chooser to select a new background color. With the anti-aliasing turned on, the plot lines are smoothed; otherwise they are drawn with short horizontal or vertical segments corresponding to the underlying data. Selecting Draw anti-aliased (the default), gives the plot a smooth and crisp look. As usual, all changes made may be canceled or approved by the user before closing this dialog.

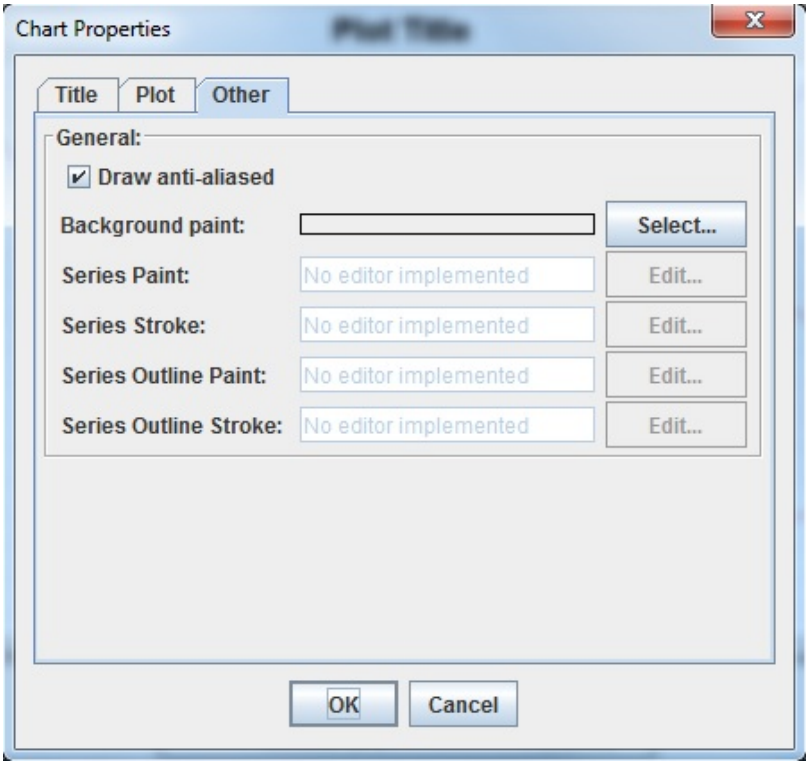

Figure 22: The Other tab allows choosing a background color and/or the choice of anti-aliased drawing.

Change x, y Axes Tick Sizes...

This submenu allows modification of the major tick. For example, the ticks of both x and y axes on the plot of Figure 19 are equal to 0.25. When this option is selected, a dialog for entering new values will appear (see Figure 23). Initially, it contains the current tick values. After the new values have been entered and the Done button is pressed, the new tick spacing will show on the axes. **Note**: for the logarithmic type of axis the tick size change has no effect.

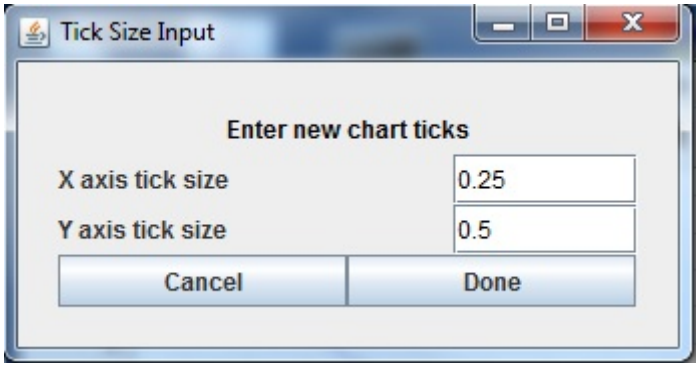

Figure 23: Choosing the tick sizes for the axes.

Resizing Plot Boundaries

This menu selection brings out a dialog for entering a new width and height of the plot window. It opens with the current width and height in pixels and expects the new values in pixels to be entered. If an entered number is too small or too big, the out of range warning will appear that gives the range of possible values. The upper limit is pretty large and the width of the plot is going to be limited by the width of the screen. The plot also can be resized by dragging the sides or corners of the plot window.

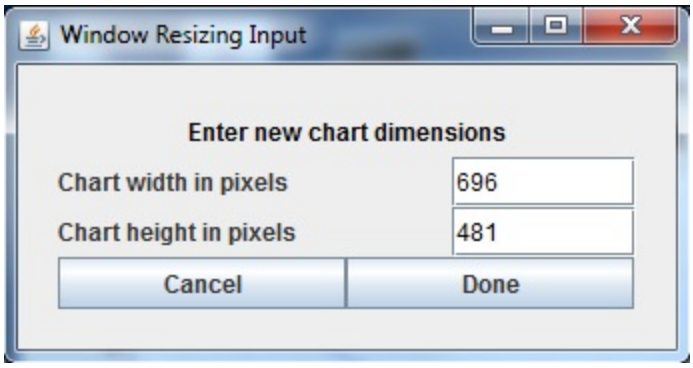

Figure 24: The resizing editor allows the user to select exact number of pixels for the chart size.

Zoom in both axes

This menu selection displays a part of the plot corresponding to a smaller range of values of both axes. The same effect can also be achieved by clicking in the plot area and "stretching" a rectangle from its left upper corner to the lower right corner for a new plot area. In the top portion of Figure 25, the colored rectangle in the lower right corner was created by dragging the rectangle from its upper left corner. The lower portion of Figure 25 shows the zoomed in plot, after the mouse button is released in the lower right corner of the rectangle.

Zoom out both axes

This operation reverses the previous action, it restores the display of the larger portions of each axis. The Zooming out effect can also be achieved by clicking in the plot area and dragging a rectangle up and to the left. Regardless of the size of the dragged rectangle, the zoom out action will show the entire graph.

Zoom in x axis, Zoom in y axis

The action displays a part of the plot corresponding to a smaller range of values of the corresponding axis.

Zoom out x axis, Zoom out y axis

The previous operation may be reversed with this option; it restores a previous range of values of the corresponding axis.

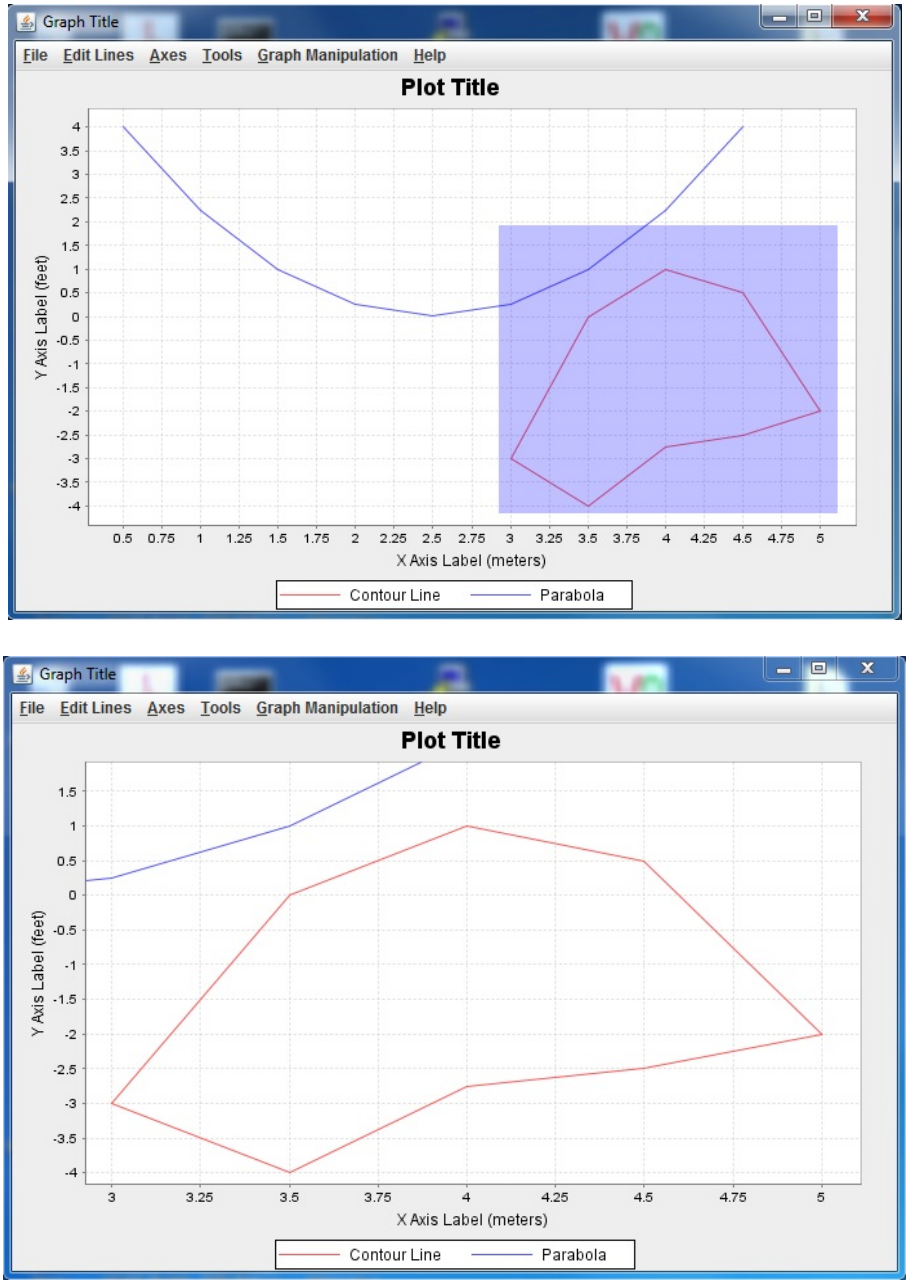

Figure 25: Left-clicking in the graph area and dragging creates a rectangle that allows precise zoom control.

Auto Scale (both, x axis, y axis)

These choices bring the display of the axes back to the full range of the values of the independent variable and the dependent variable.

Help Menu

The Help menu provides explanation for each of the menu options for the XY Plot. It may be accessed by using the menu bar or shortcut key combination *Alt+h* (Windows), or *Control+Option+h* (Macintosh). Under the Help menu, there are five submenu options corresponding to the five menus at the top of the graph frame.

The Bar Plot

The second type of plot available in the LANL Plotting Software is the Bar Plot (see Figure 26). Much of the capability is completely analogous to that shown in the XY Plot section, however, Bar Plot specific details will be described here.

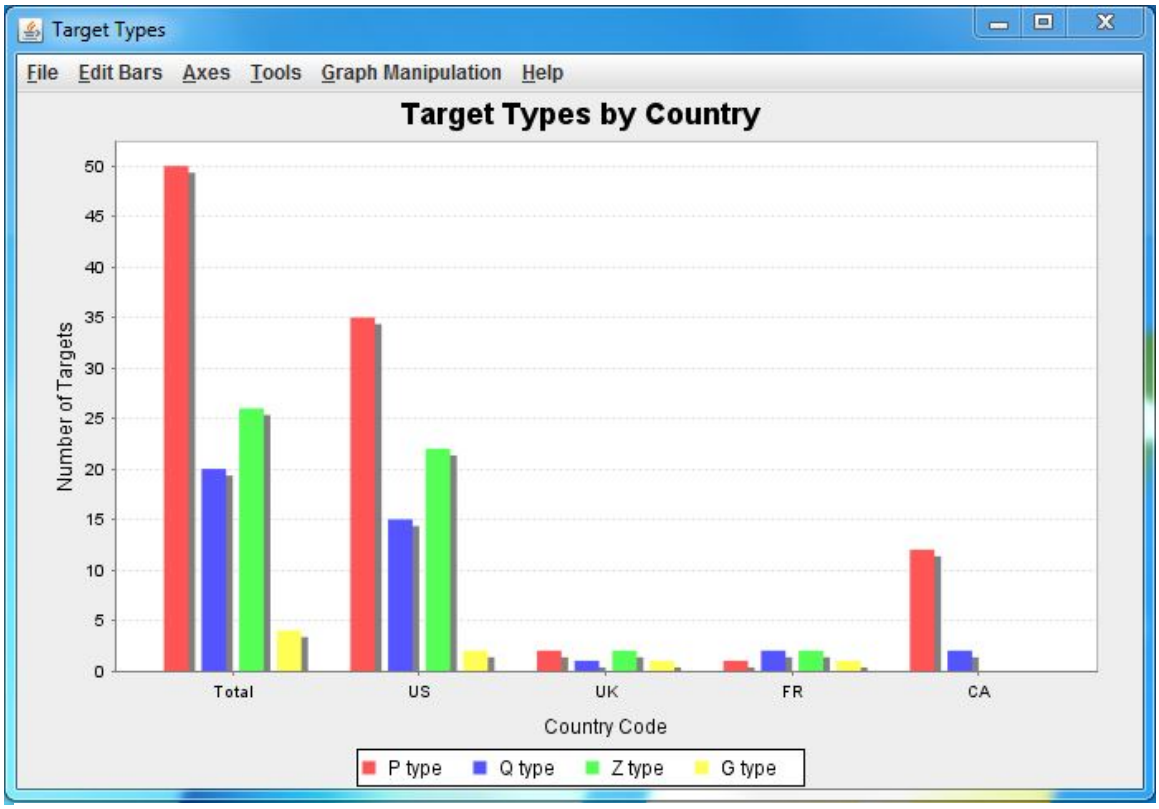

Figure 26: A Bar Plot with five sets of bars plotted

File Menu

The File Menu for the Bar Plot tool offers the analogous functions to that of the XY Plot tool so the reader is directed to the XY Plot, File Menu section for details on the menu item functionality that are not included here. It may be accessed by using the menu bar or shortcut key combination *Alt+f* (Windows), or *Control+Option+f* (Macintosh). Figure 27 shows the File Menu options available.

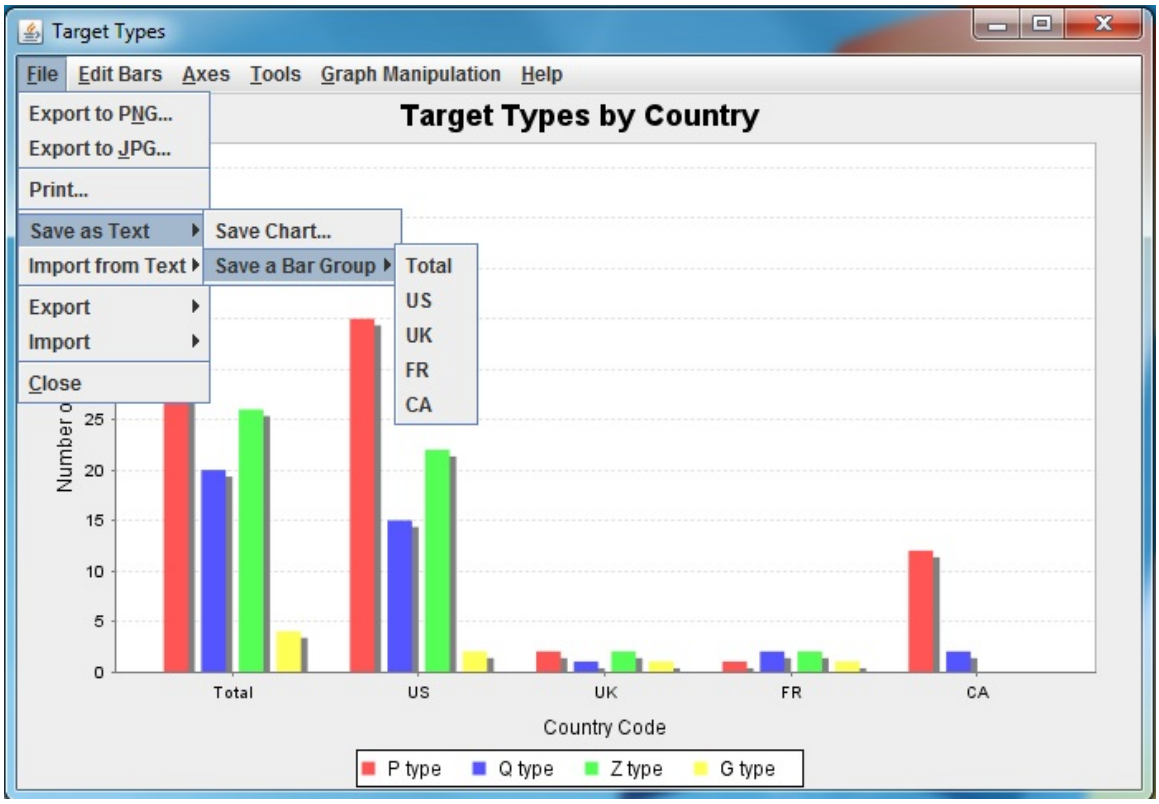

Figure 27: The Bar Plot File Menu is the same as that of the XY Plot, however, the specific submenus differ in the ability to save a Bar Group (instead of a Line in the case of the XY Plot)

A Bar Plot specific detail is that a Bar Group can be saved, imported and exported separately from the chart as a whole (analogous to a Line in the XY Plot case).

An example file is presented below to illustrate the format for the text files for saving and importing a Bar Group:

```
Target Types
Target Types by Country
This result was written at: Mon Apr 03 17:06:21 MDT 2017
Domain Axis Name is Country Code
Range Axis Name is Number of Targets
Range Axis: low is 0.0 and high is 52.5
Range Axis Type is 0 ( LINEAR )
Axes orientation is VERTICAL


The chart has 0 labels:

          Bar Value         Bar Name        Bar Group Name
          5.000E01          P type          Total
          3.500E01          P type          US
          2.000E00          P type          UK
          1.000E00          P type          FR
          1.200E01          P type          CA
          2.000E01          Q type          Total
          1.500E01          Q type          US
          1.000E00          Q type          UK
          2.000E00          Q type          FR
          2.000E00          Q type          CA
          2.600E01          Z type          Total
          2.200E01          Z type          US
          2.000E00          Z type          UK
          2.000E00          Z type          FR
          4.000E00          G type          Total
          2.000E00          G type          US
          1.000E00          G type          UK
          1.000E00          G type          FR
```

The first two lines of this file are the name of the chart and name of the plot. Next, the time that the file was saved is shown.

The axes names are next preceded by “Domain Axis Name is” and “Range Axis Name is”. After that is the “Range Axis: low is <min value> and high is <max value>” and the Range Axis Type (LINEAR or LOG) and orientation (VERTICAL or HORIZONTAL).

The next grouping lists the number of labels present followed by three tab-separated columns with headers: Bar Value, Bar Name and Bar Group Name. The contents of each column are the numeric value of the bar data, the string describing the category of the bar and the string describing the bar group, respectively.

In a similar manner, the format for the text output/input for a bar group is:

```
This result was written at: Tue Apr 04 12:01:10 MDT 2017
```

```
Bar Value          Bar Name         Bar Group Name
3.500E01           P type           US
1.500E01           Q type           US
2.200E01           Z type           US
2.000E00           G type           US
```

Edit Bars Menu

This menu gives the user a number of choices for editing the chart Bars and Bar Groups. It may be accessed by using the menu bar or shortcut key combination *Alt+e* (Windows), or *Control+Option+e* (Macintosh). When a Bar or Bar Group is changed, the legend and the submenu list of Bar and Bar Group names is automatically updated as needed.

Delete All Bars...

The choice of this item brings up a warning window requesting a confirmation of this action to prevent inadvertent erasing of all the bars on the chart. If the deletion is confirmed by the user, all bars on the chart will be cleared.

Delete a Bar

Selecting this submenu will show the list of the bar names. When a bar name is selected, a confirmation window will ask if the user wants to delete the bar. If the deletion is confirmed, the bar is deleted from the chart.

Change Bar Color

This selection allows the user to change a bar's color by selecting the bar name from the submenu list. Doing so will bring up a color chooser window (see Figure 4) and the new color can be selected from the pallet.

Delete a Bar Group

Selecting this submenu will show the list of the bar group names. When a bar group name is selected, a confirmation window will ask if the user wants to delete the bar group. If the deletion is confirmed, the bar group is deleted from the chart.

Copy a Bar Group

This choice of the selected bar group in the submenu list copies that bar group so that it can be pasted into another chart.

Paste a Bar Group

This submenu item action pastes a copied bar group to the chart. The user needs to ensure the compatibility of the pasted bar group with the chart. The axis units must match for the chart to make sense.

Cut a Bar Group

This option removes the submenu-selected bar group from the chart and copies it, so it can be pasted into another chart.

Change Bar Label

This submenu allows you to change the legend name for a bar in the chart. Selecting this option will bring up a popup frame showing the current bar label (see Figure 28). The user can edit the label and click "OK" to change it. The name will be changed in the legend and in all the submenus that show the list of bar names.

Figure 28: The Change Bar Label popup dialog

Change Bar Group Label

This submenu allows you to change the legend name for a bar group in the chart. Selecting this option will bring up a popup frame showing the current bar group label (see Figure 29). The user can edit the label and click "OK" to change it. The name will be changed in the legend and in all the submenus that show the list of bar group names.

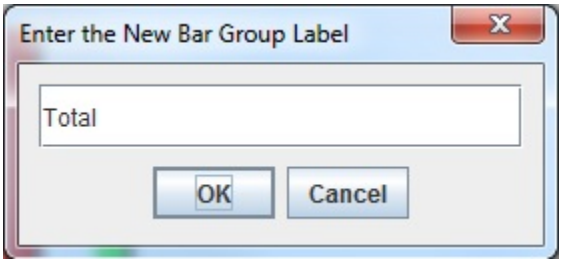

Figure 29: The Change Bar Group Label popup dialog

Axes Menu

This menu is used to make changes to the default axes settings. It may be accessed by using the menu bar or shortcut key combination *Alt+a* (Windows), or *Control+Option+a* (Macintosh).

Reverse Axes

Selecting this submenu shows bars on the vertical (y) axis and the bar values on the horizontal (x) axis (See Figure 30). Selecting this menu item again will restore the axes to their original location.

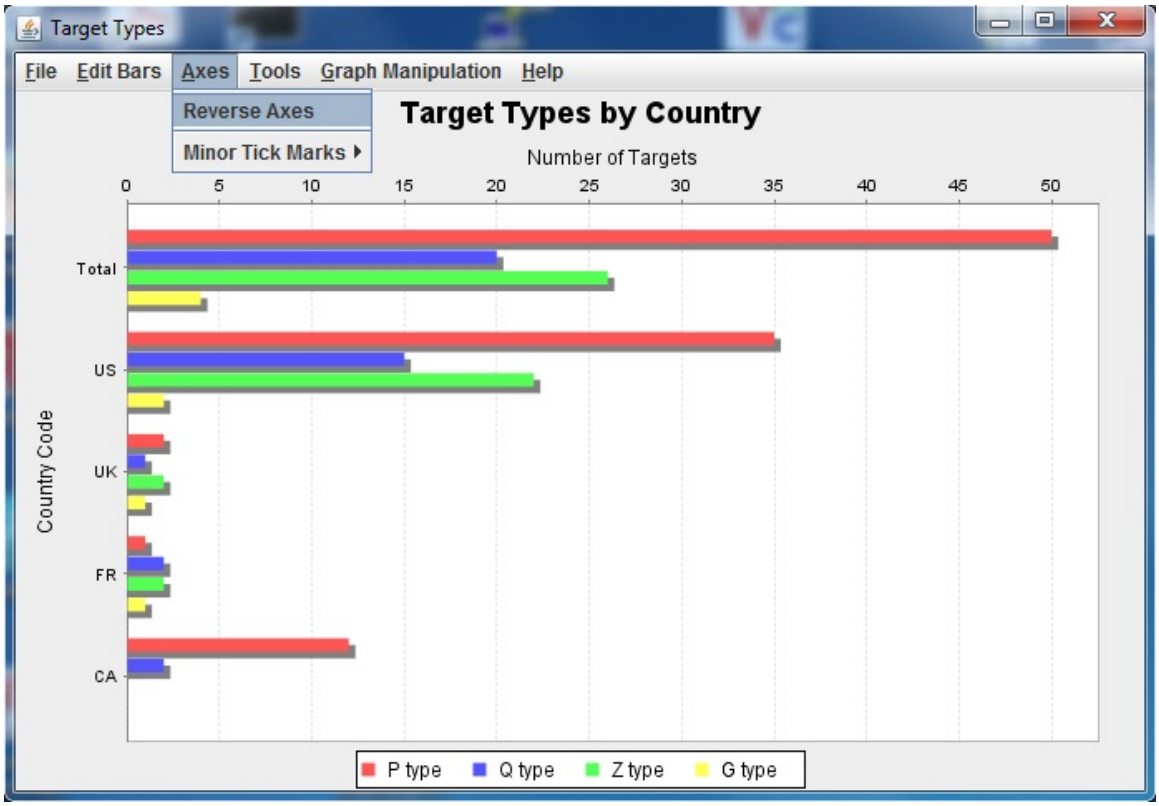

Figure 30: Reversing the axes on the Bar Plot puts the values on the horizontal (x) axis and the bars on the vertical (y) axis. Choosing the option one more time restores it to the default.

Minor Tick Marks

The default axis marking is to have only the major tick marks present, but if the user desires to see a set of minor tick marks between the major ticks on the range axis (which is vertical by default, but may be changed to the horizontal), this option can be selected bringing up a submenu of numbers between 0 and 10. Selecting 0 or 1 effectively turns the minor tick marks off. Figure 31 shows the resulting vertical axis when a minor tick value of 5 is chosen.

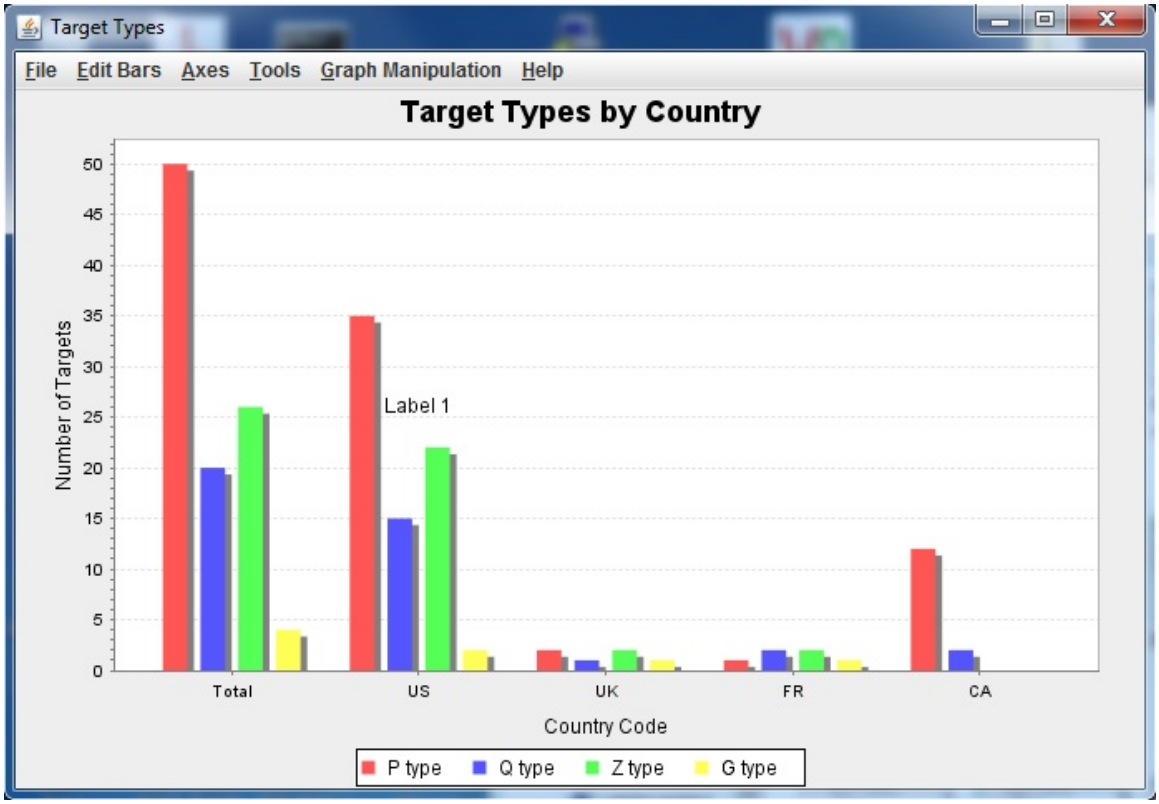

Figure 31: The resulting vertical axis when a minor tick value of 5 is chosen.

Tools Menu

The tools menu comprises a series of check box options as well as other submenus that allow for the manipulation of the labels and markers. It may be accessed by using the menu bar or shortcut key combination *Alt+t* (Windows), or *Control+Option+t* (Macintosh). There is also a choice to restore the plot to its original condition, when it was first drawn.

Show Legend

This check box shows the legend of line names and types. The legend contains the user-provided names of the bars. The default position of the legend bar is at the bottom center of the chart.

Hide Legend

Selecting this submenu will hide the legend.

Move Legend Horizontally

This submenu enables the user to move the legend bar horizontally to one of three positions: Right, Center, and Left relative to the plot area.

Right

The choice puts the legend bar in the rightmost position on the current vertical level (see Figure 32).

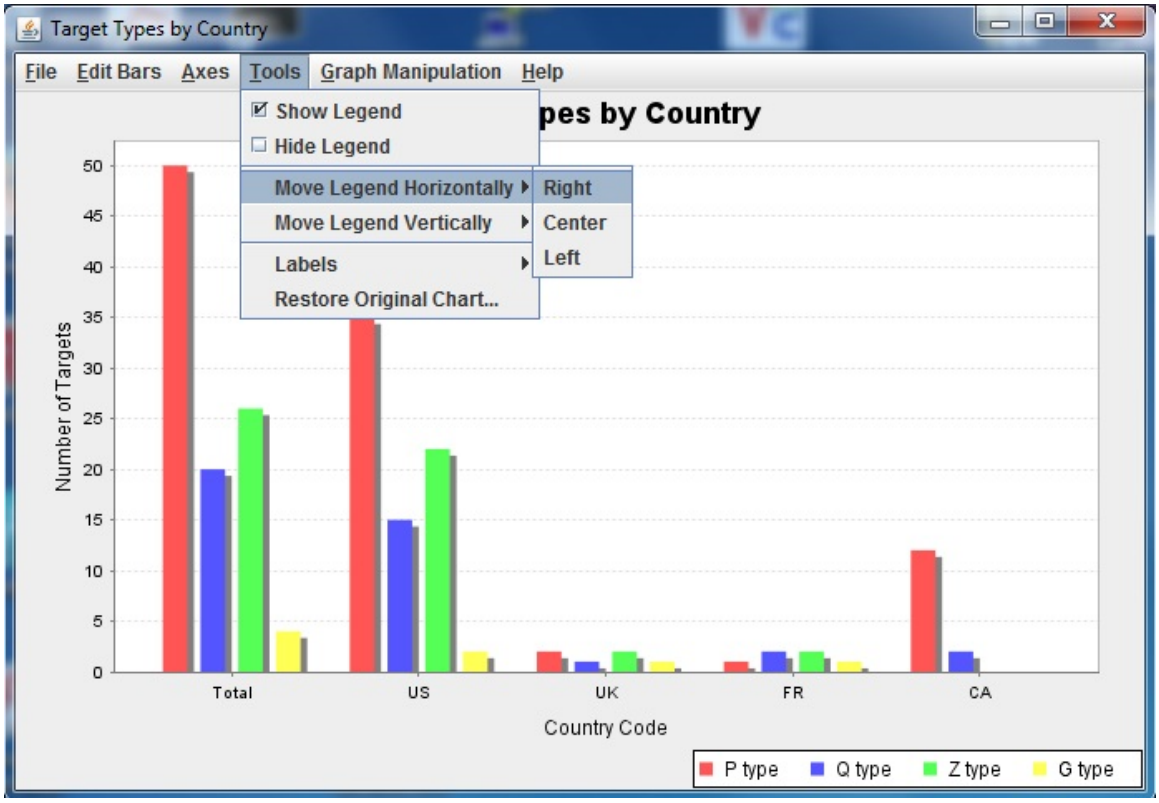

Figure 32: Bar Plot legend moved to the right

Center

This choice centers the legend bar on the current vertical level.

Left

This choice places the legend bar in the leftmost position on the current vertical level.

Move Legend Vertically

This option enables the user to change vertical position of the legend bar Up or Down to one of two locations: just above or just below the plot. The horizontal position of the bar remains the same.

Up

This selection moves the legend bar to the top of the chart if it was at the bottom of the chart, otherwise no action is taken (analogous to Figure 14 in the XY Plot section).

Down

This selection moves the legend bar to the bottom of the chart if it was at the top of the chart, otherwise no action is taken.

Labels

This submenu has the following choices: Add Label..., Change Label, Remove Label, and Clear All Labels... These submenus manipulate the labels that are text strings that can be placed anywhere in the plot area.

Add Label...

This selection allows the user to put a new label on the chart. It shows a dialog window with three fields: two for the x and y coordinates of the new label middle point, and one for the label text (see Figure 33). Initially, the text field for the label is empty and the number fields display the coordinate center of the plot. The X-coordinate can be chosen from a drop-down menu of the bar groups. The Y-coordinate is expressed in units of the Y-axis on the chart. The user may overwrite these coordinates to place the label at a desirable position on the plot. The Y-coordinate value must be in the range of its displayed axis interval. If the value falls outside of this interval, an out of range message will appear when the Done button is pressed. In this case, the user needs to correct the value and press the Done button again. The Cancel button closes the dialog window without adding a label. Figure 34 shows the graph with a label added to the US bar group.

Figure 33: The Add or Change Label popup dialog box has a drop-down chooser for the X-coordinate and a numeric value for the Y.

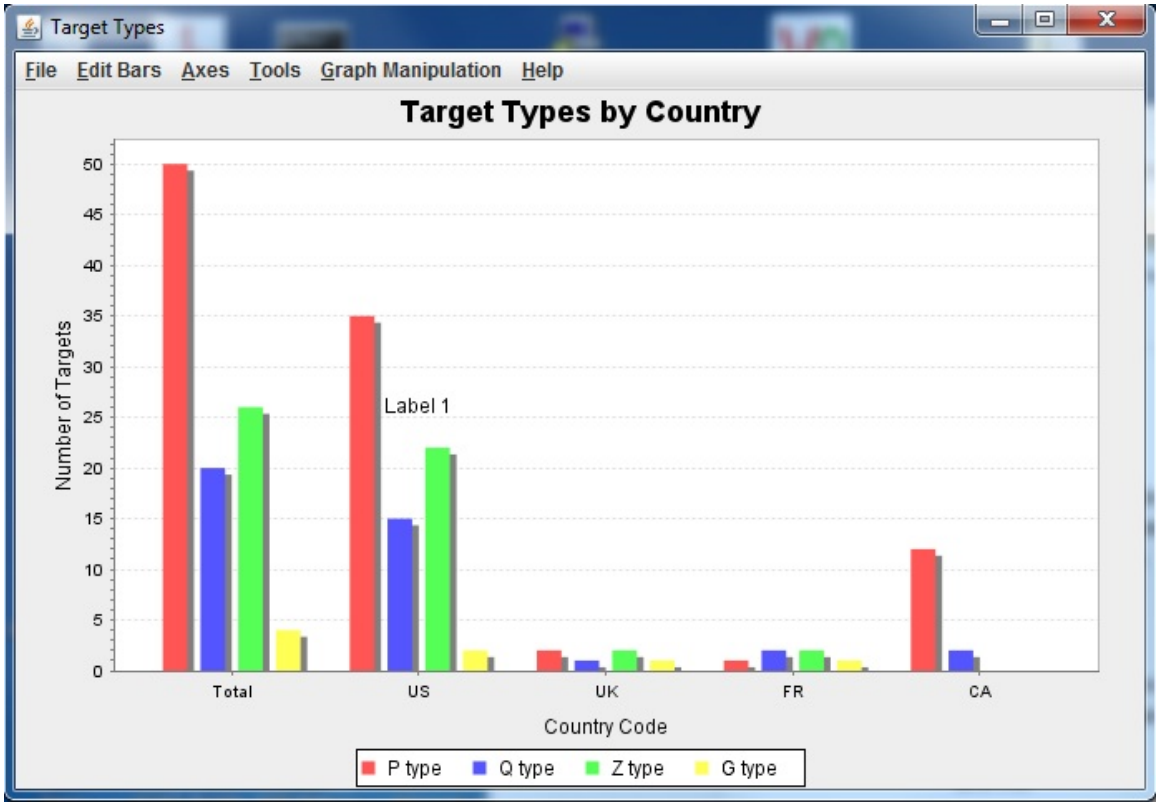

Figure 34: The new label added to the chart.

Remove Label

This submenu selection displays the list of the chart labels. Choosing one of them removes this label from the plot after your intention is confirmed using a confirmation dialog.

Clear All Labels...

Selecting this menu item will display a warning asking the user to confirm that all of the labels on the chart should be deleted. After the confirmation, all labels are eliminated from the plot.

Restore Original Chart...

The last sub-menu in the tools menu gives the user an option to erase all changes made to the chart in a current session. On selection of this option a message asking the user to confirm this decision will appear.

Graph Manipulation Menu

This menu controls graph properties, the graph size, and zooming options. It may be accessed by using the menu bar or shortcut key combination *Alt+g* (Windows), or *Control+Option+g* (Macintosh). There are a variety of zooming options in the Graph Manipulation menu: zooming in or out both axes at the same time, or zooming only one axis, or using automatic scaling of one or both axes. **Note:** the right mouse click in the

plot area pops up a menu with choices of ***Properties***, ***Print***, and ***Zoom*** that are identical to those invoked from the File and Graph Manipulation menus. The **Save as** option from this menu gives an opportunity to save the chart as a PNG file.

Edit graph properties

This selection opens a dialog window (analogous to the XY Plot in Figure 20) with three tabs: Title, Plot, and Other. The same dialog can be opened by right-clicking on the chart (see Figure 20) and selecting "Properties..." See the XY Plot Graph Manipulation Menu section for a complete description of this capability.

Zoom in both axes

This menu selection displays a part of the plot corresponding to a smaller range of values of both axes. The same effect can also be achieved by clicking in the plot area and "stretching" a rectangle from top to bottom (or vice versa) for a new plot area (see Figure 35).

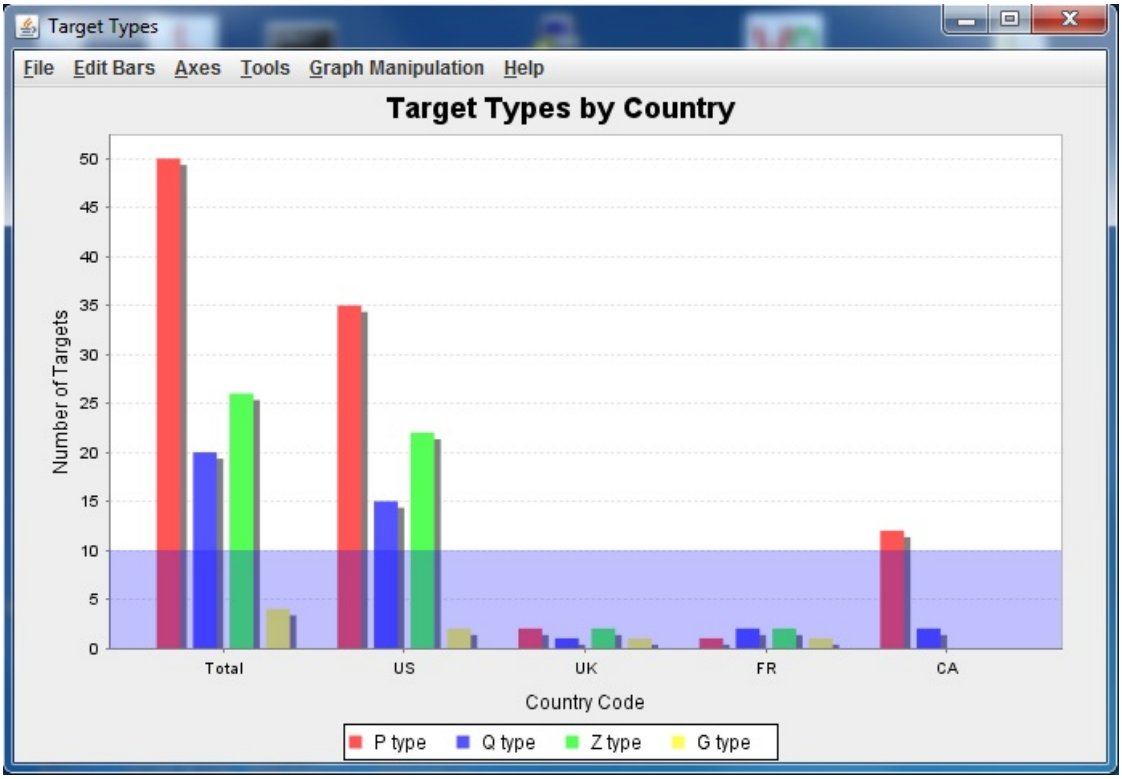

Figure 35: Left-clicking in the graph area and dragging creates a new rectangle for zooming.

Zoom out both axes

This operation reverses the previous action, it restores the display of the larger portions of each axis.

Zoom in x axis, Zoom in y axis

The action displays a part of the plot corresponding to a smaller range of values of the corresponding axis.

Zoom out x axis, Zoom out y axis

The previous operation may be reversed with this option; it restores a previous range of values of the corresponding axis. The Zooming out effect can also be achieved by clicking in the plot area and moving the pointer right to left or upward.

Auto Scale

These choices bring the display of the axes back to the full range of the values of the independent variable and the function.

Help Menu

The Help menu provides explanation for each of the menu options for the Bar Plot. It may be accessed by using the menu bar or shortcut key combination *Alt+h* (Windows), or *Control+Option+h* (Macintosh). Under the Help menu, there are five submenu options corresponding to the five menus at the top of the graph frame.

The Histogram Plot

A third type of plot available in the LANL Plotting Software is the Histogram Plot (see Figure 36). Again, much of the capability is completely analogous to that shown in the XY Plot and Bar Plot sections.

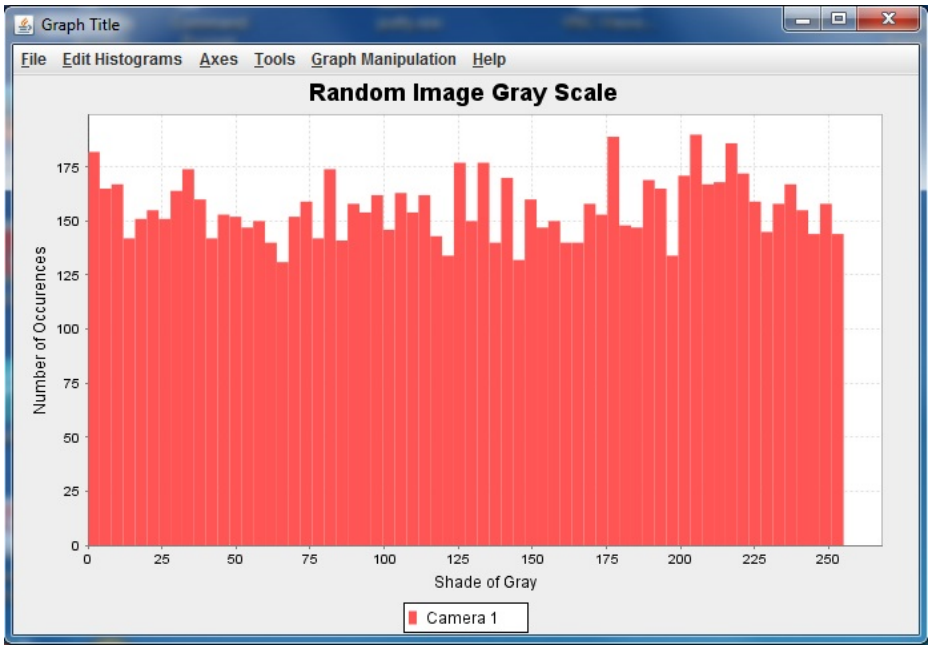

Figure 36: The Histogram Plot tool

File Menu

The File Menu for the Histogram Plot tool offers some of the analogous functions to that of the XY Plot tool so the reader is directed to the XY Plot, File Menu section for details on the menu item functionality that are not included here. The File Menu may be accessed by using the menu bar or shortcut key combination *Alt+f* (Windows), or *Control+Option+f* (Macintosh). Figure 37 shows the File Menu options available. Absent from the Histogram Plot File Menu are the options "Save as Text" and "Import from Text".

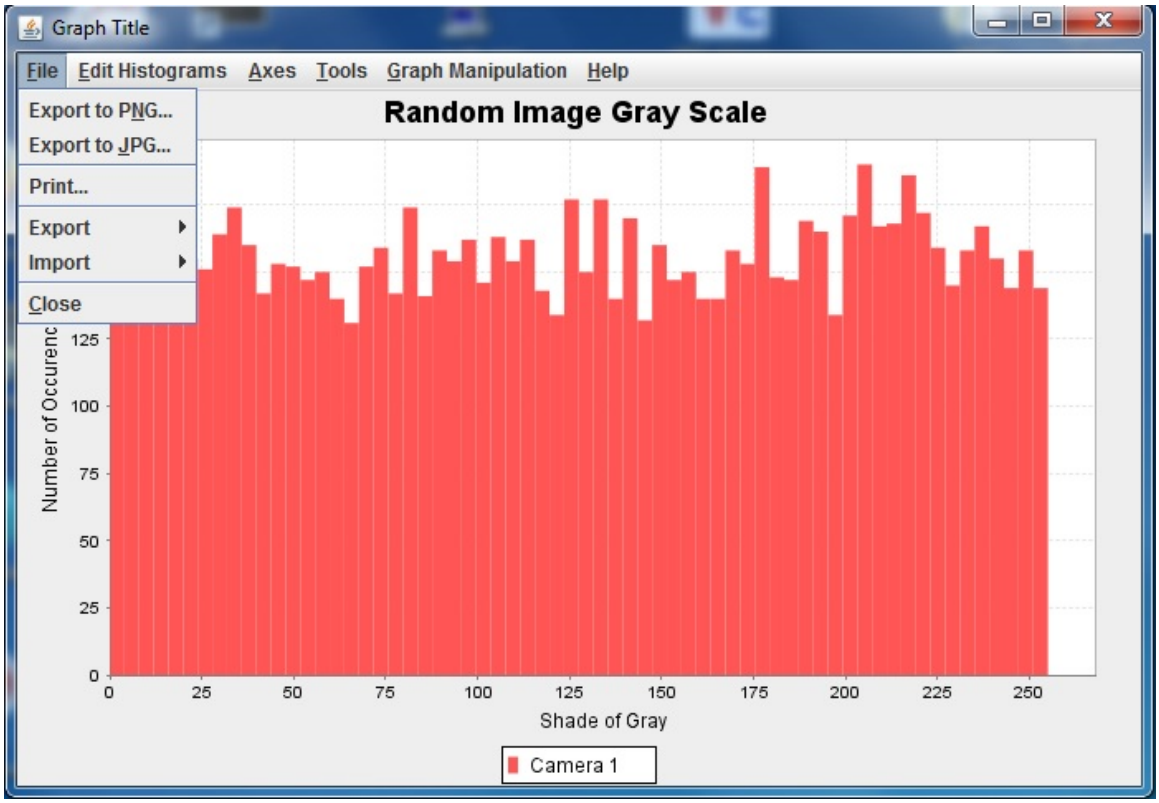

Figure 37: The Histogram Plot File Menu options

Edit Histograms Menu

This menu gives the user a number of choices for editing the chart histogram. It may be accessed by using the menu bar or shortcut key combination *Alt+e* (Windows), or *Control+Option+e* (Macintosh). When a histogram is changed, the legend and the submenu list of histogram names is automatically updated as needed.

Delete All Histograms...

The choice of this item brings up a warning window requesting a confirmation of this action to prevent inadvertent erasing of all the histograms on the chart. If the deletion is confirmed by the user, all histograms on the chart will be cleared.

Delete a Histogram

Selecting this submenu will show the list of the histogram names. When a histogram name is selected, a confirmation window will ask if the user wants to delete the histogram. If the deletion is confirmed, the histogram is deleted from the chart.

Copy a Histogram

This choice of the selected histogram in the submenu list copies that histogram so that it can be pasted into another chart.

Paste a Histogram

This submenu item action pastes a copied histogram to the chart. The user needs to ensure the compatibility of the pasted histogram with the chart. The axis units must match for the chart to make sense.

Cut a Histogram

This option removes the submenu-selected histogram from the chart and copies it, so it can be pasted into another chart.

Change Histogram Color

This selection allows the user to change a histogram's color by selecting the histogram name from the submenu list. Doing so will bring up a color chooser window (refer back to Figure 4) and the new color can be selected from the pallet.

Change Histogram Label

This submenu allows you to change the legend name for a histogram in the chart. Selecting this option will bring up a popup frame showing the current histogram label (see Figure 38). The user can edit the label and click "OK" to change it. The name will be changed in the legend and in all the submenus that show the list of histogram names.

Figure 38: The Change Histogram Label popup dialog.

Axes Menu

This menu is used to make changes to the default axes settings. It may be accessed by using the menu bar or shortcut key combination *Alt+a* (Windows), or *Control+Option+a* (Macintosh).

Reverse Axes

Selecting this submenu shows the histogram on the vertical (y) axis and the values on the horizontal (x) axis (See Figure 39). Selecting this menu item again will restore the axes to their original location.

Figure 39: Reversing the axes on the Histogram Plot puts the values on the horizontal (x) axis and the histogram bars on the vertical (y) axis. Choosing the option one more time restores it to the default.

Minor Tick Marks

The default axis marking is to have only the major tick marks present, but if the user desires to see a set of minor tick marks between the major ticks on one or both axes, this option can be selected bringing up a submenu of numbers between 0 and 10. Selecting 0 or 1 effectively turns the minor tick marks off. Refer back to figure 31 to see the resulting change to the vertical axis when a minor tick value of 5 is chosen.

Tools Menu

The tools menu comprises a series of check box options as well as other submenus that allow for the manipulation of the labels and markers. It may be accessed by using the menu bar or shortcut key combination *Alt+t* (Windows), or *Control+Option+t* (Macintosh). There is also a choice to restore the plot to its original condition, when it was first drawn. The options and functionality for the Tools menu is exactly analogous

with that in the Bar Plot Section with the addition of Show/Hide Click Coordinates and Markers, which we explain below.

Show Click Coordinates

The click coordinates are the coordinates of a point on the plot that has been clicked on with the mouse. When this submenu is selected, the x and y coordinates of the point are displayed along with dashed crosshairs (see Figure 40. The point coordinates are shown until another point is clicked.

Hide Click Coordinates

Selecting this submenu hides the crosshair lines and coordinates.

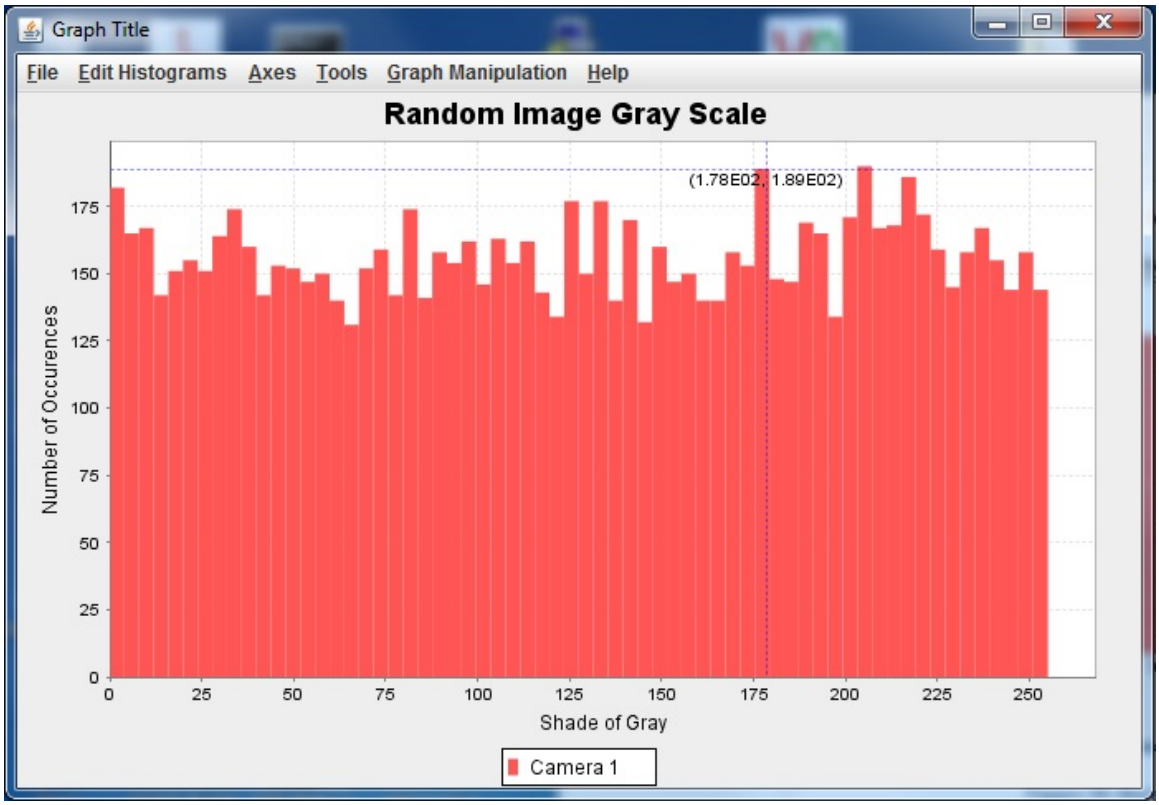

Figure 40: With the Show Click Coordinates option, clicking on the graph displays the x and y lines corresponding to the clicked point. To remove these lines, use the Hide Click Coordinates option.

Markers

This submenu allows the user to manage axis markers for the x and y axes. The markers are horizontal or vertical lines that are drawn on the plot and defined by an axis coordinate. Manipulation of the markers is done for each axis separately with the submenu options X Axis Markers and Y Axis Markers. Selecting either of these menu items shows submenus to add a marker, remove a marker, or clear all markers.

Add Marker...

When this submenu is selected, a dialog will be shown to enter a new marker for each axis (see Figure 41). After entering the coordinate and pressing the Done button, the marker will be displayed on the plot. Figure 42 shows the plot with the value 160 marked on the Y-axis.

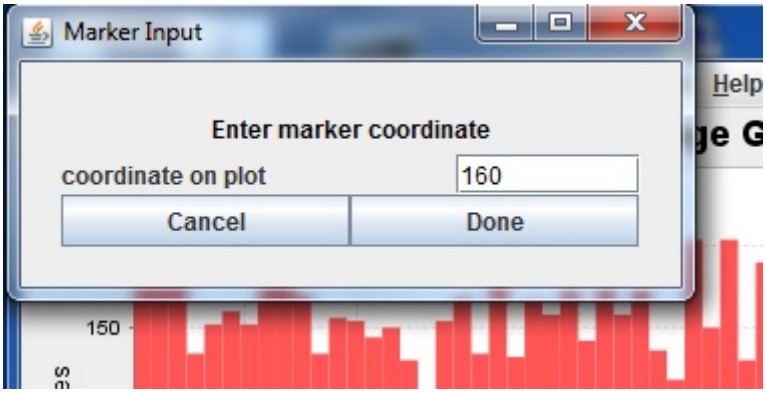

Figure 41: The Marker Input dialog popup for Histogram Plots.

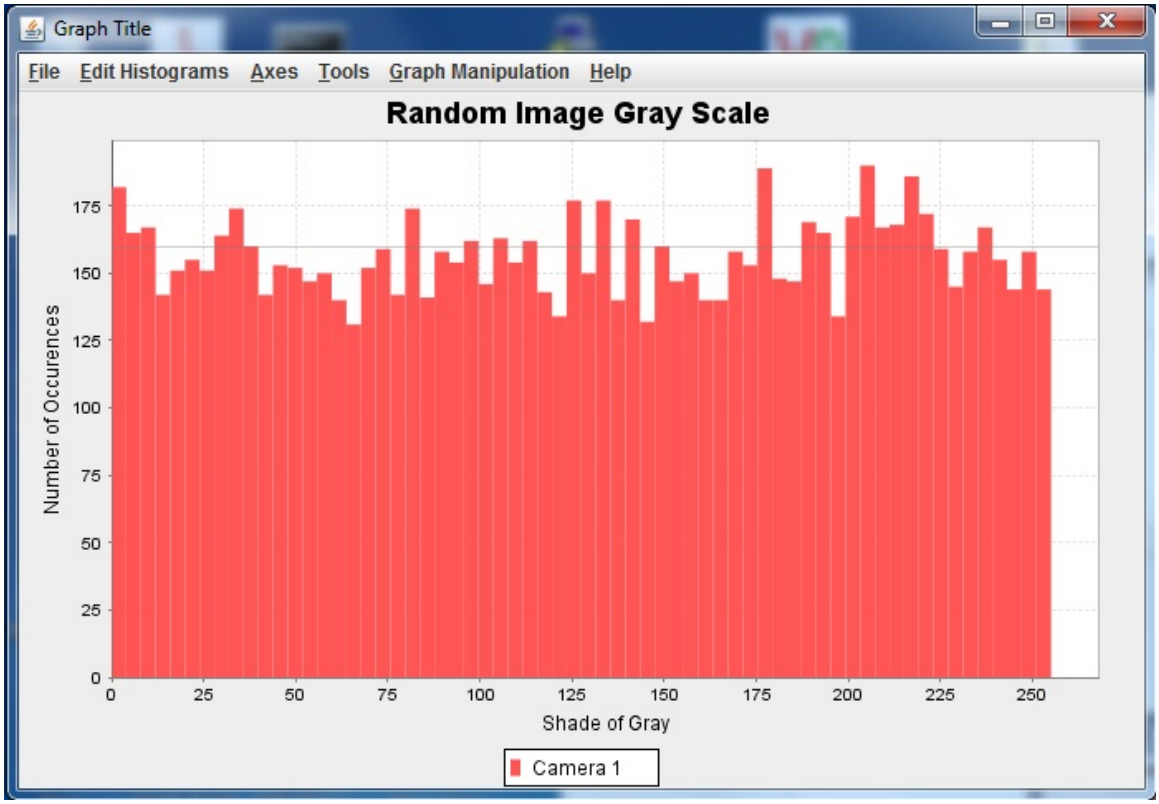

Figure 42: Marker added on the Y-axis at value 160.

Remove Marker

Any marker of an axis may be selected from the list of the axis markers for removal. The user will be asked to confirm the removal.

Clear All Markers...

The user can remove all markers from an axis. The user will be asked to confirm the removal of all of the markers.

Restore Original Chart...

The last sub-menu in the tools menu gives the user an option to erase all changes made to the chart in a current session. On selection of this option a message asking the user to confirm this decision will appear.

Graph Manipulation Menu

This menu controls graph properties, the graph size, and zooming options. It may be accessed by using the menu bar or shortcut key combination *Alt+g* (Windows), or *Control+Option+g* (Macintosh). There are a variety of zooming options in the Graph Manipulation menu: zooming in or out both axes at the same time, or zooming only one axis, or using automatic scaling of one or both axes. **Note:** the right mouse click in the plot area pops up a menu with choices of ***Properties***, ***Print***, and ***Zoom*** that are identical to those invoked from the File and Graph Manipulation menus. The **Save as** option from this menu gives an opportunity to save the chart as a PNG file.

The Graph Manipulation Menu for the Histogram Plot tool is exactly analogous to that for the XY Plot with all the same options and functionality. The user is referred to the XY Plot, Graph Manipulation Menu section of this document for detailed discussion.

Help Menu

The Help menu provides explanation for each of the menu options for the Histogram Plot. It may be accessed by using the menu bar or shortcut key combination *Alt+h* (Windows), or *Control+Option+h* (Macintosh). Under the Help menu, there are five submenu options corresponding to the five menus at the top of the graph frame.

Date XY Plot

A third type of plot available in the LANL Plotting Software is the Date XY Plot (see Figure 43). Again, much of the capability is completely analogous to that shown in the XY Plot and Bar Plot sections. The dates entered, although displayed in human readable dates, are processed using *Unix computer time* or seconds since Jan 1, 1970 0:00:00 GMT (there are plenty of websites available to convert a human readable date to Unix time). This will be needed when entering labels on the graph below.

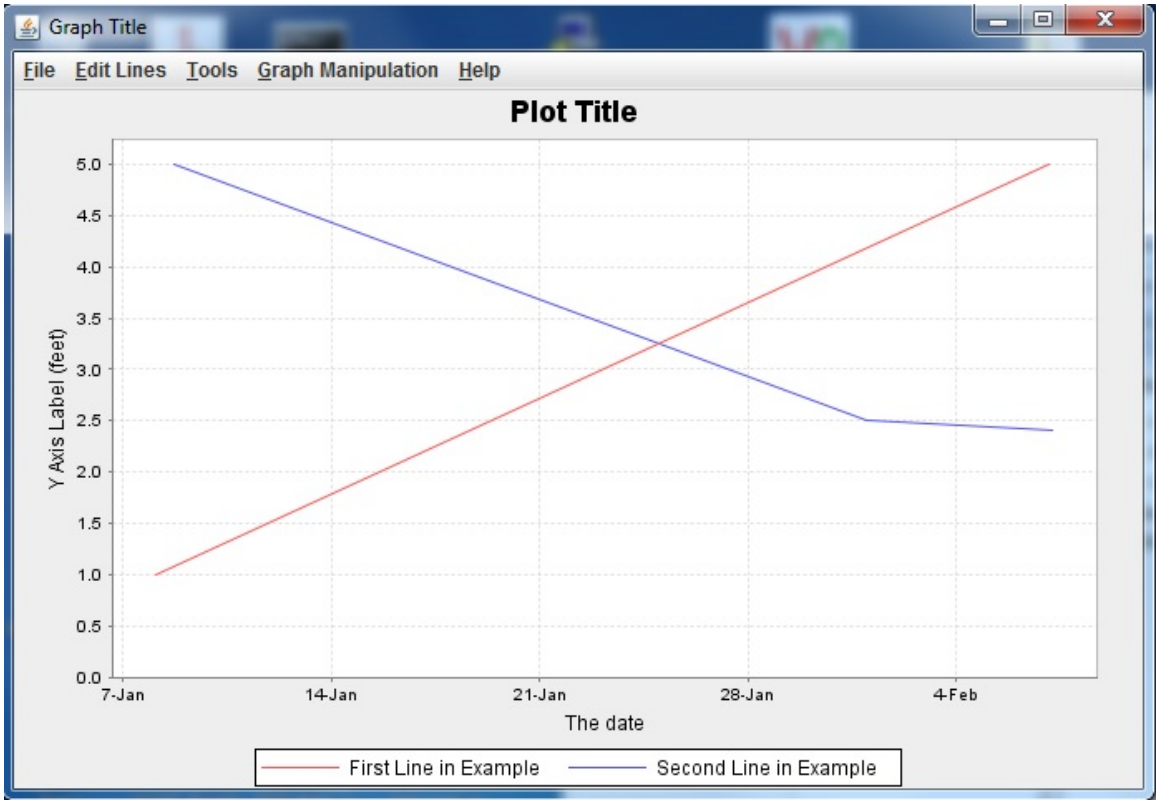

Figure 43: The Date XY Plot

File Menu

The File Menu for the Date XY Plot tool offers some of the analogous functions to that of the XY Plot tool so the reader is directed to the XY Plot, File Menu section for details on the menu item functionality that are not included here. It may be accessed by using the menu bar or shortcut key combination *Alt+f* (Windows), or *Control+Option+f* (Macintosh).

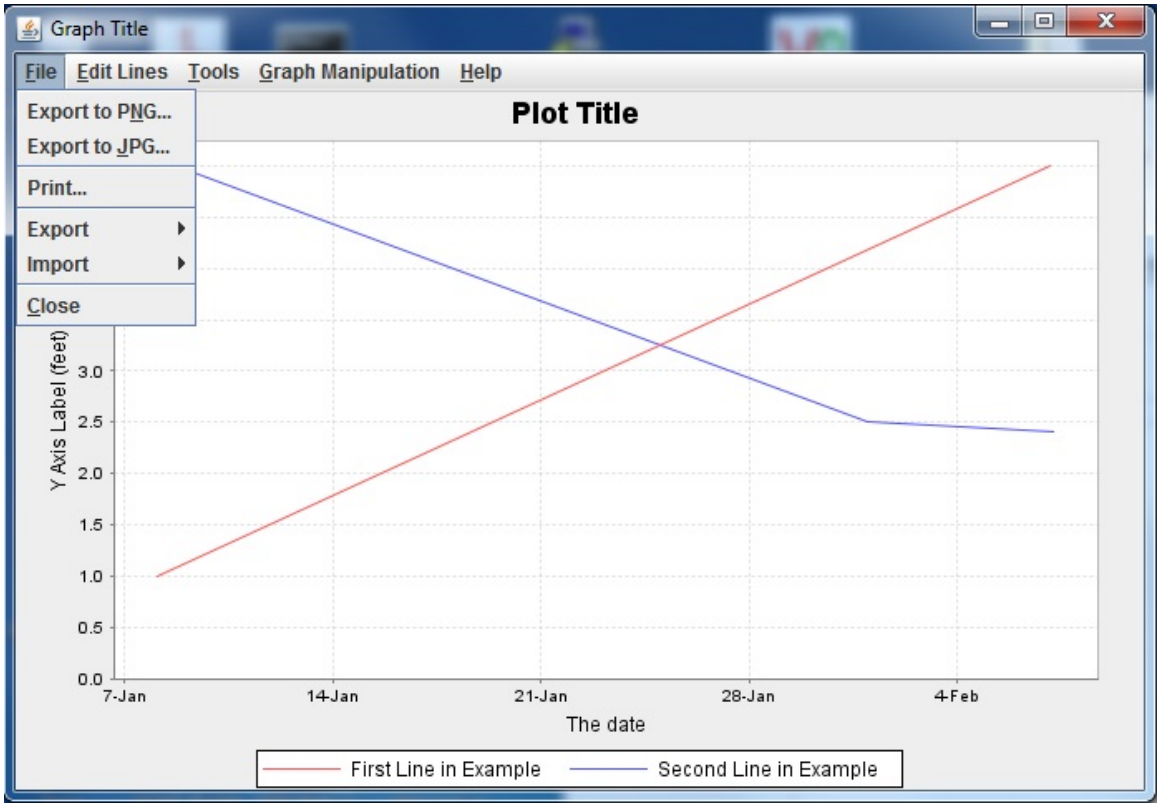

Figure 44: Shows the File Menu options available. As with the Histogram Plot, absent from the Date XY Plot File Menu are the options “Save as Text” and “Import from Text”.

Edit Lines Menu

This menu gives the user a number of choices for editing the chart histogram. It may be accessed by using the menu bar or shortcut key combination *Alt+e* (Windows), or *Control+Option+e* (Macintosh). When a histogram is changed, the legend and the submenu list of histogram names is automatically updated as needed.

Delete All Lines...

The choice of this item brings up a warning window requesting a confirmation of this action to prevent inadvertent erasing of all the lines on the chart. If the deletion is confirmed by the user, all lines on the chart will be cleared.

Delete a Line

Selecting this submenu will show the list of the line names. When a line name is selected, a confirmation window will ask if the user wants to delete the line. If the deletion is confirmed, the line is deleted from the chart.

This choice of the selected line in the submenu list copies that line so that it can be pasted into another chart.

Paste a Line

This submenu item action pastes a copied line to the chart. The user needs to ensure the compatibility of the pasted line with the chart. The axis units must match for the chart to make sense.

Cut a Line

This option removes the submenu-selected line from the chart and copies it, so it can be pasted into another chart.

Change a Line Color

This selection allows the user to change a line's color by selecting the line from the submenu list. Doing so will bring up a color chooser window (see Figure 4 in the XY Plot section) and the new color can be selected from the pallet.

Change Line Type

Selecting this menu item for a given line in the submenu list brings up a pull down menu that will allow you to choose a different line type than the default thin, solid line (see Figure 5 in the XY Plot section). **Note:** due to a bug in the JFreeChart code, changing the line type to a different line type may cause the line to disappear during zooming operations. Selecting Auto Scale both axes under the Graph Manipulation menu will cause the line to reappear.

Change Line Label

This submenu allows you to change the legend name for a line in the chart. Selecting this option will bring up a popup frame showing the current line label. The user can edit the label and click "OK" to change it. The name will be changed in the legend and in all the submenus that show the list of line names.

Show Line or Data

This submenu allows you to toggle back and forth between showing the data as a connected line or as the individual data points. If a line is currently being shown as a connected line, selecting that line from the submenu list will toggle it to show just the data points and vice versa.

Tools Menu

The tools menu comprises a series of check box options as well as other submenus that allow for the manipulation of the labels and markers. It may be accessed by using the

menu bar or shortcut key combination *Alt+t* (Windows), or *Control+Option+t* (Macintosh). There is also a choice to restore the plot to its original condition, when it was first drawn.

Show Data Points

Checking this box will display the data points for the chart lines (see Figure 45). The data points may be shown by themselves or on top of lines if the Show Lines menu is checked

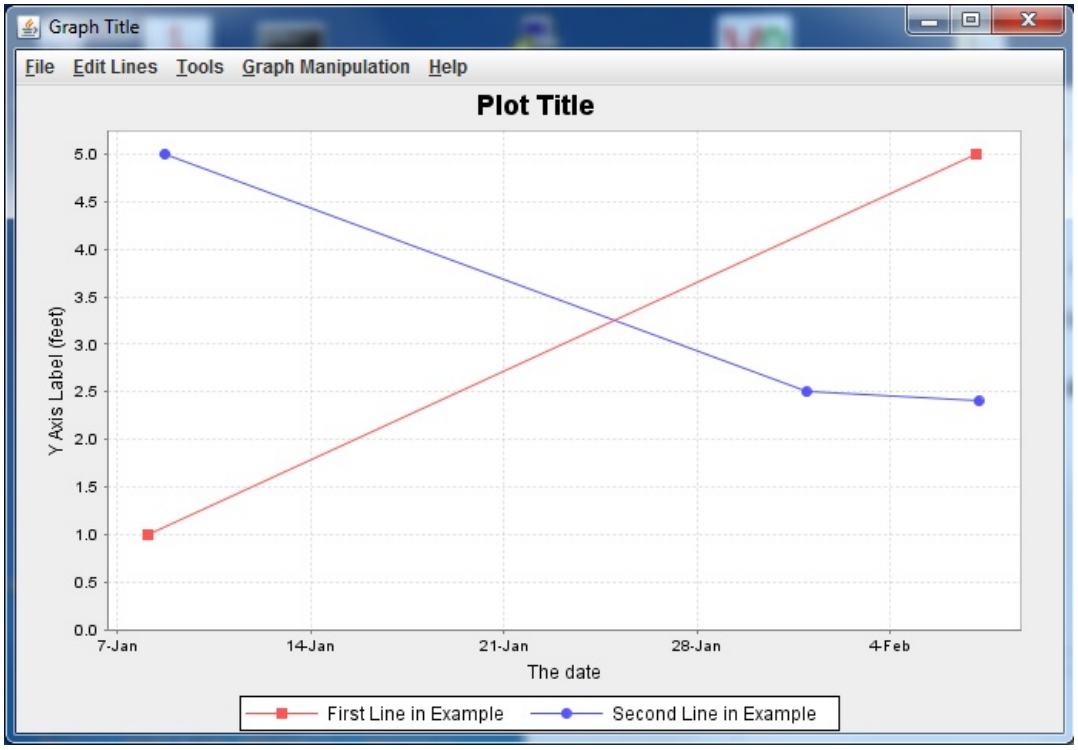

Figure 45: Data points shown in Date XY Plot

Hide Data Points

This submenu selection will eliminate the display of the separate data points from the chart. The data in this case is presented as smooth lines, and the Show Lines box will be checked automatically.

Show Lines

The data points are connected with straight line segments when this box is checked.

Hide Lines

When this box is checked, the lines connecting consecutive data points are not drawn on the chart (See Figure 46). With selection of this box the data will be represented by the separate data points, and the Show Data Points submenu will be checked automatically.

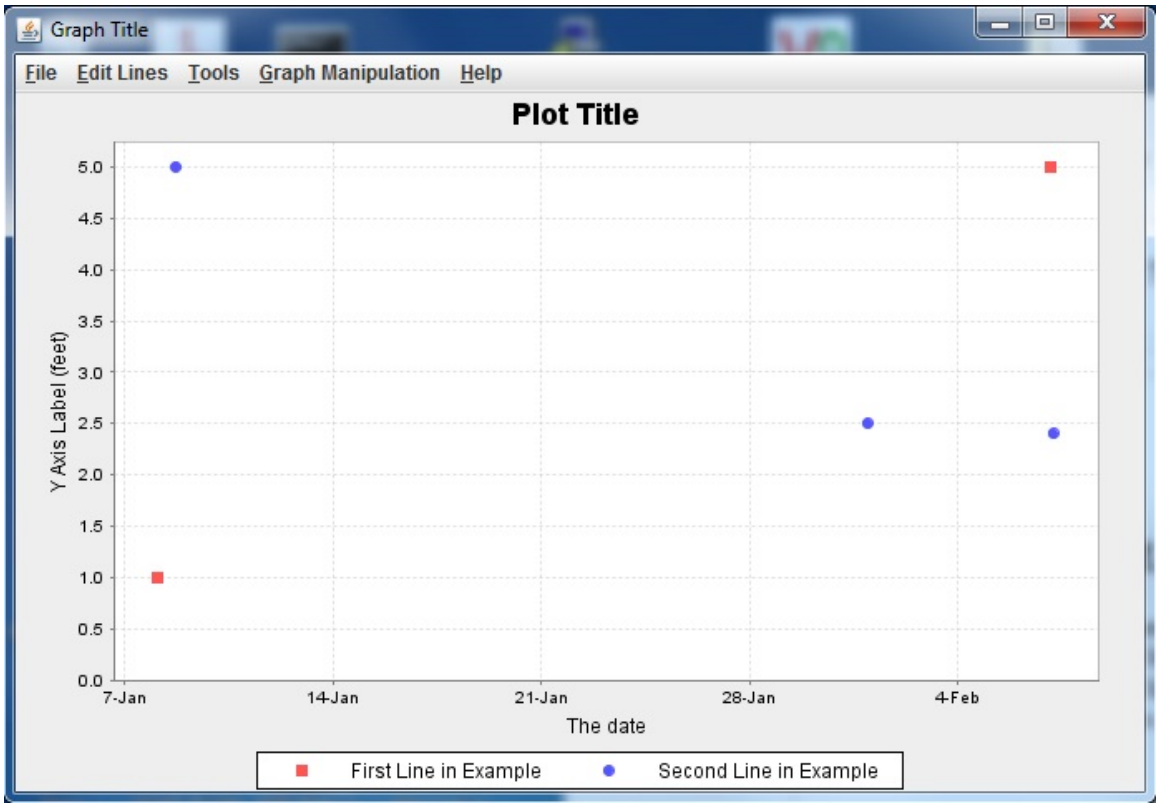

Figure 46: The resultant graph after hiding lines

Show Legend

This check box shows the legend of line names and types. The legend contains the user-provided names of the lines/point-sets. The default position of the legend bar is at the bottom center of the chart.

Hide Legend

Selecting this submenu will hide the legend.

Show Click Coordinates

The click coordinates are the coordinates of a point on the plot that has been clicked on with the mouse. When this submenu is selected, the x and y coordinates of the point are displayed along with dashed crosshairs (see Figure 47). The point coordinates (date, value) are shown until another point is clicked.

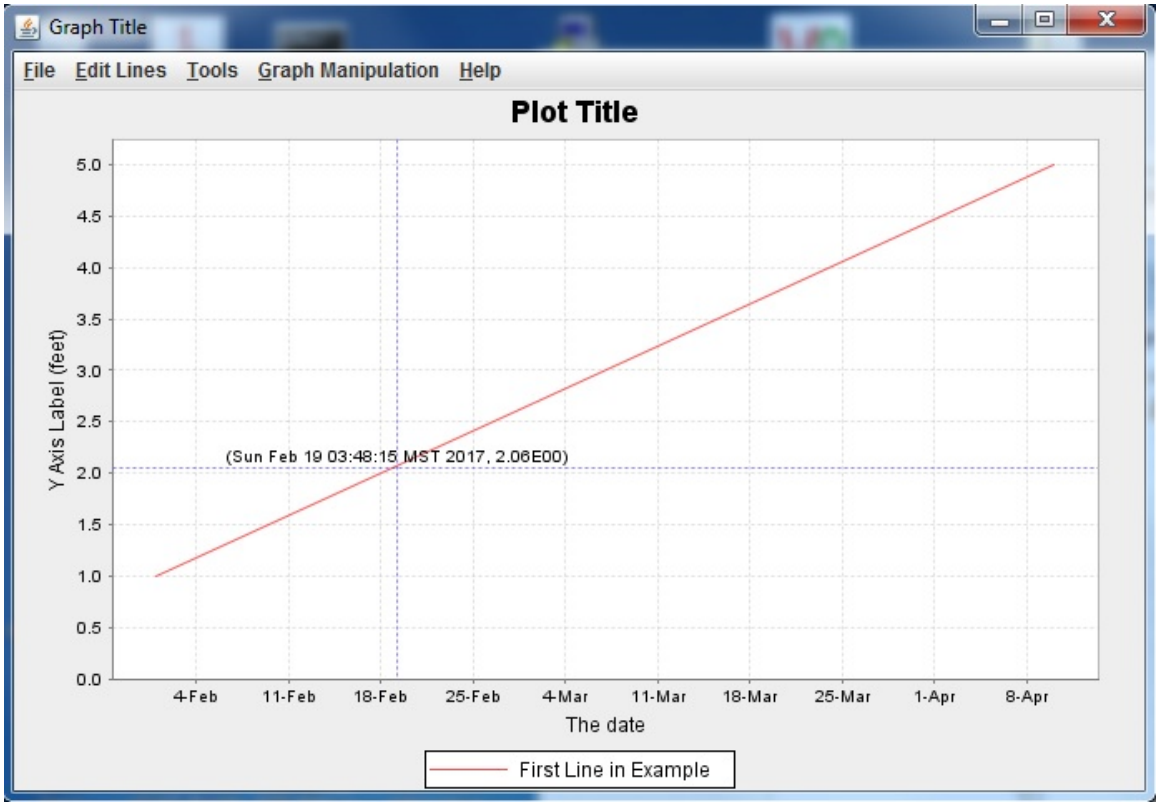

Figure 47: The Show Click Coordinates option

Hide Click Coordinates

Selecting this submenu hides the crosshair lines and coordinates.

Move Legend Horizontally

This submenu enables the user to move the legend bar horizontally to one of three positions: Right, Center, and Left relative to the plot area (see The XY Plot section, Figure 13).

Right

The choice puts the legend bar in the rightmost position on the current vertical level.

Center

This choice centers the legend bar on the current vertical level.

Left

This choice places the legend bar in the leftmost position on the current vertical level.

Move Legend Vertically

This option enables the user to change vertical position of the legend bar Up or Down to one of two locations: just above or just below the plot. The horizontal position of the bar remains the same.

Up

This selection moves the legend bar to the top of the chart (see the XY Plot section, Figure 14). If it was at the bottom of the chart, otherwise no action is taken.

Down

This selection moves the legend bar to the bottom of the chart if it was at the top of the chart, otherwise no action is taken.

Labels

This submenu has the following choices: Add Label..., Change Label, Remove Label, and Clear All Labels... These submenus manipulate the labels that are text strings that can be placed anywhere in the plot area.

Add Label...

This selection allows the user to put a new label on the chart. It shows a dialog window with three fields: two for the x and y coordinates of the new label middle point, and one for the label text (see Figure 48). Initially, the text field for the label is empty and the x, y fields display the coordinate center of the plot. The x-coordinate is expressed in date form and the y-coordinate is in the specified y-axis units. The user may overwrite these coordinates to place the label at a desirable position on the plot. The coordinate values must be in the range of their axes. If a coordinate falls outside of this interval, an out of range message will appear when the Done button is pressed. In this case, the user needs to correct the value and press the Done button again. The Cancel button closes the dialog window without adding a label. Figure 49 shows the graph with a label added.

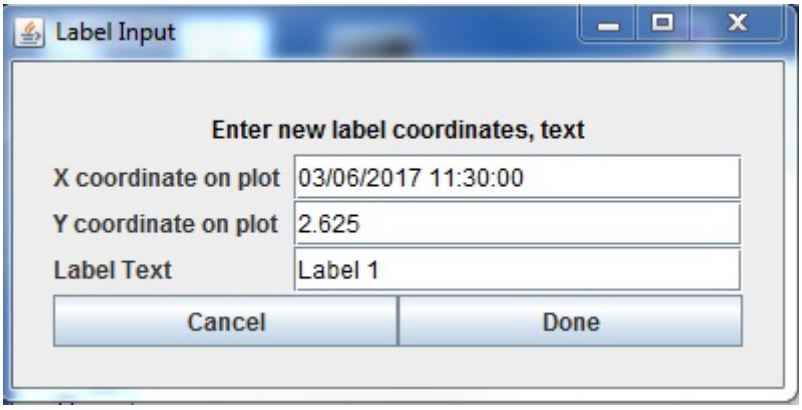

Figure 48: The Date XY Plot Label Input dialog

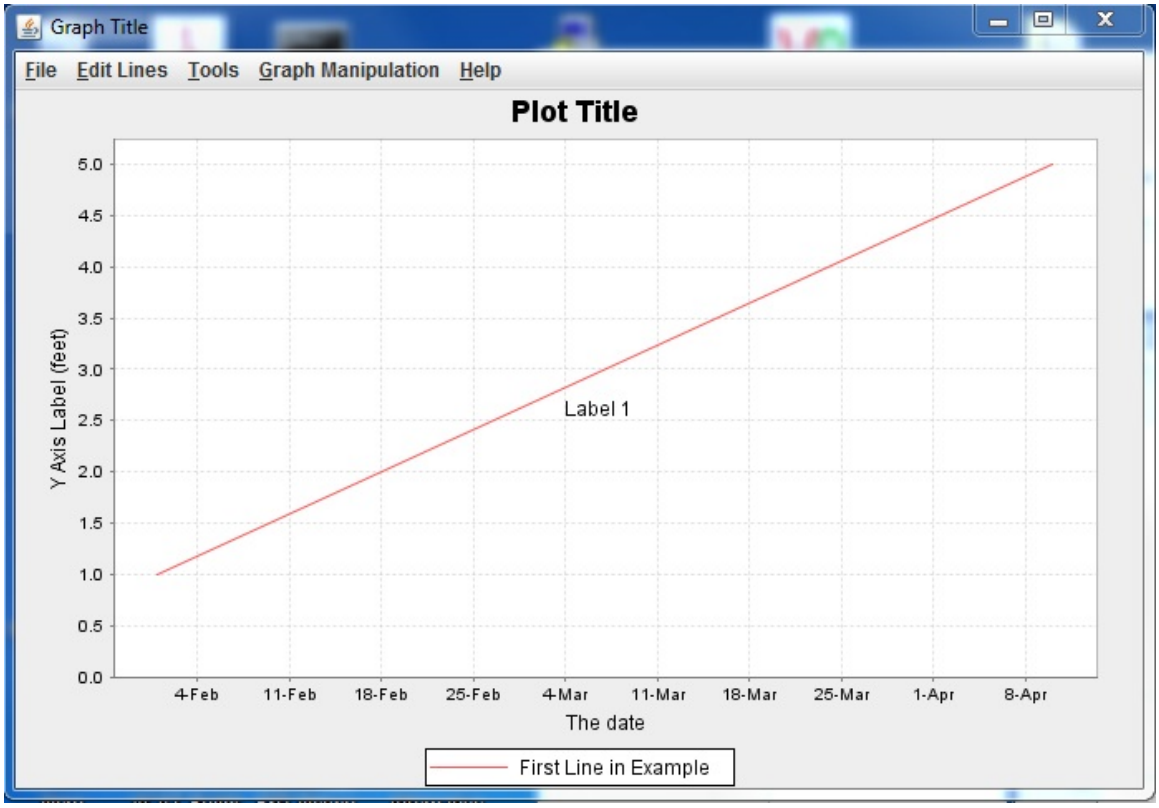

Figure 49: The Date XY Plot with label added.

Remove Label

This submenu selection displays the list of the chart labels. Choosing one of them removes this label from the plot after your intention is confirmed using a confirmation dialog.

Clear All Labels...

Selecting this menu item will display a warning asking the user to confirm that all of the labels on the chart should be deleted. After the confirmation, all labels are eliminated from the plot.

Markers

This submenu allows the user to manage axis markers for the x and y axes. The markers are horizontal or vertical lines that are drawn on the plot and defined by an axis coordinate. Manipulation of the markers is done for each axis separately with the submenu options X Axis Markers and Y Axis Markers. Selecting either of these menu items shows submenus to add a marker, remove a marker, or clear all markers.

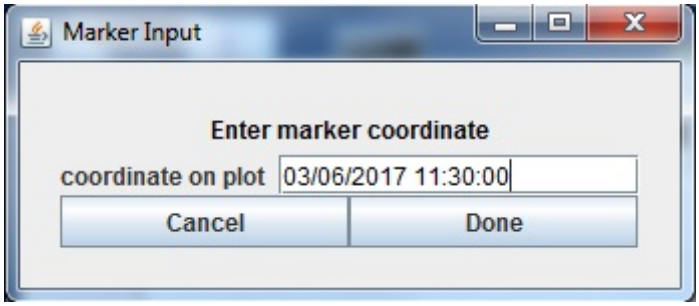

Figure 50: The Date XY Plot Marker Input for the x-axis

Add Marker...

When this submenu is selected, a dialog will be shown (see Figure 50) to enter a new marker. After entering the coordinate and pressing the Done button, the marker will be displayed on the plot. Notice the date axis is in the format of, “MM/dd/yyyy hh:mm:ss”. Figure 51 shows the plot with a marker shown on the X (date) axis.

Clear All Markers...

The user can remove all markers from an axis. The user will be asked to confirm the removal of all of the markers.

Remove Marker

Any marker of an axis may be selected from the list of the axis markers for removal. The user will be asked to confirm the removal.

Restore Original Chart...

The last sub-menu in the tools menu gives the user an option to erase all changes made to the chart in a current session. On selection of this option a message asking the user to confirm this decision will appear.

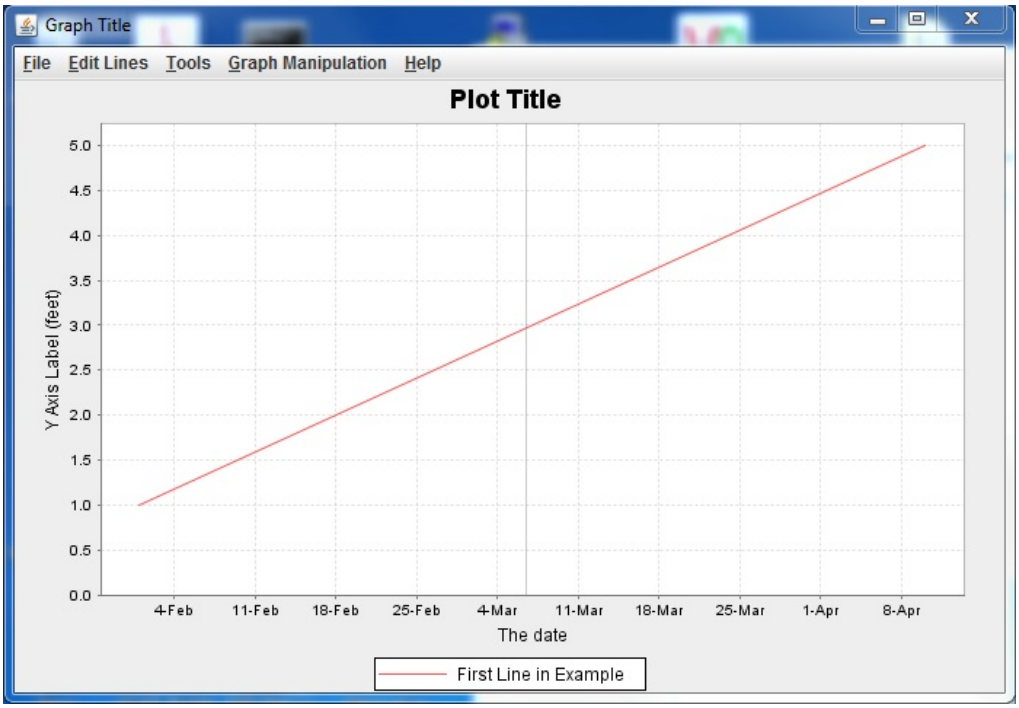

Figure 51: The Date XY Plot with a marker on the date axis

Graph Manipulation Menu

This menu controls graph properties, the graph size, and zooming options. It may be accessed by using the menu bar or shortcut key combination *Alt+g* (Windows), or *Control+Option+g* (Macintosh). There are a variety of zooming options in the Graph Manipulation menu: zooming in or out both axes at the same time, or zooming only one axis, or using automatic scaling of one or both axes. **Note:** the right mouse click in the plot area pops up a menu with choices of ***Properties***, ***Print***, and ***Zoom*** that are identical to those invoked from the File and Graph Manipulation menus. The **Save as** option from this menu gives an opportunity to save the chart as a PNG file.

Edit graph properties

This selection opens a dialog window (see the XY Plot section, Figure 20) with three tabs: Title, Plot, and Other. The same dialog can be opened by right-clicking on the chart (see the XY Plot section, Figure 19) and selecting “Properties...”

Title

The title tab (see Figure 20) handles the look of the graph title: text, font, and color.

Plot

The plot tab (see Figure 21) is responsible for the overall plot appearance, its outlines, background, and orientation.

Domain and Range Axes

The Domain and Range Axis sub-tabs allow the user to customize the chart axes. The user can change the label of an axis in the Label line; select a new font or a new color. The Ticks tab at the bottom of this window (see Figure 21) gives a choice of showing or hiding tick labels and the marks. The ranges of the axes (minimum and maximum values) may be changed when the Range tab is selected. If the Auto-adjust range box is clicked on, they display extreme axis coordinates of the plot. If this box is clicked off, the values may be changed.

Appearance

This tab controls outline stroke, outline and background paint, and the plot orientation. Changing the Orientation has the same effect as selecting the Axes: Reverse Axes menu item.

Other

The implementation of the Other tab (see Figure 22) allows choosing a background color and checking the Draw anti-aliased box. No editors are implemented for changing series paint, series stroke, series outline paint, and series outline stroke in this window. When the background paint select button is pressed, the user is presented with a new window showing a color chooser to select a new background color. With the anti-aliasing turned on, the plot lines are smoothed; otherwise they are drawn with short horizontal or vertical segments corresponding to the underlying data. Selecting Draw anti-aliased (the default), gives the plot a smooth and crisp look. As usual, all changes made may be canceled or OKed by the user before closing this dialog.

Set date axis tick size

This submenu allows modification of the major tick on the date axis with three options, Day, Week, and Month (see Figure 52). Figure 53 shows how the date axis changes with the Month option chosen.

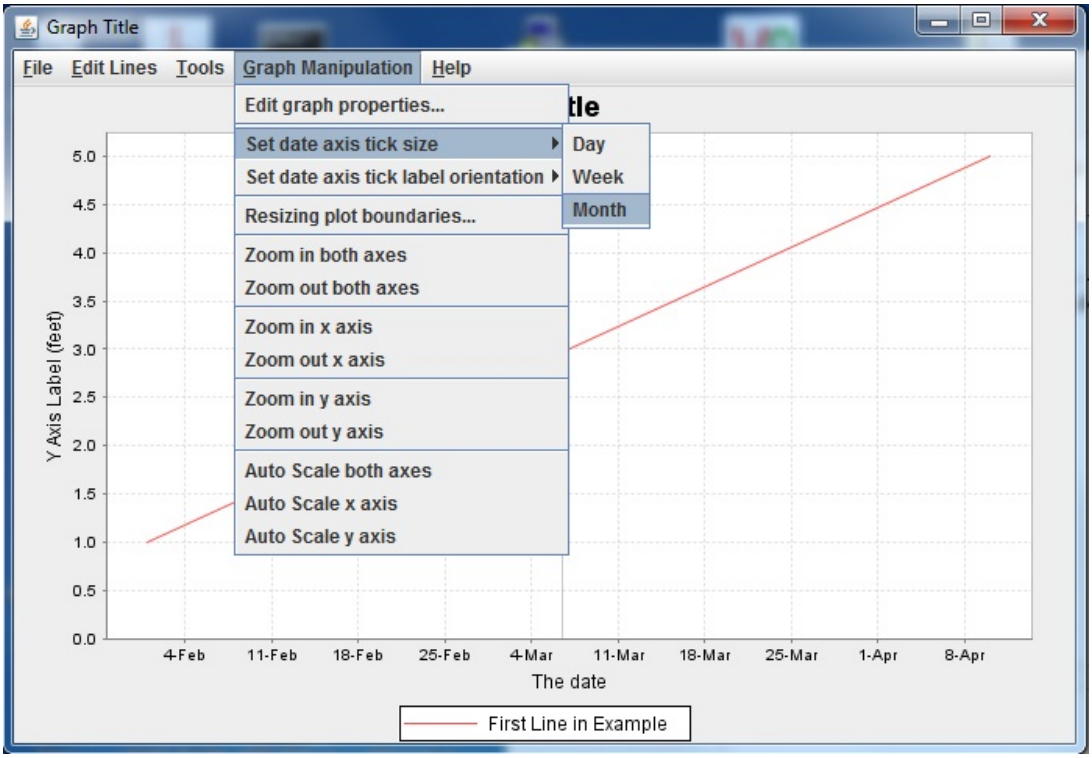

Figure 52: Setting the date tick size

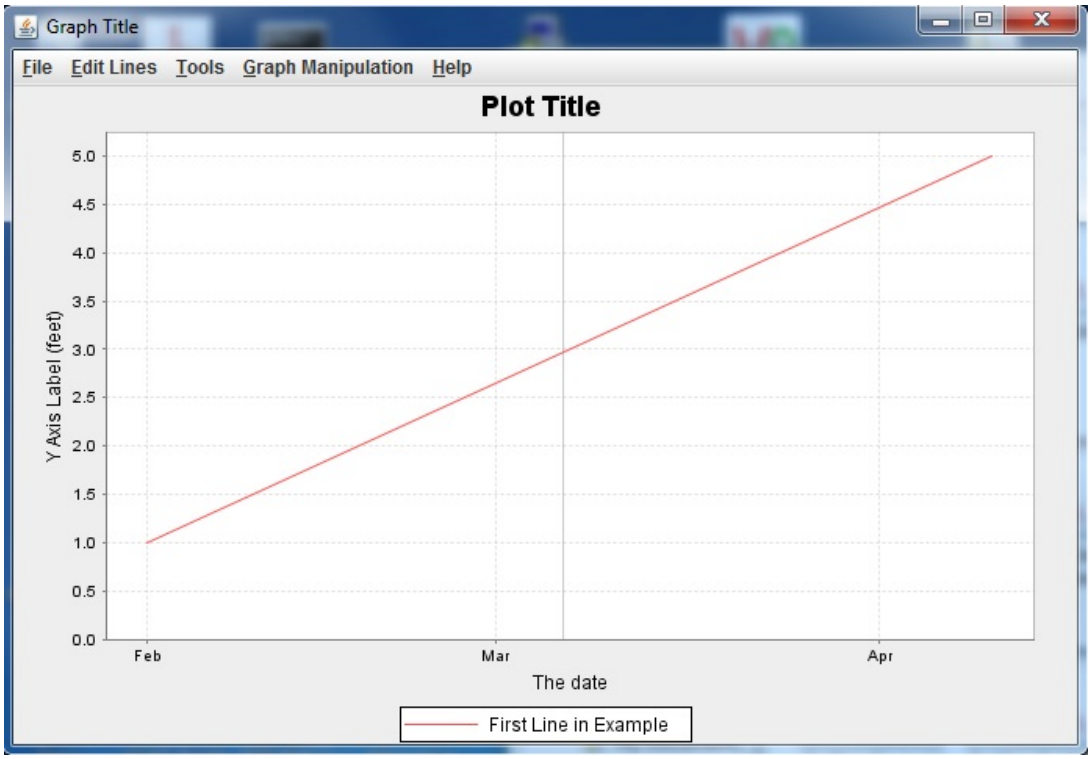

Figure 53: The date tick size set to Month

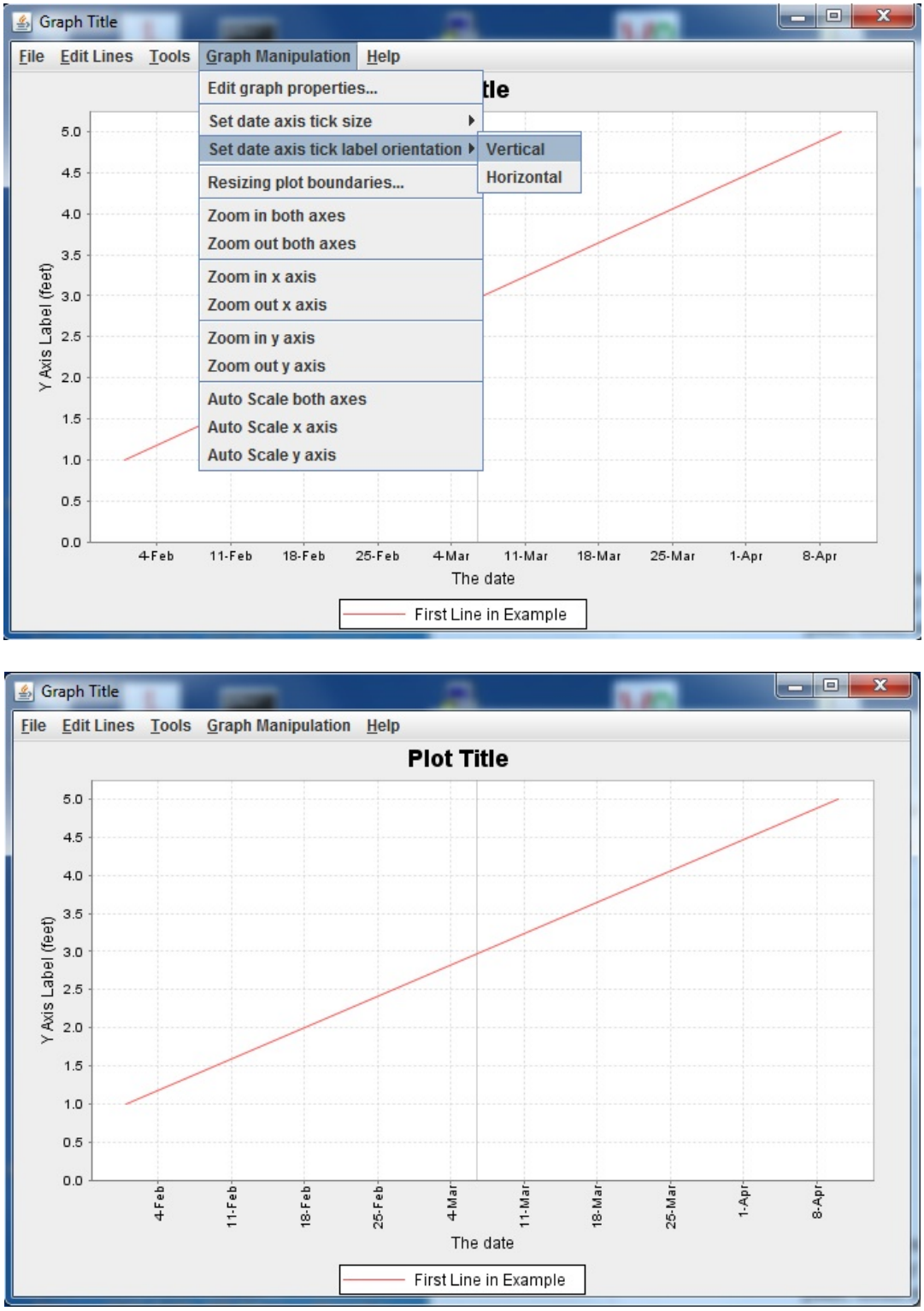

Figure 54: Setting the date axis tick label orientation to Vertical

Set date axis tick label orientation

This submenu allows modification of the major tick on the date axis with two options: Vertical and Horizontal. Figure 54 above shows how the date axis changes with the Vertical orientation option chosen.

Resizing Plot Boundaries

This menu selection brings out a dialog for entering new a width and height of the plot window. It opens with the current width and height in pixels and expects the new values in pixels to be entered. If an entered number is too small or too big, the out of range warning will appear that gives the range of possible values. The upper limit is pretty large and the width of the plot is going to be limited by the width of the screen. The plot also can be resized by dragging the sides or corners of the plot window. Refer to the XY Plot section for figures and more explanatory detail.

Zoom in both axes

This menu selection displays a part of the plot corresponding to a smaller range of values of both axes. The same effect can also be achieved by clicking in the plot area and "stretching" a rectangle from its left upper corner to the lower right corner for a new plot area.

Zoom out both axes

This operation reverses the previous action, it restores the display of the larger portions of each axes. The Zooming out effect can also be achieved by clicking in the plot area and moving the pointer right to left and upward.

Zoom in x axis, Zoom in y axis

The action displays a part of the plot corresponding to a smaller range of values of the corresponding axis.

Zoom out x axis, Zoom out y axis

The previous operation may be reversed with this option; it restores a previous range of values of the corresponding axis.

Auto Scale

These choices bring the display of the axes back to the full range of the values of the independent variable and the function.

Help Menu

The Help menu provides explanation for each of the menu options for the Date XY Plot. It may be accessed by using the menu bar or shortcut key combination *Alt+h* (Windows), or *Control+Option+h* (Macintosh). Under the Help menu, there are five submenu options corresponding to the four menus at the top of the graph frame.

Glossary of Terms

DOE	Department of Energy
DTRIAC	Defense Threat Reduction Information Analysis Center
DVD	Digital Video Disk
Java™	A programming language and trademark of Oracle Corporation
JRE	Java Runtime Environment
LANL	Los Alamos National Laboratory

Distribution

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