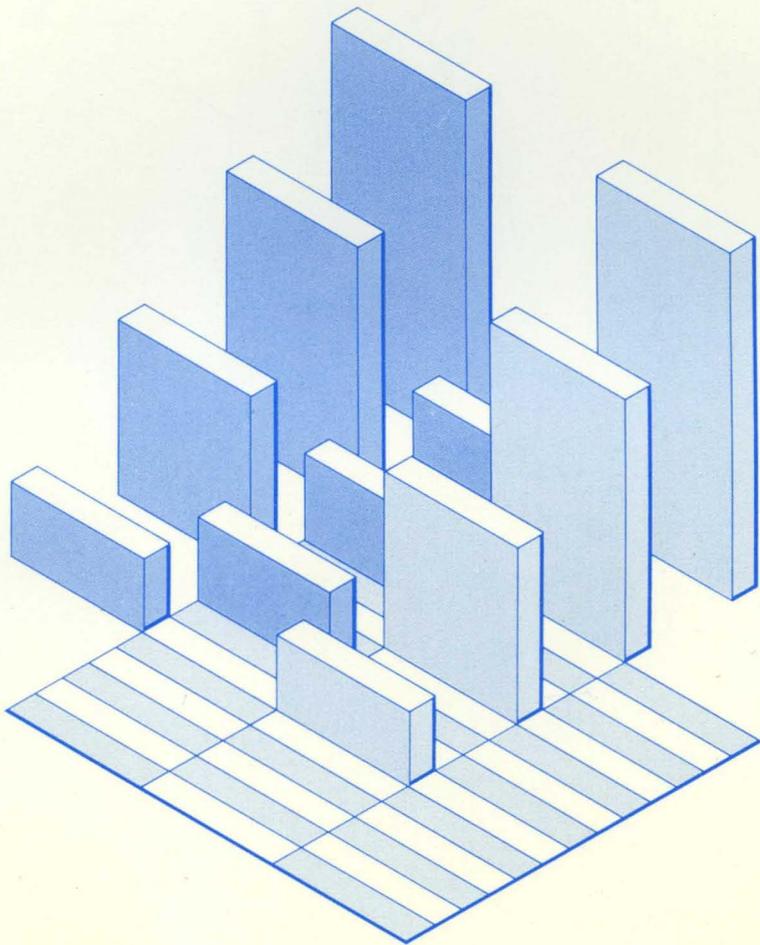


GEM[®] *Graph*[™]



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August 1987

Foreword

ABOUT GEM GRAPH™

Welcome to GEM Graph, the presentation graphics program from Digital Research®. With GEM Graph you can design and present your graphs in the following forms:

Pie Chart	Bar Graph
Line Graph	3-D Bar Graph
Area Graph	Bar and Line Graph
Map Chart	Symbol Graph

GEM Graph provides many lines, patterns, type styles, and colors to distinguish your graphs. You can add comments anywhere on the graph and move labels and legends to suit your needs.

You can use data directly from the keyboard, or from a variety of spreadsheet and database programs including Lotus® 1-2-3™, Supercalc®, and dBASE III®.

With GEM Graph you can use the most popular black and white or color dot matrix, ink jet, and laser printers to produce high-quality printed graphs.

You can also display a series of graphs on your computer screen at specified intervals for demonstrations and office presentations.

Using GEM Draw™, you can rearrange your finished graph and place two or more graphs on one page. You can also use GEM Draw to make your own graph symbols.

ABOUT THIS MANUAL

This manual is designed to teach you the basics of GEM Graph through a step-by-step tutorial that shows you how to make several different types of graphs.

Follow the instructions in Section 1, "Getting Started," to install GEM Graph on your system.

Use the tutorial in Section 2, "Making Graphs," to learn the easy features of GEM Graph.

For an overview of all the concepts in GEM Graph, read Section 3, "GEM Graph Concepts."

Use Sections 4 through 8 for reference information as you need it.

For suggestions on graph design and further reading, see the appendixes.

Note: The illustrations in this manual were created with GEM Paint™, GEM Draw, and GEM Graph.

The graphs in this manual are for illustration only. They are not based on actual data.

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Getting Started

This section shows you how to install GEM Graph on a hard disk system, on a floppy system, and how to start GEM Graph from either kind of system.

This manual assumes you have read Part 1, "Getting Started with the GEM Desktop" in the GEM Desktop™ guide, that you have the GEM Desktop installed on your system, and you have completed the "Introductory Session" to acquaint yourself with the basic operations that make GEM applications easy to use.

If you need to refresh your memory, the GEM Desktop manual contains a glossary of terms.

PUTTING GEM GRAPH ON A HARD DISK

Note: If you have a floppy disk system, skip to the next section, "Putting GEM Graph on Floppy Disks."



INSTALL.APP

1. Start the GEM Desktop and open the hard disk icon.
2. Insert the GEM Graph APPLICATION MASTER disk into drive A and open the drive A floppy disk icon. Its initial directory contains some folder and document icons, and an application icon called INSTALL.APP.
3. Double-click on the INSTALL.APP icon. This starts a special program that requests your "OK" and starts the installation procedure.

At the conclusion of the program a dialog tells you that GEM Graph and the GEM Map Editor are installed in the

GEMAPPS folder on your hard disk, and the sample graphs are in the GRAPHS folder on your hard disk.

GEM Graph is now ready to run from your hard disk. You can remove your APPLICATION MASTER disk from drive A and put it in a safe place.

Skip to "Starting GEM Graph From a Hard Disk."

PUTTING GEM GRAPH ON FLOPPY DISKS

To prepare GEM Graph for a floppy disk system, you need three formatted floppy disks: one for your working copy of GEM Graph, one for the graphs you create, and one for the GEM Map Editor. You can use new disks or disks containing information you no longer want. Follow the steps below to prepare your disks to run GEM Graph.

1. Start the GEM Desktop.
2. Remove the GEM Desktop disk from drive A and insert the GEM Graph APPLICATION MASTER disk into drive A.
3. Press the Escape key (Esc). This shortcut changes the active window's directory to show what is on the GEM Graph APPLICATION MASTER disk you just inserted into drive A.



INSTALL.APP

The GEM Graph APPLICATION MASTER disk's initial directory contains some folder and document icons, and an application icon called INSTALL.APP.

4. Double-click on the INSTALLAPP icon. This starts a special program that places your GEM application on your floppy disks. Follow the directions that appear on your screen for labeling, inserting, and removing disks.
5. The MASTER disks go in drive A. The disks you are preparing go in drive B.

6. At the conclusion of the program, a dialog tells you that GEM Graph is installed in the GEMAPPS folder on the APPLICATION disk, and the sample graphs are in the GRAPHS folder on the DATA disk, and the GEM Map Editor is in the GEMAPPS folder on the Map Editor disk.

Your floppy disks are now ready to run GEM Graph. Put your original disks in a safe place.

To make an extra DATA disk to use with GEM Graph, copy the following three folders from your GEM Graph APPLICATION MASTER disk to a new formatted disk:

- GRAFMAPS
- GRAFSYMS
- GRAPHS

Skip to "Starting GEM Graph From Floppy Disks".

STARTING GEM GRAPH FROM A HARD DISK

1. Start the GEM Desktop.
2. Open the GEMAPPS folder and locate the GRAPH.APP icon in your directory window.
3. Do one of the following:



GRAPH . APP

- Double-click on the GRAPH.APP icon.
- Select the GRAPH.APP icon and then choose the **Open...** command from the File Menu.

You can also start GEM Graph by opening a document of type GRF in the GRAPHS folder or any other folder.

STARTING GEM GRAPH FROM FLOPPY DISKS

1. Start the GEM Desktop and remove the GEM Desktop disk from drive A.
2. Insert your copy of the GEM Graph APPLICATION disk into drive A.
3. Insert your copy of the GEM Graph DATA disk into drive B.
4. Open the drive A floppy disk icon. If it is already open, press the Escape key to update the directory.
5. Open the GEMAPPS folder in drive A, and locate the GRAPH.APP icon.
6. To start GEM Graph, do one of the following:



GRAPH.APP

- Double-click on the GRAPH.APP icon.
- Select the GRAPH.APP icon and then choose the **Open...** command from the File Menu.

You can also start GEM Graph by opening a graph document of type GRF in the GRAPHS folder or in any other folder.

STOPPING GEM GRAPH

The File Menu contains several commands you can use to stop GEM Graph, depending on whether or not you want to save changes to a graph. If you opened a sample graph and made changes you do not want to save, choose **Quit** from the File Menu and answer Yes to the "Abandon edited graph?" alert box, to return to the GEM Desktop. See the File Menu in Section 4 for a complete discussion of these commands.

THE NEXT STEP

The next section, "Making Graphs", teaches you step-by-step how to use GEM Graph.

If you want to proceed to the tutorial, start GEM Graph by opening the GRAPH.APP icon.

If you already opened a graph and want to proceed to the tutorial, choose the **New** command from the File Menu.

End of Section 1

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Making Graphs

This section shows you step by step how to make and save graphs. You will learn most of the features of GEM Graph as you follow the instructions to make a pie chart, and a three-dimensional bar graph from sample spreadsheet data.

To make all graphs, you generally follow these steps:

1. Enter the titles and data for your graph.
2. Choose a graph icon from the Gallery Menu.
3. Save your graph.

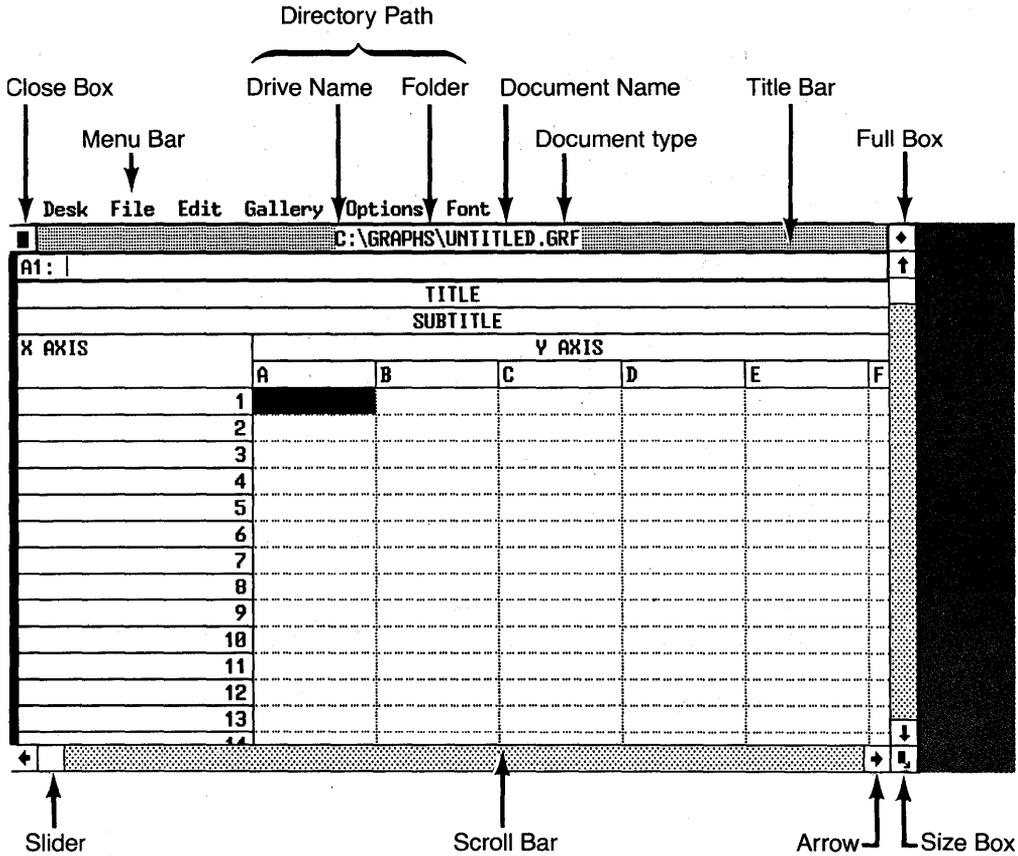


GRAPH.APP

Follow the instructions in Section 1 to start the GEM Desktop. Then start GEM Graph by opening the **GRAPH.APP** icon.

After a moment, your GEM Graph screen appears.

GEM GRAPH SCREEN



Window Borders

The Menu Bar contains drop-down menus with commands you can choose to create and change your graphs.

The **Data Window** appears below the Menu Bar. GEM Graph displays your current directory path, document name, and document type in the title bar. At this point the document name is **UNTITLED**. Note the document type, **GRF**. GEM Graph automatically appends GRF to the name of the document in the Data Window.

The Data Window is now the active window and contains the title bar, close box, full box, size box, scroll bars, sliders, and arrows. These features work the same as on your GEM Desktop.

You can practice using these features on the Data Window. Remember that a drop-down menu appears when your mouse pointer passes over each menu title. The menu disappears when you move the pointer outside the menu and click.

If you click to select a menu command at this time, please select the **Quit** command from the File Menu, do not save changes, and restart GEM Graph so you can follow the tutorial in order.

Your screen should now look like the one in the following picture, which shows the parts of the Data Window.

Y Axis Column Labels

The screenshot shows the GEM Graph interface. At the top is a menu bar with 'Desk', 'File', 'Edit', 'Gallery', 'Options', and 'Font'. Below the menu bar is a title bar containing the file path 'C:\GRAPHS\UNTITLED.GRF'. The main window is divided into several sections: an 'Editing Line' at the top left showing 'A1: |', followed by a 'Title Line' with the text 'TITLE' and a 'Subtitle Line' with the text 'SUBTITLE'. Below these is a grid with columns labeled 'X AXIS' and 'Y AXIS'. The 'X AXIS' column has a header 'X Axis Label' and rows numbered 1 through 13. The 'Y AXIS' column has a header 'Y Axis Label' and sub-headers 'A', 'B', 'C', 'D', 'E', and 'F'. Three arrows point from the text 'Y Axis Column Labels' to the 'D', 'E', and 'F' sub-headers. The grid is currently empty.

Parts of the Data Window

Note the **Editing Line** above the **TITLE** line. The **Editing Line** displays the text or data you are entering in the selected box as you type it. You can type long names or numbers if you need to. The **Editing Line** now displays A1.

Note the box that is highlighted. This is the selected box. It is in Column A, Row 1. The Editing Line always displays the name of the box that is selected.

When you type, your keystrokes appear on the Editing Line. When you press Enter, or an arrow key, or click the mouse, GEM Graph transfers the information on the Editing Line to the selected box.

The first step in making a graph is to enter the following in the Data Window:

- Title and subtitle of the graph.
- Labels for the axes.
- Data you want to plot.

The next section tells you how to do this.

If you do not have a mouse you can use the arrow keys to move the pointer. See Section 3, page 3-12 for instructions on using GEM Graph without a mouse.

MAKING A PIE CHART

You will be entering titles and data as shown in the following picture of the Data Window.

Desk File Edit Gallery Options Font

C:\GRAPHS\UNTITLED.GRF

A4: 22000

JACK HORNER CONFECTIONS
PIE IS TOP SELLER

X AXIS	Y AXIS					
	A	B	C	D	E	F
PIE	42000					
CAKE	30000					
COOKIES	27000					
TARTS	22000					
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Data Window With Pie Chart Data

1. Move your mouse pointer to the word TITLE and click to select the Title Line.

If you click on the wrong space, move the pointer to the correct space and click again.

GEM Graph highlights the Title Line to show it is

selected, places the contents of the selected box on the Editing Line (in this case TITLE), and places the vertical text cursor on the Editing Line to indicate that you can type your own graph title.

Notice the single quote (') in front of TITLE. This single quote appears on the Editing Line in front of any text that is not a number.

As soon as you begin typing, GEM Graph erases the previous data and displays what you type on the Editing Line.

If you prefer, you can press the Esc key to clear the Editing Line before you type.

2. Type **JACK HORNER CONFECTIONS**. You can use lower case letters if you prefer. This is the title of your graph.

If you make a typing error, use the Backspace key to erase the mistake, then retype.

Press Enter or click to transfer the title to the Title Line. When you use the Enter key, GEM Graph automatically moves the selection one box down.

3. If it is not selected, move the pointer to SUBTITLE and click to select it. Type **PIE IS TOP SELLER**. This is the subtitle of your graph.
4. Move the pointer to the first box under X AXIS, currently preset to the value 1 for convenience. Click to select the box for the first slice label. The Editing Line displays 1:1. Type **PIE** on the Editing Line.
5. Move the pointer to the box labeled 2 under X AXIS and click to select it. Note that PIE now appears under X AXIS. GEM Graph automatically transfers information from the Editing Line when you select a new box. Type **CAKE** on the Editing Line.

6. Move the pointer to the box labeled 3, click to select it, and type **COOKIES**.
7. Move the pointer to the box labeled 4, click to select it, and type **TARTS**.

You have now entered all the titles and labels for your first pie chart.

Note: You can use the arrow keys to move the highlighted box up, down, left, or right. If you prefer to use the arrow keys to move the highlighted box, you can try it now as you enter the data for your pie chart. For more information on using the arrow keys, see "Arrow Keys" in Section 3.

The first column label under Y AXIS is preset to **A**.

The next step is to enter data in Column A.

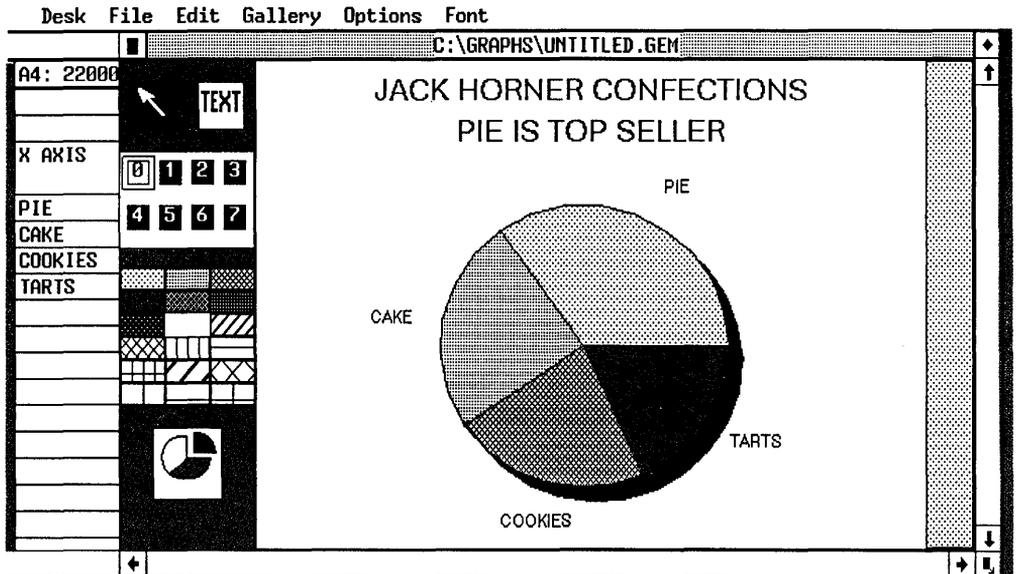
8. Move the pointer to the first box under Column A and click to select it. The Editing Line displays **A1:** to indicate the first box or cell in Column A. Type the number **42000** on the Editing Line.
9. Move the pointer to box **A2**. Use the same method to enter the numbers **30000**, **27000**, and **22000** in the next three boxes under Column A: box **A2**, **A3**, and **A4** respectively. Press Enter to register your last entry.

You have now entered all the data for your first pie chart, and your Data Window should look like the one in the preceding picture.

10. Move the pointer to the Gallery Menu and click on the pie chart icon to select it.

GEM Graph now shows you the Display Window, complete with your pie chart, title, and labels next to each slice. Each section of the pie has a different pattern.

The left side of the Display Window contains a Toolkit.
The next lesson shows you how to use it.



Display Window With Pie Chart

The Display Window overlaps the Data Window. If you need to return to the Data Window, click on any visible part of it.

To return to the Display Window, click on any visible part of it or choose the pie chart icon from the Gallery Menu.

Saving Your Pie Chart

The next step is to name your pie chart and save it.

Notice that the document name in the Title Bar of the Display Window is still **UNTITLED**, but the document type is now **GEM** instead of **GRF**. **GEM Graph** automatically appends the type **GEM** to the document name in the Display Window.

When you save your graph on disk, **GEM Graph** makes two documents. Both documents have the name you give them when you save your graph, but one has a type of **GRF**; the other has a type of **GEM**.

You open a document of type **GRF** to use with **GEM Graph**, but you open a document of type **GEM** to use with **GEM Draw**, **GEM Write™**, and **Output**.

1. To save your pie chart, select the **Save As...** command from the File Menu.

GEM Graph displays the Item Selector so you can provide a name for your pie chart.

The Item Selector displays the names of all the sample graphs of type **GRF**. The cursor is at the beginning of the Selection line.

2. Type the name **PIE** on the Selection line, and press Enter or click on the OK button.

GEM Graph automatically supplies the correct document types for you. If you prefer, you can add a document type of **GRF** or **GEM** when you type the name. **GEM Graph** still makes the same two graph documents.

The Item Selector closes and the Display Window reappears with your pie chart.

Recall that GEM Graph saves your graphs in the GRAPHS folder.

You have now made and saved your first graph. To display it on the screen or printer use the **To Output** command in the File Menu. See "Part 3: GEM Output Guide" in your GEM Desktop manual for instructions.

If you want to stop now, you can choose the **Quit** command from GEM Graph's File Menu. The **Quit** command returns you to the GEMAPPS folder on the GEM Desktop.

In this lesson you learned to do the following:

- Start GEM Graph.
- Enter titles, labels and data in the Data Window.
- Choose a graph icon from the Gallery Menu and display your graph in the Display Window.
- Make the Data or Display Window active by clicking on it.
- Use the Item Selector to name your graph for saving on disk.

In the next lesson you learn how to make a three-dimensional bar graph, set your own patterns and type styles, add a legend box, and type your own comments right on the graph!

MAKING A THREE-DIMENSIONAL BAR GRAPH

In this lesson you use our sample data document made with a spreadsheet program to make a three-dimensional bar graph and an area graph. You also learn to use the Gallery, Options and Font Menus, and the Toolkit in the Display Window.

If you have not already done so, locate the GEMAPPS folder and open the GRAPH.APP icon. If you still have a pie chart on your screen, choose the **New** command from the File Menu, then click on the Data Window. In either case, you begin with a fresh Data Window.

1. Display the File Menu and select the **Import Data...** command. When you use the **Import Data...** command, the Item Selector appears with a list of all documents with the types CSV, DIF, PRN, and WKS in the root directory of your current drive.
2. Folders are marked with a diamond and are listed first in the Item Selector. Use the scroll bar in the Item Selector if you need to, and locate the GRAPHS folder. Click on the GRAPHS folder to display the documents in it.
3. Double-click on the document SPREAD.WKS in the Directory window. GEM Graph loads the data from this sample spreadsheet document into the Data Window.
4. Add the following titles and labels so your Data Window looks like the one in the picture.

Note: You can restart this lesson at any time. Starting over does not affect the sample data document, and you do not need to save this practice graph.

Change This

To This

TITLE
SUBTITLE
X AXIS
Y AXIS

SHARPE CHEESE COMPANY
CHEDDAR SELLS BEST IN Q1
FIRST QUARTER
'1000 LBS

Type the single quote first to follow numbers with letters.

Row 1
Row 2
Row 3
Column A
Column B
Column C

January
February
March
Swiss
Jack
Cheddar

Desk File Edit Gallery Options Font

C:\GRAPHS\UNTITLED.GRF

C: 'Cheddar

SHARPE CHEESE COMPANY						
CHEDDAR SELLS BEST IN Q1						
FIRST QUARTER	1000 LBS					
	Swiss	Jack	Cheddar	D	E	F
January	50	100	150			
February	100	150	200			
March	150	200	250			
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Data Window with Spreadsheet Data



5. Display the Gallery Menu and select the 3-D bar graph icon. Your new graph appears in the Display Window.

In the last lesson you saved your pie chart at this point. In this lesson you can use the Display Window features to change your graph.

Changing Your Graph

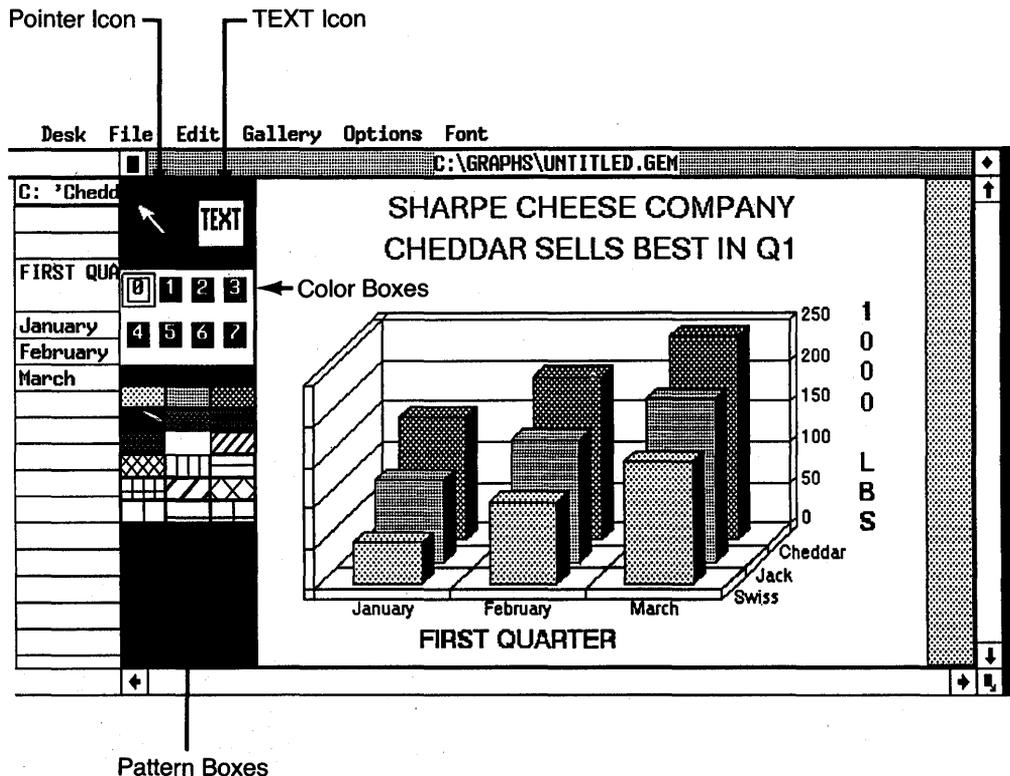
Follow the steps in this section to learn how to use the Display Window, but do not be concerned about the final appearance of the graph. If you click on something then change your mind, just move the pointer and click again.

Note: If at any time you like your graph and want to save it, choose the **Save As...** command from the File Menu. When the Item Selector dialog appears, type a name of up to eight characters on the Selection line. You do not need to add the type GRF. GEM Graph does it for you. Press Enter or click on OK. Your graph is saved in the GRAPHS folder, then reappears in the Display Window so you can continue working on it. You can do this as many times as you wish. The **Save** command keeps only the newest version of the graph. The **Save As...** command keeps both the old version under the old name, and the new version under the new name you give it.

To change your graph, use the Toolkit, located to the left of your graph, and the Font and Options Menus, located in the Menu Bar at the top of the screen.

In general, to modify a graph in the Display Window:

- Select the part you want to change.
- Select a pattern or color from the Toolkit, or a command from the Font Menu.



3-D Bar Graph With Toolkit

Notice the Pointer icon in the upper left of the Toolkit. When the Pointer is highlighted, you can select any graph element to change the pattern, color, or type size.

Use the TEXT icon next to the Pointer icon only when you want to type comments on your graph.

The numbered boxes represent eight colors you can use for graph elements if you have a color screen or printer.

The pattern boxes show the patterns you can use in slices, bars, lines, and areas of your graphs.

Depending on the graph icon you choose from the Gallery Menu, the Toolkit might display graphic symbols, a line-thickness indicator and line markers, or an explode-slice icon.

1. Move the pointer to any one of the three tallest bars in the group labeled Cheddar, then click once to select this group. Small boxes appear on the bars to show the group is selected. These boxes are called selectors.

Now move the pointer to one of the patterns in the Toolkit on the left side of the graph, then click to select it. This pattern fills the selected set of bars. The bars remain selected until you click outside the group or select something else.

You can change the pattern on the other sets of bars in the same way. First click on one of the bars in a set, then click on a pattern of your choice.

2. Notice the window border on the bottom of the screen. Remember you can use the scroll bar, slider, and arrow to position the graph in the window. Click on the right-pointing arrow to move the graph closer to the Toolkit.
3. Display the Options Menu and select the **Hide Tools** command. The Toolkit disappears and your graph is centered in the Display Window.
4. Move the pointer to any area inside the title and click. Selectors appear to show the title is selected.

Display the Font Menu and choose the **Bold** command. The graph title now appears in bold-face type.

Choose the **Italic** command from the Font Menu. The title appears in bold-face italic type. Try all the Font styles if you wish.

5. Move the pointer to one of the cheese names and click. Selectors appear around all the cheese names, or Y Axis column names.

Display the Font Menu and notice the check mark next to 20 Point. This is the type size of the selected text on the printed page.

Move the pointer to 28 Point and click. The cheese labels appear in the larger point size.

Change the size of the month names to 28 Point.

You can change the style and point size of any text element on the graph.

If you make the text very large, the graph is scaled to a smaller size to fit on the page.

Changing to a Different Graph



1. Display the Gallery Menu and click on the Area Graph icon. In a few moments your data is transformed into an area graph.

When you select a new graph icon, GEM Graph displays its own preset format with patterns, font sizes and styles you can change. However, GEM Graph remembers the format you set for your previous graph.

2. Notice the legend to the right of the graph. The Y Axis column labels appear next to the patterns that correspond to each column of data.

Move the pointer to the outside edge of the legend and click to select it. Selectors appear around the legend to show it is selected. The selectors are connected by a solid line. This solid line means you can actually MOVE the legend to a place of your choice on the graph.

If you accidentally select a pattern box or the text inside the legend, click again until you select the whole legend.

With the selectors and connecting lines still visible, position the pointer in the middle of the legend, then press and hold down the mouse button while you drag the rectangular outline of the legend to another area of the Display Window. Release the mouse button.

GEM Graph redraws the area graph to fill the space vacated by the legend.

Practice moving the legend a few times.

3. Display the Options Menu and choose the **Preferences** command. The AREA CHART PREFERENCES dialog appears.

Move the pointer to Column Labels and select **In Area** instead of In Legend. Press Enter or click on OK. The column names now appear in their corresponding areas, instead of in a legend. The graph is enlarged to fill the space.

4. Just as you can move a legend, you can move the column names that normally appear in the legend. Click to select one of the cheese names in an area. Selectors with solid connecting lines appear around all three names.

With the pointer on top of a selected name, press and hold down the mouse button while you drag the

rectangular outline to a new location. You can do this with each cheese name if you like.

When you place column labels on a graph instead of in a legend, you can move the column labels to any part of a graph you like.

Notice that you can select all groups of text on the graph. You can change the color, font size, and font style of any selected text, but you can only **MOVE** the items with solid lines connecting the little selector boxes.



5. Display the Gallery Menu and this time select the Bar Graph (not 3-D) icon. The **BAR GRAPHS** dialog appears, displaying four bar graphs from which you can choose. The **Vertical Clustered Bar Graph** icon is highlighted to show it is selected. Press **Enter** or click on **OK**. A vertical clustered bar graph appears. The graph has a legend.

6. Display the Options Menu and select the **Preferences...** command.

Move the pointer to **Value Labels** and select **Yes** instead of **No**. Press **Enter** or click on **OK**. The **Y Axis** values appear on each corresponding bar.

Adding Comments to Your Graph

1. Display the Options Menu and select the **Show Tools** command.
2. Select the **TEXT** icon in the Toolkit.
3. Move the pointer out of the Toolkit and onto the graph. As the pointer leaves the Toolkit, it changes into an I-beam cursor, to show that **TEXT** is now selected.
4. To obtain more space on the graph, select the **Hide Tools** command in the Options Menu.

5. Move the I-beam cursor to an empty space on the graph where you want to add a comment, such as the source of the data.
6. Click once to establish the starting point for the first character of your comment. Move the I-beam out of the way to see the vertical text cursor.
7. Type a comment. Use the Delete key to correct typing mistakes. Use the Escape key to delete the entire comment. If you type over an existing title, you can use the Delete key to erase characters. The existing title will be redrawn correctly. You can select, change, and MOVE comments, even if they are on top of another graph element.
8. **Shortcut:** You don't have to use the Toolkit to select TEXT. You can double-click in the Display Window to select TEXT. The pointer changes to the I-beam. Double-click again to select the Pointer icon.

This completes the tutorial. You have learned to use the Data Window and the Display Window to make several different graphs. The next section more fully describes the features of GEM Graph.

End of Section 2

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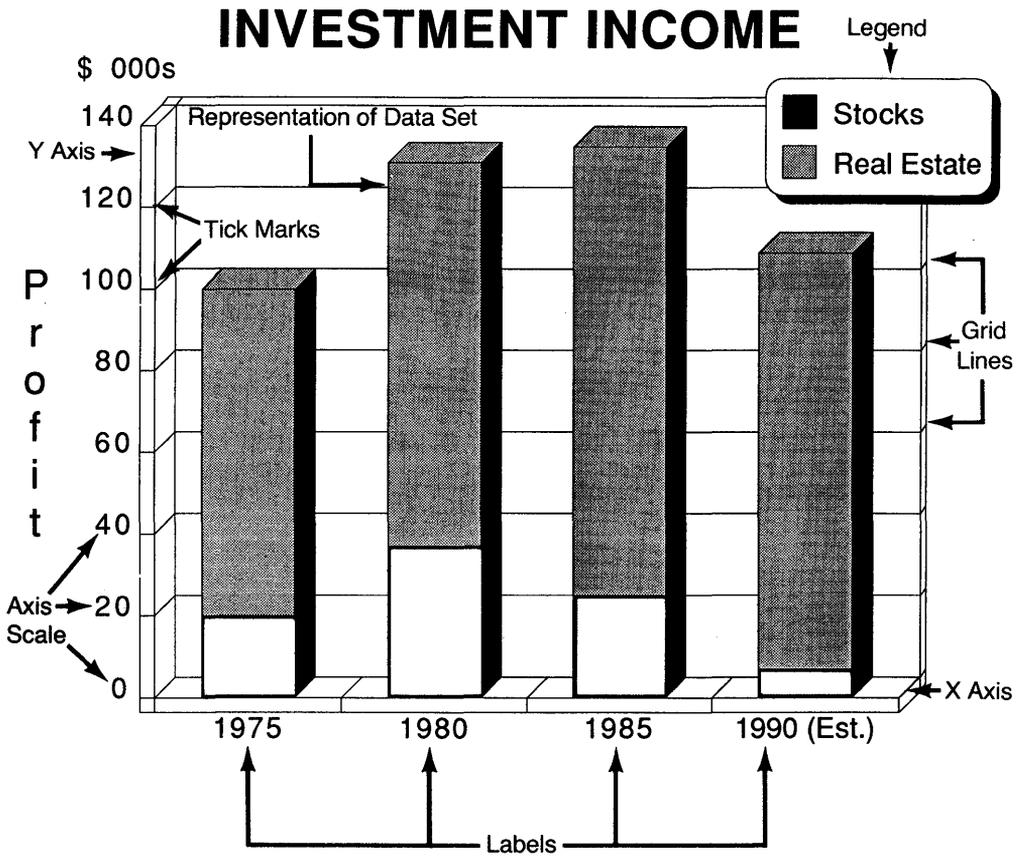
GEM Graph Concepts

This section describes the basic elements of a graph, the two windows GEM Graph uses to make graphs, and the graph documents and types associated with each window. It then describes the editing keys and mouse button techniques to use with GEM Graph, and finally, how to use the Item Selector to open and save documents.

BASIC GRAPH ELEMENTS

A graph is a visual representation of the relationships between quantities and things, frequently over a period of time.

A typical graph contains the basic elements shown in the following picture.



Basic Elements of a Graph

The table below describes the basic graph elements.

Element	Description
Axis Scale	Increment between tick marks on an axis.
Data Set	Set of numbers that is plotted to create a line, bar, or other graph type.
Grid Lines	Lines extending from the axes onto the graph to mark the units of measurement and make the graph easier to read.
Labels	Text describing what is measured on each axis.
Legend	Explanation of the patterns, line styles, symbols, and labels used in the graph.
Tick Marks	Short marks on to the axes to show the units of measurement.
X Axis	Axis showing units of time, names of items, or other classifying labels.
Y Axis	Axis showing scale of measurement for the graph.

GEM GRAPH WINDOWS

GEM Graph has two windows you use to create a graph, the **Data Window** and the **Display Window**. You have already used these windows in Section 2, "Making Graphs." Refer to the pictures of the Data and Display Windows in Section 2 to refresh your memory.

You enter the titles and data for a graph in the Data Window. You view and change the appearance of your graph in the Display Window.

Depending on how you start GEM Graph, you see either the Data Window or the Display Window. When you start GEM Graph by opening the GRAPH.APP icon, the Data Window appears. When you start GEM Graph by opening a graph document of type GRF, the Display Window appears.

If the Data Window is active, you can make the Display Window active by choosing a graph icon from the Gallery Menu or by clicking on a visible part of the Display Window.

To make the Data Window active again, move the mouse pointer to any visible part of the Data Window and click, or close the Display Window.

You can move or size either window when it is active, just as you can on the GEM Desktop.

The title bar of the active window contains the directory path and name of your graph document. The document name is UNTITLED until you give it a name when you choose **Save As...** from the File Menu.

Document Types GRF and GEM



P I E . G R F

When you save a graph on disk, GEM Graph creates two graph documents. Both documents have the same name – the one you gave your graph when you saved it, but they have different types.

One graph document has the type GRF. Use the GRF version of the document with GEM Graph.



P I E . G E M

The other graph document has the type GEM. Use the GEM version of the document when you want to include your graph into a GEM Write document, enhance it with GEM Draw, or print it with the Output program.

The Data Window title bar always displays the graph name with type GRF. The Display Window title bar always displays the graph name with type GEM.

Using the Menu Commands

Each menu in the Menu Bar contains commands. Menu commands become available or unavailable depending on what you are doing. Bright commands are available. Dim commands are unavailable. When you select data in the Data Window, or part of your graph in the Display Window, commands you can use to move or change the selected elements become available and are displayed in normal brightness.

EDITING KEYS

Use the editing keys described in the following table when you are working in the Data Window or adding comments in the Display Window. See "Adding Comments to a Graph" later in this section.

Key	Action
Backspace	Deletes character to left of cursor. Characters to right move one space left.
Del	Deletes character at cursor when Ins (Insert) key is <u>on</u> . Remaining characters move one space left. See "Insert Key" on next page.
End	Selects last column and row containing data in Data Window.
Enter	Transfers text from Editing Line into selected box in Data Window. Moves highlighted box down one line.
Home	Selects box A1 in Data Window.
Left arrow	Moves selection left one box. Moves text cursor left one character when Ins is <u>on</u> , or when adding comments in Display Window.
Right arrow	Moves selection right one box. Moves text cursor right one character when Ins is <u>on</u> , or when adding comments in Display Window.

Editing Keys Continued

Key	Action
Up arrow	Moves selection up one box.
Down arrow	Moves selection down one box.
Shift tab	Moves all Y axis columns left one page.
Tab	Moves all Y axis columns right one page.
PgUp	Moves all Y axis columns up one page.
PgDn	Moves all Y axis columns down one page.
Ins	Makes left and right arrows move text cursor on the Editing Line. See below.
Num Lock	Switches between arrow keys and numeric keypad. See below.

Insert Key

The Ins (Insert) key switches the left and right arrow keys between two functions: moving the selected box in the Data Window or moving the text cursor one character left or right on the Editing Line. Characters you type are inserted before the text cursor on the Editing Line. Use Ins to correct a mistake at the beginning of a long name or number. Ins is automatically on when TEXT is selected in the Display Window. To return the arrow keys to non-insert, press Ins, Enter, an up or down arrow, or click.

Num Lock Key

The Num Lock key switches the numeric keypad between two functions: entering numbers or using the arrow keys. Num Lock is useful for entering large amounts of numeric data from the keyboard. When using numbers, the Ins key produces the number 0. Press Enter or click to transfer information from the Editing Line to the selected box. Press Numlock again to turn the numeric keypad off and turn the arrow keys on.

ARROW KEYS

The arrow keys perform the following functions, depending on the current state of the Ctrl (Control), Num Lock, and Ins (Insert) keys. The arrow keys can:

- Move the highlighted box in the Data Window.
- Move the text cursor character-by-character on the Editing Line when you press Ins, or when TEXT is selected in the Display Window.
- Enter numbers from the numeric keypad on the Editing Line when you press Num Lock.
- Move the mouse pointer when you press Ctrl. When the arrow keys are moving the pointer, the Num Lock and Ins keys have no effect.

Use the following guidelines to change the function of the arrow keys.

- If the arrow keys display numbers on the Editing Line and you do not want them to, press the Num Lock key.
- If the arrow keys move the mouse pointer and you do not want them to, press the Ctrl key.
- If you do not have a mouse and you want the arrow keys to move the pointer, press the Ctrl key. See page 3-12 for instructions on how to use GEM Graph without a mouse.

GEM GRAPH CURSORS

GEM Graph uses four different cursors to tell what is selected, where your next action occurs, and what type of action you can do, as described in the following table.

Cursor	Description
	Block Cursor Shows the current selection in the Data Window.
	Pointer Shows the area to be selected when you click or perform an equivalent action.
	Text Cursor Shows where the next character you type appears, either on the Editing Line in the Data Window, or when TEXT is selected in the Display Window.
	I-beam Shows TEXT is selected in Display Window so you can add or edit comments.

MOUSE BUTTON TECHNIQUES

The following table describes the mouse button techniques to use with GEM Graph.

Action	Effect
Click	Selects box or graph element at pointer.
Double-click	In Data Window, selects entire column or row for Cut , Copy , and Paste commands. Must position pointer on column or row label. See Edit Menu in Section 4. In Display Window, positions text cursor to add or edit comments.
Drag	In Data Window, selects area for Cut , Copy , and Paste . In Display Window, moves selected graph element.

See "Moving the Mouse" in your GEM Desktop manual for more information on these techniques.

IF YOU DON'T HAVE A MOUSE

You can use the arrow keys to move the pointer. If the arrow keys do not move the pointer, press and release the Ctrl key. Your computer beeps to let you know the arrow keys now move the pointer.

Use the following techniques to move the pointer:

- Hold down an arrow key to make the pointer move continuously and rapidly.
- Hold down a Shift key at the same time as an arrow key to make the pointer move slowly.

The following table shows the keyboard equivalents of GEM Desktop mouse button techniques:

Mouse Action	Keyboard Equivalent
Click	Press the Home key.
Double-click	Press the Home key twice.
Drag	Press and release the End key. This has the same effect as holding down the mouse button.
	Use the arrow keys to move the pointer.
	Press the Home key. This has the same effect as releasing the mouse button.

For more information see your GEM Desktop manual.

ENTERING DATA IN THE DATA WINDOW

The Data Window contains boxes in which you enter the title of your graph, the labels of the X and Y axes, and the numbers that determine what your graph looks like. See Section 2 for pictures of the Data Window.

When you select a box in the Data Window, GEM Graph displays the name and current contents of that box on the **Editing Line**. If the selected box contains words instead of numbers, GEM Graph precedes the word with a single quote (').

Note: To enter a label that contains numbers followed by letters or non-numeric characters, first type a single (') or double (") quote.

The row numbers already provided under X AXIS are preset values that GEM Graph uses for the X axis. You can change these row numbers to other numbers or to labels.

The labels A, B, C, D and so on under Y AXIS are preset labels for the Y axis columns. You can change these column labels.

The columns under A, B, C, D and so on are for numbers. Each column of numbers represents one data set on your graph. For example, the numbers in column A make one line on a line graph. If you choose a bar graph, the numbers in column A make one set of bars.

Negative Values

GEM Graph can plot negative values. However, pie charts, area graphs, and stacked bar graphs cannot use negative values. In these cases GEM Graph displays an alert box stating that negative values will be plotted as absolute values.

Missing Data

If you are missing some data in a particular data set, leave the appropriate boxes in the Data Window empty. GEM Graph simply leaves a space in your graph where the data is missing. It does not treat an empty box as a zero, because a value of zero would change the meaning of the data.

Scientific Notation

If your data contains numbers longer than ten digits, GEM Graph displays them in the Data Window in scientific notation so the numbers can fit into the boxes.

MODIFYING YOUR GRAPH IN THE DISPLAY WINDOW

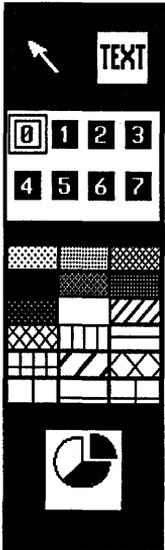
This section describes how to modify your graph, move elements, and add comments in the Display Window. See Section 2 for pictures of the Display Window.

Your graph appears in the the Display Window when you enter data in the Data Window, then choose a graph icon from the Gallery Menu or click on the Display Window, or when you open a graph document of type GRF.

A map appears in the Display Window when you select the map icon from the Gallery Menu. See "Map Chart" in Section 4.

The left side of the Display Window contains a Toolkit you can use to modify the appearance of your graph. You can also use commands in the Options and Font Menus. For a complete description of the commands in these menus, see Section 4, "GEM Graph Menus."

Using the Toolkit



The Toolkit contains a Pointer icon, a TEXT icon, eight numbered color boxes, and some combination of patterns, symbols, a line-thickness indicator, or an explode-slice icon. The contents of the Toolkit varies, depending on the type of graph you select from the Gallery Menu. If your hardware does not support color, the numbered color boxes appear in monochrome. Refer to the labeled picture of the Toolkit in "Making Graphs," page 2-15.

You can use the Toolkit to add text to your graph, to change colors, patterns, symbols, line markers and line thickness, and to explode a slice of a pie chart.

The Pointer icon is selected until you click on the TEXT icon. With the Pointer selected, you can make all changes except adding comments. Select the TEXT icon when you want to add comments to your graph. See "Adding Comments to a Graph" later in this section.

To change a color, pattern, or symbol in your graph:

1. Move the pointer to any element of your graph and click to select it. GEM Graph places little boxes in or around the selected item to show it is selected. These boxes are called "selectors."
2. Choose any color, pattern, or symbol in the Toolkit and click on it. Symbols appear in the Toolkit only when you choose a symbol graph from the Gallery Menu.

The line-thickness indicator appears in the Toolkit only when you choose a line graph or a bar and line graph from the Gallery Menu.

To change the thickness of a line:

1. Move the pointer to the line you want to change and click to select it.
2. Click on the arrow in the line-thickness indicator and drag it to the thickness you want.



To change a line marker:

1. Move the pointer to the line you want to change and click to select it.
2. Click on the line marker of your choice in the Toolkit.

If you have a legend on your graph, it automatically changes to reflect the new pattern, color, symbol, line marker, or line thickness you select.



The explode-slice icon appears in the Toolkit only when you choose the pie chart from the Gallery Menu.

To explode a slice in a pie chart:

1. Move the pointer to the pie slice you want to explode and click to select it.
2. Click on the explode-slice icon in the Toolkit.

Using Colors

The numbered color boxes in the Toolkit correspond to colors on your screen or printer. GEM Graph automatically makes each data set on your graph a different color, as well as a different pattern. Even if you have a monochrome screen, GEM Graph records each data set on your graph as a different color, for use with a color printer.

If you are using device driver software from other than your GEM Desktop diskettes, the colors on your screen or printer might vary from those in the following table.

Box Number	Color
0	White
1	Black
2	Red
3	Green
4	Blue
5	Cyan
6	Yellow
7	Magenta

Moving Graph Elements

To move a graph element in the Display Window:

1. Click on the element you want to move.

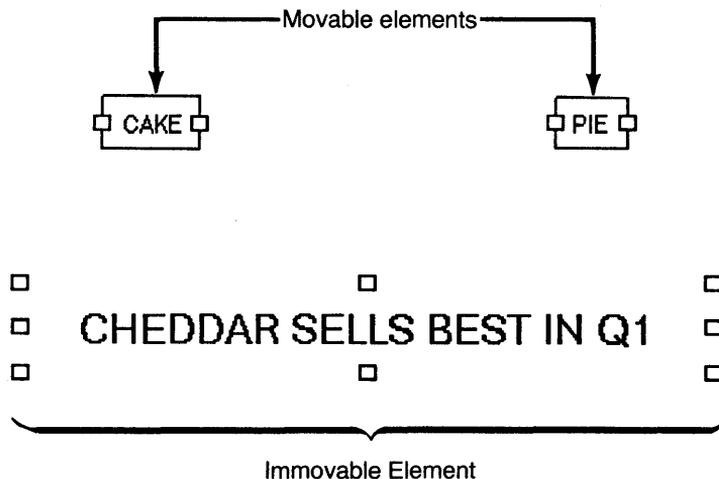
When you click to select any element, GEM Graph places selectors in or around the edges of the element to show it is selected.

2. Hold down the mouse button and drag the element to a new location.

GEM Graph tells you if you can move a graph element when you select it.

- If you can move an element, the selectors are connected by a line.
- If you cannot move an element, the selectors are not connected by a line.

The picture shows a movable and immovable element with selectors.



Elements With Selectors

Adding Comments to a Graph

You can add comments to your graph in the Display Window using the following steps.

1. Select **TEXT** from the Toolkit. The pointer changes to an I-beam, indicating that **TEXT** is selected.
2. Move the pointer to the place on your graph that you want to add a comment.
3. Click to display the text cursor, which indicates where your first character appears. This is the same cursor that you use on the Editing Line in the Data Window.
4. Type your comment. While **TEXT** is selected you can use the Backspace, Delete, and left and right arrow keys to move the text cursor. GEM Graph beeps when you reach the window border. You can use the scroll bar to move the graph over in the window to continue typing.

To edit comments already on your graph:

1. Click on the text you want to change. The text cursor appears at the end of the text.
2. Use the Backspace key to erase characters, then retype.
3. To delete the whole comment, click to select it and press the Escape key or choose the **Delete** command from the Edit Menu.

Shortcut to Adding Comments

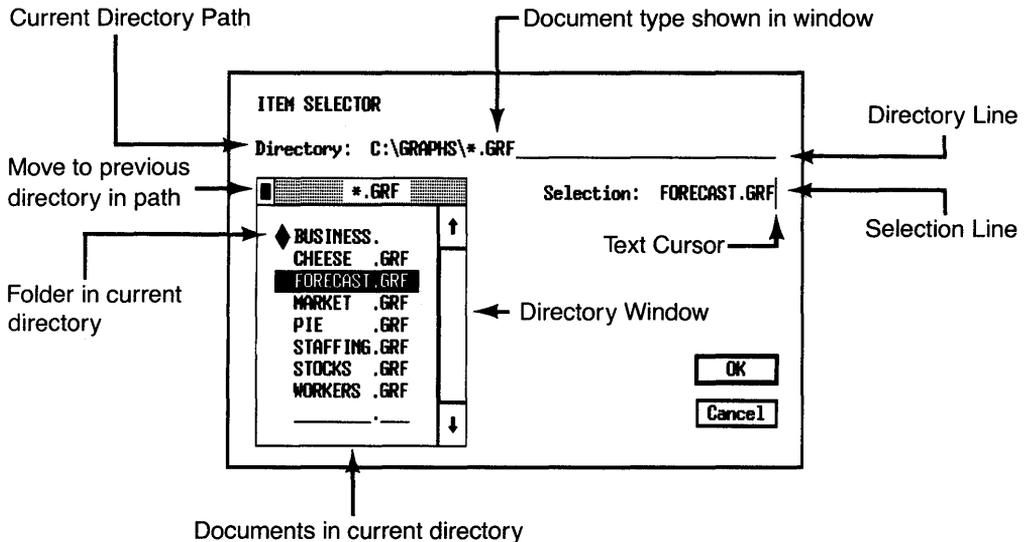
You do not have to display the Toolkit to select **TEXT** each time you want to annotate your graph. To display the text cursor, double-click in the Display Window where you want to add text. Start typing. Double-click again to select the Pointing Finger.

ITEM SELECTOR

The Item Selector is a special dialog you use to store a document on disk or recall one stored previously. The Item Selector appears when you choose any of these File Menu commands:

- **Open...**
- **Save As...**
- **Import Data...**
- **Load Symbols...**
- **Load Map...**

The illustration shows the parts of the Item Selector.



Components of Item Selector

Directory Line and Directory Window

The **Directory line** shows you the the drive and folder names of the documents listed in the directory window. For example, the Directory line C:\GRAPHS*.GRF tells you that the directory window lists all documents with type GRF in the GRAPHS folder on Drive C. (*.GRF means "all documents with the typè GRF." The asterisk replaces the documents' names.)

The Directory line tells you where GEM Graph:

- Saves your graphs.
- Looks for a graph or other document to open.

For more information on directories, see your GEM Desktop manual.

Saving Your Graphs

The File Menu has two commands for saving graphs: **Save As...** and **Save**.

- Use the **Save As...** command to name and save a graph for the first time.
- Thereafter, use the **Save** command to periodically save changes to your graph. The **Save** command saves the graph under the name in the window Title Bar.

You can also use the **Save As...** command to:

- Save an edited graph under a new name.
- Save a graph to a different directory or disk.

Naming and Saving a Graph for the First Time

To give a graph a name and save it for the first time, choose the **Save As...** command. When the Item Selector appears, type a name and press the Enter key or click on the OK button. You don't have to type the GRF document type; GEM Graph supplies it automatically. This technique saves your graph on the drive and folder listed in the Directory line.

Saving an Edited Version of a Graph

In most cases you'll use the **Save** command for new versions of graphs you have already named and saved. However, you might want to keep the edited version of your graph and the original.

For example, you might have a graph called MAY.GRF that shows sales figures for the month of May. To make the graph for June, it might be easiest to recall MAY.GRF and change a number here and there. To save this edited version (which you'll call JUNE.GRF) without losing MAY.GRF, choose **Save As...** instead of **Save**. When the Item Selector appears, type JUNE in the Selection line and press Enter or click on OK.

Opening a Graph

To open a graph, choose the **Open...** command from the File Menu. When the Item Selector appears, the directory window lists the GRF documents in your current directory. To select one of these graphs, you can do any of the following:

- Double-click on the graph's name. This is the fastest method.
- Click on a name to make it appear on the Selection line. Then press Enter or click on OK.
- Type the name of the graph on the Selection line. Then press Enter or click on OK.

The directory window can only list nine names. If the directory contains more than nine items, use the scroll bar, arrows, or slider to see the other names. To scroll continuously, hold down the mouse button while the pointer is over an arrow or the scroll bar.

Note: If you want to select a document in another directory, you must edit the Directory line. See "Changing the Directory Line and Directory Window," and "Selecting a Document in a Different Directory," next.

Changing the Directory Line and Directory Window

To save or open a document in a different directory from the one listed in the Directory line, you must change the Directory line and update the directory window. You can do either of the following:

- **Change the Directory line:**
 1. Click on the Directory line or press the up arrow or Shift Tab key to move the cursor to the Directory line.
 2. Press the Esc key to clear the line, or use the Backspace or left and right arrow keys.
 3. Type a new path name, such as
C:\MYGRAPHS*.GRF
 4. Update the directory window by clicking inside the window or pressing Enter.
- **Use the pointer to change the directory window:**
 - Click on a folder name in the directory window. Folders are marked with diamonds and appear first in the window.
 - Click on the directory window's close box to move to the previous folder.
 - To change to another disk, continue to click on the directory window's close box until the window lists the drive names for the disk drives in your system. Click on the drive name for the disk you want, then click on folder names, if any, on that disk.

Saving a Graph to a Different Directory

To save a graph to a directory different from the one listed in the Directory line:

1. Change the Directory line to the new drive letter and folder.
2. Press Enter or click in the directory window to update it.
3. Click on the Selection line or press the Tab or down-arrow key to move the cursor to the Selection line.
4. Type a name on the Selection line, and press Enter or click on OK.

Selecting a Document in a Different Directory

To select a document in a directory different from the one on the Directory line, you combine two techniques already described in this section.

1. Change the Directory line and update the directory window.
2. When the directory window contains the list of document names from your new directory, choose the name you want. As noted previously, the fastest method is to double-click on the document's name.

End of Section 3

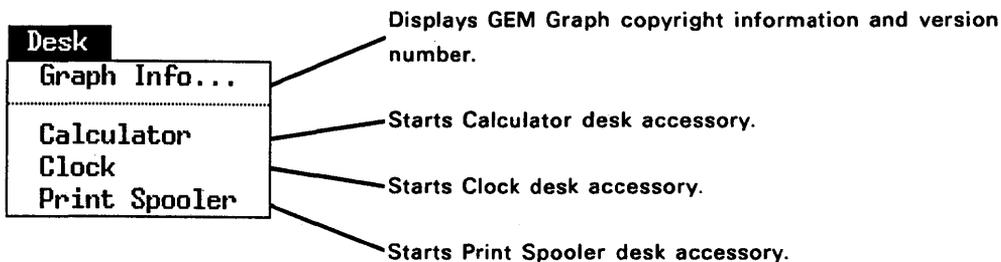
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GEM Graph Menus

This reference section describes each of GEM Graph's menus. The GEM Desktop manual describes the Desk Menu and tells you how to use desk accessories. Your system might show additional desk accessories.

DESK MENU



Note: Your system must have more than 320 Kilobytes of Random Access Memory (RAM) to use the desk accessories. If your system has less memory, the desk accessories are not available, and their names do not appear in the Desk Menu.

FILE MENU

This illustration shows the top half of the File Menu. The bottom half is on the next page.



Clears the Data and Display Windows so you can start a new graph.

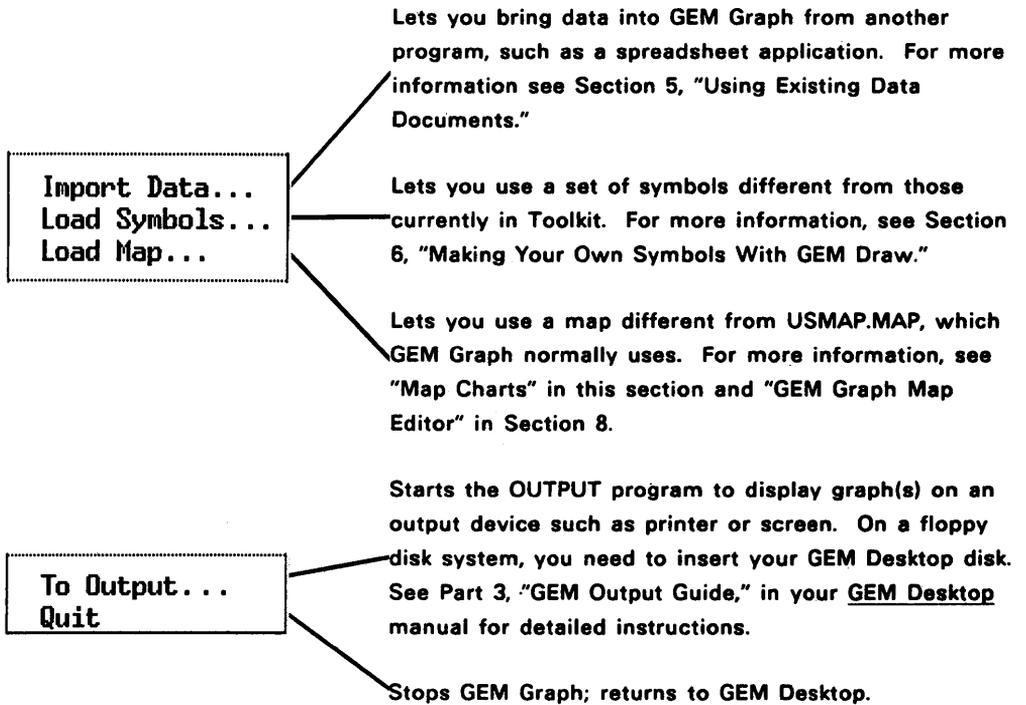
Displays Item Selector showing GRF documents in current folder. You can recall any existing graph document with the type GRF from disk.

Removes active window from your screen and continues running GEM Graph.

Saves graph under name and path shown in window title bar. Graph stays on screen so you can continue working on it. Use the Save command periodically so you don't have to redo your work in case of a computer malfunction or power failure.

Displays Item Selector to name a new graph or save an existing graph on disk under a different name. Graph stays on screen so you can continue working on it. Useful for creating a revised version from an original graph and keeping both. See page 3-21 for more information.

Discards all changes made to a graph since the last time you saved it. Original graph reappears on screen and remains unchanged on disk.



Note: If you make changes to a graph on your screen and then choose the **New, Open..., Close, Abandon, To Output,** or **Quit** commands, GEM Graph displays a dialog asking if you want to abandon the edited graph. You can respond as shown in the table:

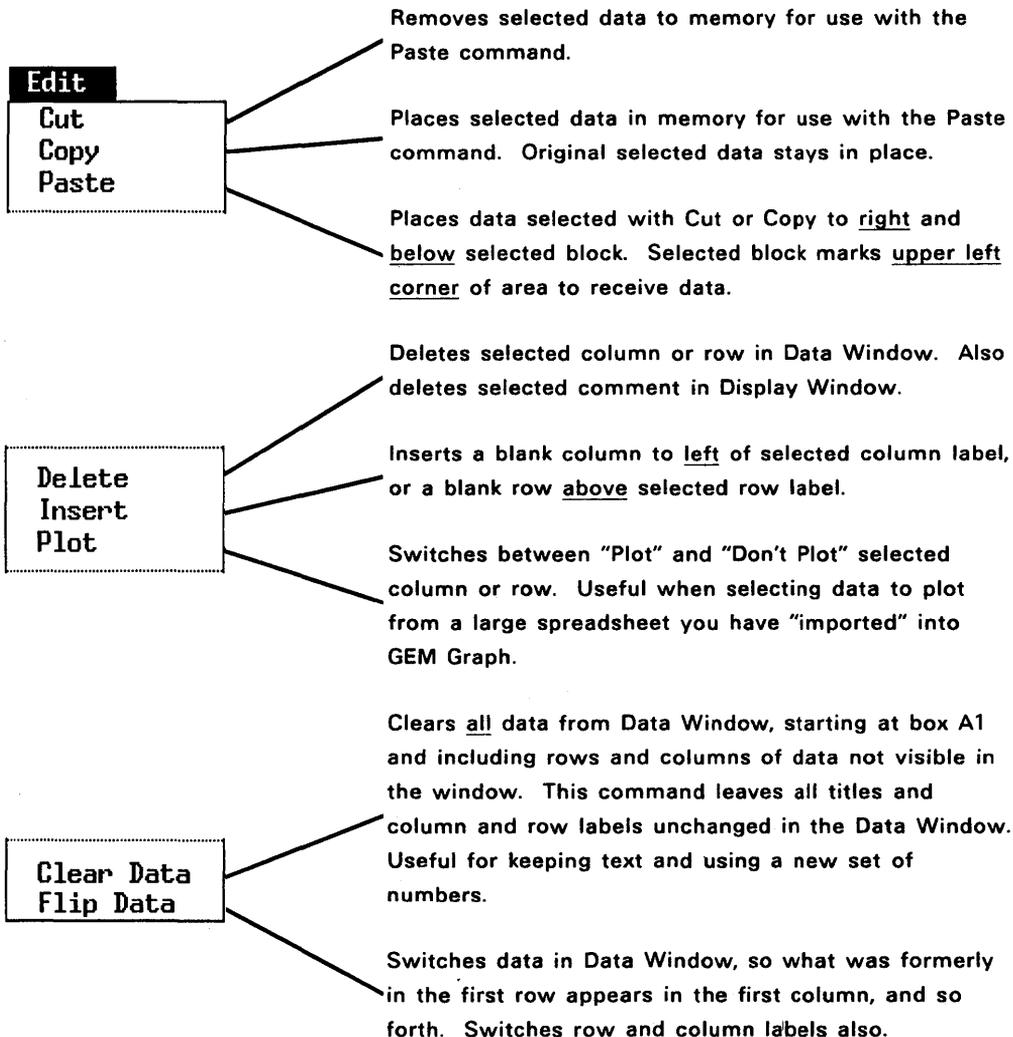
Answer	Action
YES	GEM Graph abandons the changes and then carries out your request.
NO	GEM Graph saves your graph under the name and folder in the title bar, then carries out your request.
CANCEL	GEM Graph ignores the command and returns to your graph.

If you want to save your changes and your graph is still untitled, GEM Graph displays the Item Selector so you can provide a name, then saves your graph, and then carries out your request.

See "GEM Graph Concepts," page 3-21, for instructions on using the Item Selector.

EDIT MENU

The commands in the Edit Menu affect the data in the Data Window. The next section tells how to select data to use with the Edit Menu.

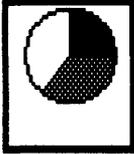


Rules For Selecting Rows and Columns

- Except for an entire column or entire row, you cannot select data you cannot see on the screen.
- To select an entire Y axis column including the column label, double-click on the Y axis column label.
- To select part of a Y axis column, drag through the data you want to select. You cannot include the column label when you select part of the data in a column.
- To select a rectangular section of Y axis data, drag through the data you want to select. You cannot include the column labels in a selection that includes data from two or more columns.
- To select more than one Y axis column label, drag through the column labels you want to select.
- To select the entire column of X axis row labels, including the X axis label, double-click on the X axis label.
- To select a section of the X axis, not including the X axis column label, drag through the X axis labels you want to select.
- To select an entire X axis row, double-click on the row label.
- You cannot select data from the X axis and the Y axis at the same time unless you select a whole row.
- You cannot select more than one column of data and select column labels at the same time. You must make two separate selections.
- You cannot select data in two different areas in the same selection.

GALLERY MENU

Pie Chart



Use a pie chart to show the relative sizes of the component parts of some whole, such as sources of a company's total revenue, or the categories that make up total expenses.

A pie chart uses only one data set, that is, one column of data, taken from the leftmost Y axis column of data that is selected for plotting. Each value determines the size of a slice.

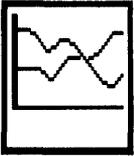
You can enter labels for the slices in the X axis column. The number of entries under X axis determines the number of pie slices.

To offset or "explode" a slice for emphasis, click on the slice you want to explode to select it, then click on the explode-slice icon in the Toolkit. Click again to reform the pie.

Use the **Preferences...** command in the Options Menu to place slice names in a legend box, and to display value labels as actual numbers or as percentages.

Refer to the sample pie chart in Section 2, "Making a Pie Chart," to see how sample data in the Data Window becomes a pie chart in the Display Window.

Line Graph



A line graph emphasizes trends, fluctuations, and patterns of change by means of a rising and falling line. For example, you can use a line graph to show how the quantity of an item varies over time.

Use a line graph when there are many points to plot. Line graphs are less effective when there are only a few data entries in a column, when there is too little variation in quantities along a single line, or if the statistics in two columns are too similar to distinguish the lines easily.

The X axis typically represents time. The Y axis typically represents quantities.

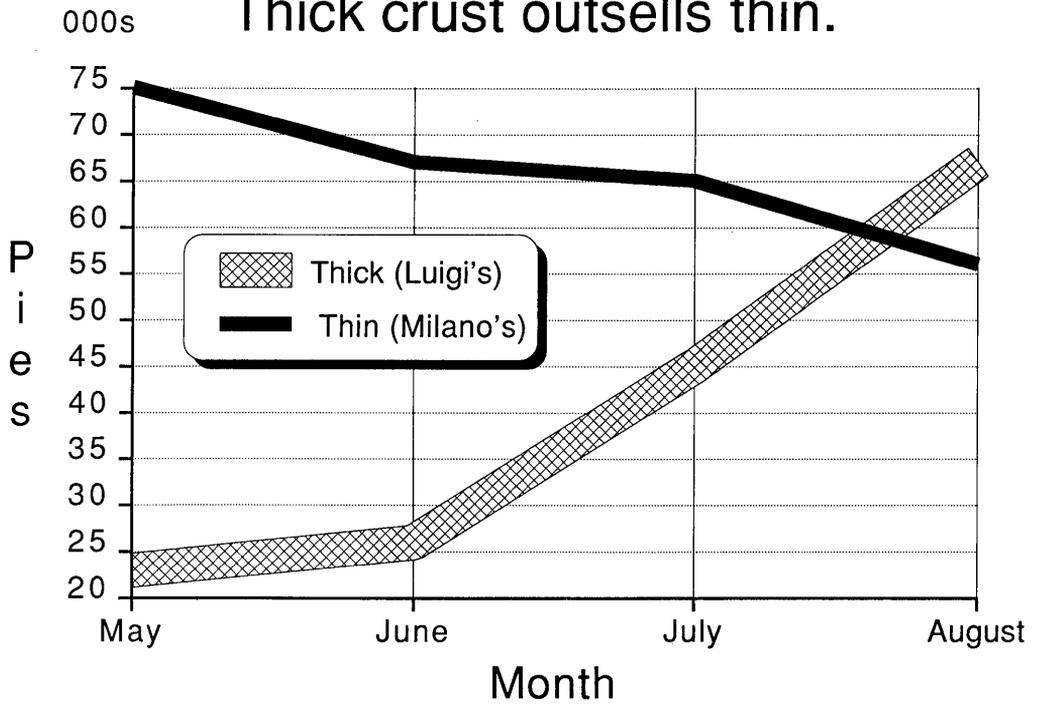
For a given Y axis column, each data item is plotted and the points are connected to form one line in your graph. If you have more than one column of data, you can use a different marker or color for each line in your graph.

You can use the line-thickness indicator in the Toolkit to change the thickness of a line. You can change the fill pattern of a thick line. See "Using the Toolkit" on page 3-16 for instructions.

If your line is fairly straight, try using the **Axis...** command in the Options Menu to decrease the distance between units on the Y axis, thereby highlighting small changes more effectively.

PIZZA WARS!

Thick crust outsells thin.



Sample Line Graph

Area Graph



An area graph is a variation of a line graph. It is useful for showing:

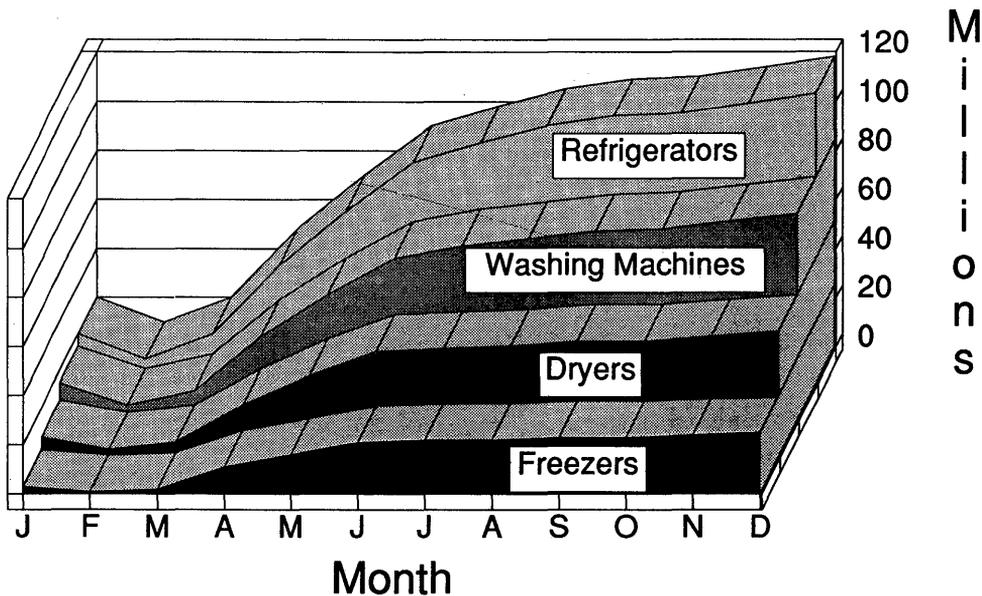
- Quantities as volume
- Volume of each part as compared to the whole
- Flow over time

For one data set, an area graph is a line graph with a fill pattern between the graph line and the baseline.

If you plot more than one set of data, GEM Graph stacks the data. This means that each Y value represents the sum of all Y values in the same row up to that point.

DURABLE GOODS TAKE OFF

Economy Rebounding Strongly



Bar Graph



A bar graph uses rectangular bars of varying height or length to represent different quantities of something.

Bar graphs are useful for comparing, ranking, and showing differences between data sets, when the emphasis is on individual figures rather than the overall flow that a line chart typically shows.

Each Y axis column of data makes one set of bars along the horizontal or vertical axis.

Bar graphs are not suitable for long columns of data because the bars become too crowded on the graph.

Use a bar graph to:

- Show quantities of one item over a period of time.
- Show quantities of different items all at the same time.
- Compare one thing to another.

When you select the bar graph icon from the Gallery Menu, GEM Graph displays four bar graph icons from which you can choose:

- Vertical Clustered Bar Graph
- Horizontal Clustered Bar Graph
- Vertical Stacked Bar Graph
- Horizontal Stacked Bar Graph

Vertical Bar Graph



Use a **vertical bar graph** to show time comparisons when there are few time periods or few data items to plot. Usually the Y axis represents quantities and the X axis represents time.

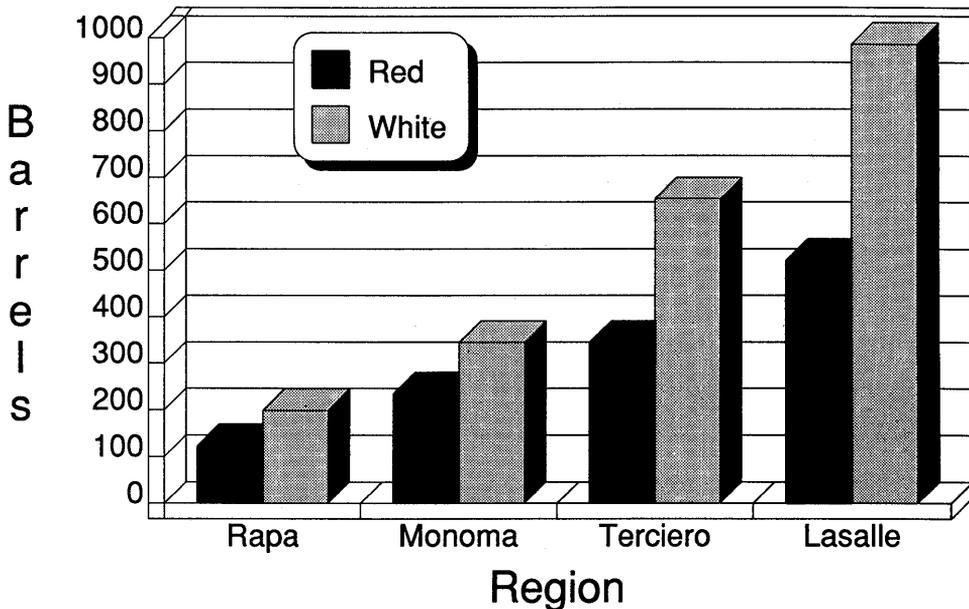
Horizontal Bar Graph



Use a **horizontal bar graph** to show item comparisons. In this case the Y axis is not a scale, but is used to label the measured items. You can therefore arrange the bars in any sequence that suits your purpose.

WINE SALES BY REGION

White pulls ahead



Vertical Clustered Bar Graph

If you have more than one column of data, decide whether to use a **clustered** or **stacked** bar graph to show all the sets of data.

Clustered Bar Graph

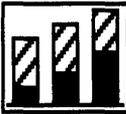
Use a **clustered bar graph** to show more than one set of data at different time periods, or to compare more than one set of data on another basis.



A clustered bar graph displays each column of data as one set of bars, and places the bar sets next to each other along the chosen axis. You can choose a different pattern or color to differentiate each set of bars.

Stacked Bar Graph

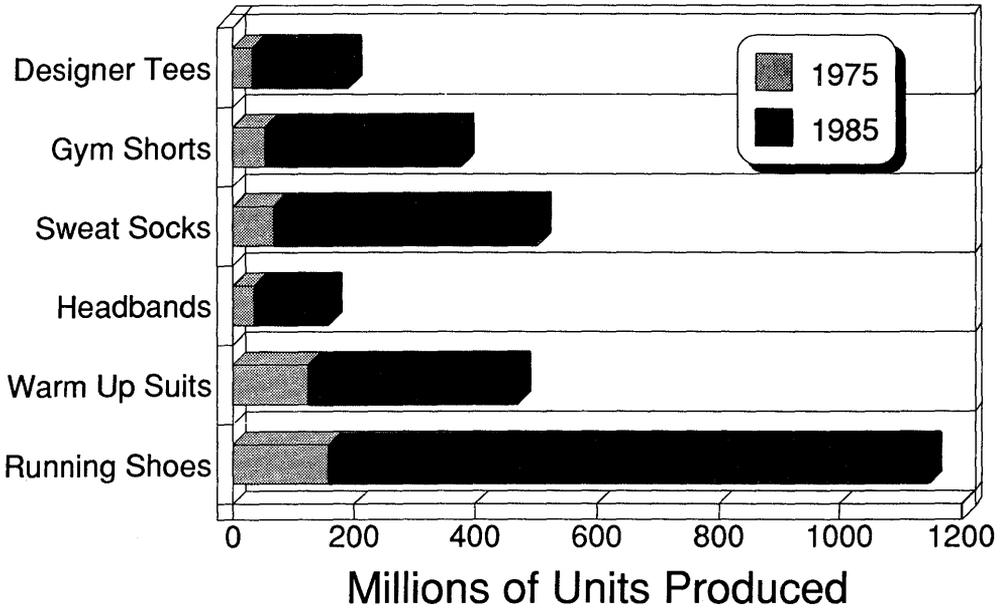
Use a **stacked bar graph** to show amounts of two or more items as parts of the total of the items, frequently over several time periods. For example, you can show several products comprising total sales over a number of months. More than three items is usually too complex to understand easily.



In a stacked bar graph, the leftmost column of data becomes the bottom set of bars. The next column is stacked on top of the first, and so on, to show totals for a given X axis row label. Each Y value represents the sum of all Y values in the same row up to that point.

FITNESS IS RUNNING WILD

Can the industry keep up?



Horizontal Stacked Bar Graph

Three-Dimensional Bar Graph



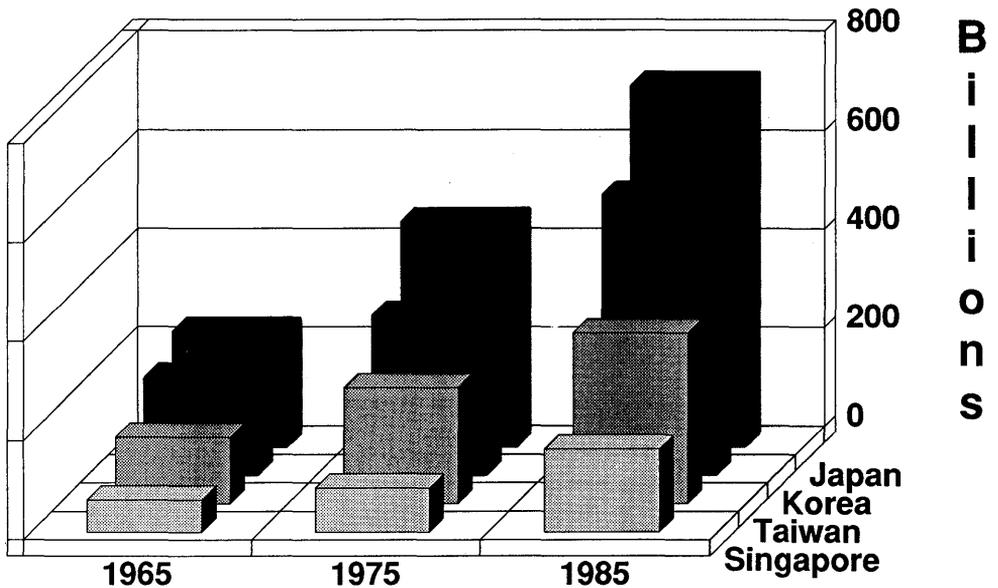
A three-dimensional bar graph arranges sets of bars vertically from front to back instead of next to each other as in a clustered bar graph.

You can use a 3-D bar graph instead of a regular or clustered bar graph.

GEM Graph displays the leftmost column of data in the foreground, and the rightmost column of data in the background.

ELECTRONICS IMPORTS

Japan Faces Competition



Bar and Line Graph

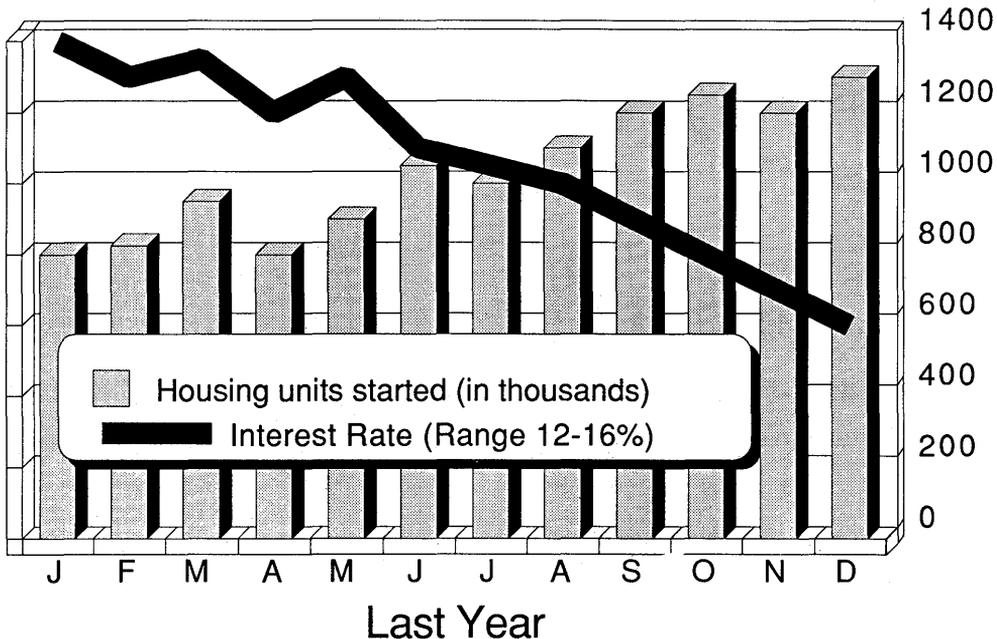


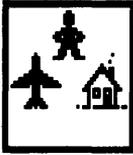
Use a bar and line graph to link two different subjects with a common factor, such as time. For example, a bar and line graph can show period-by-period quantities combined with a line graph that shows a moving average over the same period of time.

GEM Graph plots the values you enter in the rightmost column as the line.

You can use the line-thickness indicator in the Toolkit to make a thick line. You can select the line and choose a different pattern for it. See "Using the Toolkit" on page 3-16 for instructions.

BOOM IN HOUSING Fueled by lower interest rates?



Symbol Graph

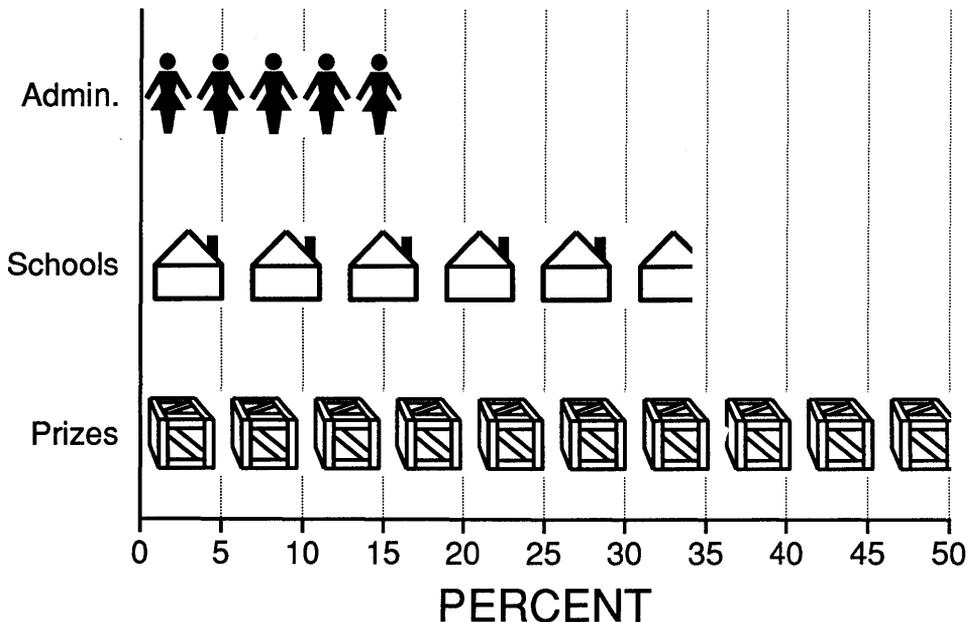
A symbol graph is a bar graph that uses drawings to represent one or more units of an item. The symbols are repeated until the bar reaches the appropriate length or height.

Symbol graphs use the leftmost Y axis column of data that is selected for plotting.

The Toolkit displays the symbols that come with GEM Graph. See Section 6 for instructions on using GEM Draw to make your own symbols.

Lottery Take

Where does it go?



Map Chart



The GEM Graph software includes the following two map documents:

- USMAP.MAP
- EUROMAP.MAP

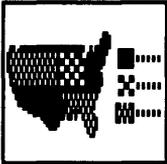
You can use these maps to create statistical and regional map charts.

When you select the Map Chart icon from the Gallery Menu, GEM Graph automatically places the names of the regions in the X axis column of the Data Window.

Map charts use the leftmost Y axis column of data that is selected for plotting.

Statistical Map Chart

Use a statistical map chart to show all the regions that contain a number of items falling in a given range.



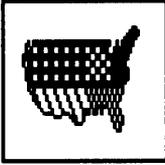
A statistical map chart assigns each region of the map a color and pattern based on the value you give the region. The color and pattern appear in the legend next to the range of values the region represents.

Statistical

GEM Graph automatically makes five even regions based on the lowest and highest values you assign the regions. Use a Y axis column to assign values to the region names.

To change the preset number and size of the ranges, use the **Scale Ranges...** command in the Options Menu.

Regional Map Chart



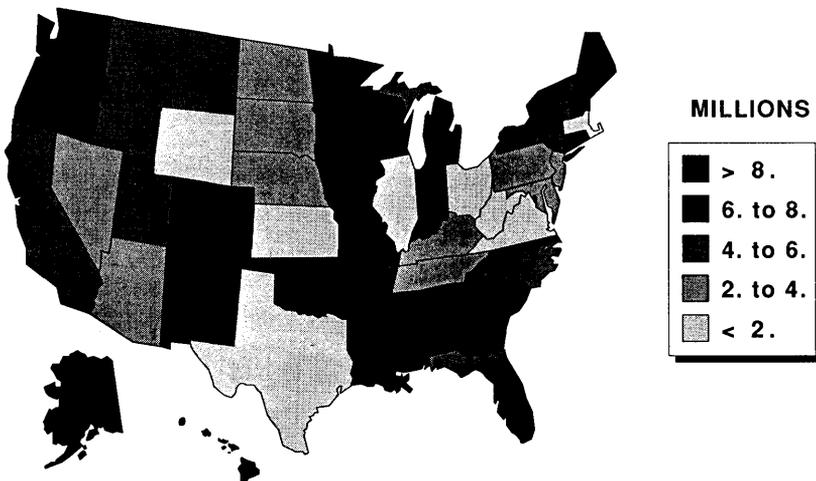
Regional

A regional map chart displays the value assigned to each region inside the region. You can use the **Preferences...** command in the Options Menu to display the region names on the map, remove the region values from the map, or display the region values as percentages. Use the **Magnify** command in the Options Menu to see the region names and values on your screen closer to the size they appear on paper.

GEM Map Editor

GEM Graph comes with a Map Editor you can use to rearrange a map to suit your own needs. You can, for example, combine two or more regions into one region and give it a new name. You can use colors, fill patterns, and text comments to create a map suitable for repeated use, and save it. Then, you use the **Load Map...** command in the File Menu to use your new map for a map chart. See Section 8, "GEM Map Editor", for instructions.

ALPHA OMEGA COMPANY U.S. PRODUCT SALES



OPTIONS MENU

Options

**Preferences...
Enhanced/Standard**

Displays a dialog you can use to set preferences for the appearance of your graph. The Preferences options are described on page 4-21. The content of this dialog varies slightly with the type of graph you select from the Gallery Menu.

Switches between a standard graph and a visually enhanced graph. Generally, the standard graph has two dimensions; the enhanced graph gives the appearance of three dimensions.

**Magnify On/Off
Page Format**

Switches between view of whole graph and view of enlarged portion of graph. Use the scroll bars to view other parts of the enlarged portion.

Displays a dialog you can use to select the layout, paper size, border size, and graph size on the printed page. Make these selections before using the To Output command.

**Axis...
Grid...
Scale Ranges...**

Displays a dialog you can use to specify your own axis scale.

Displays a dialog you can use to turn grid lines off, or make them dotted, dashed, or solid.

Displays a dialog you can use to change the number and size of each range for a statistical map chart.

Hide tools

Hides or shows the Toolkit on the left side of the Display Window. See page 3-16 for more information.

The next sections describe the **Preferences...**, **Axis...**, and **Scale Ranges...** commands.

Pie Chart Preferences

- Slice Names:** Places row labels from X axis column near the pie slices or in a legend.
- Value Labels:** Places Y axis values on the pie chart as numbers or percentages, or not at all.

Axis Graph Preferences

- Column Labels:** Places line, bar, and area labels near the lines, bars, or areas on the graph, or in a legend box.
- Value Labels:** Places Y axis values on the graph or not on the graph.
- Accumulate:** Shows each Y value as the sum of all Y values in that column up to that point.
- Percent:** Shows each Y value as a percentage of the total of the Y values in that row.

Note that in an area graph and a stacked bar graph each Y value represents the sum of all Y values in the same row up to that point.

Map Chart Preferences

- Region Names:** Places region labels from the X axis column on regions in map or not on the map.
- Value Labels:** Places values from a Y axis column on map as numbers or percentages, or not at all.

Axis... Command

Use this command to change the range of values that GEM Graph automatically assigns to the X and Y axes. The **Axis...** command is dimmed for graphs in which you cannot change the axis scale.

Press Escape or Backspace to clear an existing value, then type your own. An alert box notifies you if you enter a value that is not in the correct range for the graph.

The table describes each category in the dialog.

Term	Description
Axis Scale:	When Automatic is selected, GEM Graph determines the axis scale. Automatic remains selected until you enter new values in one of the other categories.
Minimum:	The smallest number on the axis.
Maximum:	The largest number on the axis.
Step:	Increment between tick marks.
Axis Crosses At:	The number at which you want the Y axis to cross the X axis, or the X axis to cross the Y axis.

Scale Ranges... Command

GEM Graph automatically separates a statistical map chart into five equal ranges, based on the minimum and maximum values you assign to each region name.

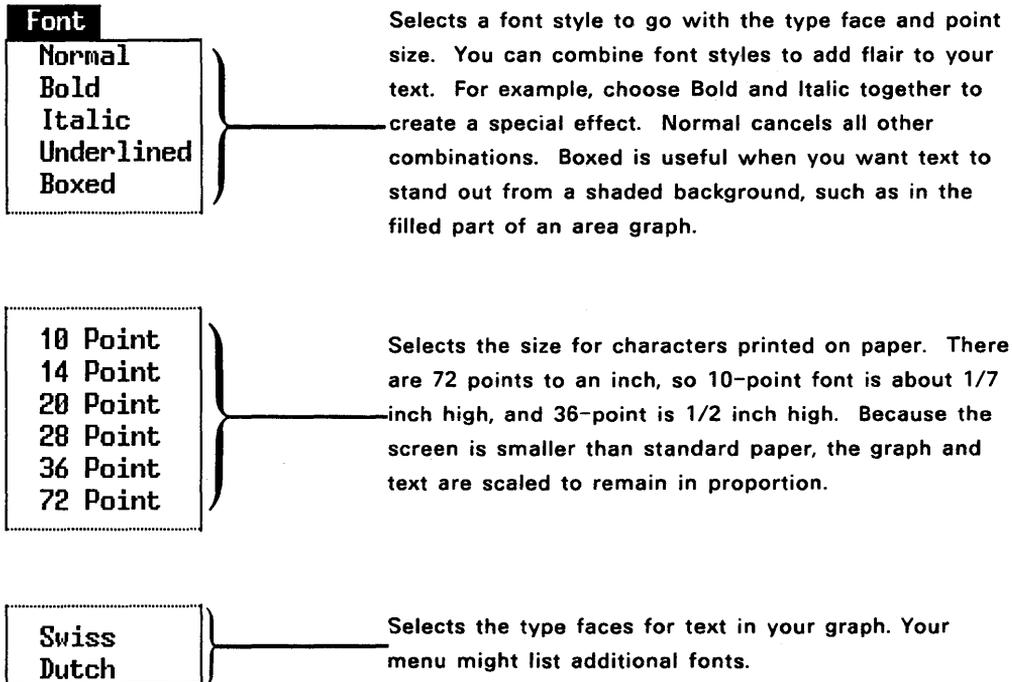
You can change the number of ranges and you can change the size of each range.

To change the number of ranges, replace 5 with the number of ranges you want. The maximum number of ranges is nine.

To change the size of a range, use the range indicator on the left of the dialog. Position the pointer in the box on the range boundary you want to change, and drag up or down, using the tick marks on the left as a guide. The size of the range changes accordingly.

GEM Graph divides your number of ranges into equal parts. You can then use the range indicator to further adjust the ranges if you wish.

FONT MENU



Check marks appear in the Font Menu to indicate the current selection of font, point size, and style for adding comments.

When you select text, the check marks show the current settings for the selected text.

To change a text characteristic, first click on the text you want to change in your Display Window, then click on the Font Menu command of your choice.

End of Section 4

Using Existing Data Documents

This section tells you how to use data from a spreadsheet or database program with GEM Graph.

Spreadsheet and database programs typically make data documents in several different formats. Your application manual tells you which formats your application uses.

To use data from another program with GEM Graph, you must produce a document with one of the four following types:

Document Type	Description
DIF	Data Interchange Format, generated by Lotus 1-2-3, VisiCalc®, and others.
CSV	Comma Separated Values, generated by SuperCalc, dBase II®, dBase III, and others.
PRN	Readable text document, generated by many programs for output to the screen or printer.
WKS	Worksheet document, generated by Lotus 1-2-3.

You can use a PRN document with GEM Graph if it has:

- No empty cells.
- At least two spaces between text and a number.
- At least one space between a number and text.
- At least one space between two numbers.
- A carriage return at the end of each line.

You can generally make your document with the type PRN look like the description above by setting the column widths in your application program. If the data in the PRN document looks orderly printed on paper, it is probably fine for use with GEM Graph.

When your spreadsheet or database document is in one of the four formats, start GEM Graph and select the **Import Data...** command from the File Menu.

When you use the **Import Data...** command, the Item Selector appears showing a list of all documents with the types CSV, DIF, PRN, and WKS in the root directory of your current drive.

Select the document you want from the Item Selector.

You might need to click on a folder name or scroll through the Directory window of the Item Selector to locate the document you want to use. See page 3-21 for a complete discussion of how to use the Item Selector to locate documents.

GEM Graph displays your data in the Data Window. It appears in the data section under the Y Axis column labels. If your data document contains titles, column labels, and row labels, these are in the data section under the Y Axis column labels also. There is no data in the title box, subtitle box, or X Axis column.

The picture shows a sample document with the type DIF, generated by Lotus 1-2-3, as it first appears in the Data Window.

Move these labels into Y Axis Columns

X AXIS	Y AXIS			
	A	B	C	D
1				
2		January	February	March
3				
4	Product A	50	100	150
5	Product B	100	150	200
6	Product C	150	200	250

DIF Document As First Imported

GEM Graph does not plot the titles and labels. It treats titles and labels as missing data, and begins plotting with the first available row and column of numeric data. Space is assigned to the graph to show that data is missing. See "Missing Data" in Section 3.

You can use the Edit Menu to rearrange the data in the Data Window. For example, you can move the titles, labels, and numeric data into the appropriate boxes, as shown in the following picture.

X AXIS	Y AXIS			
	January	February	March	D
Product A	50	100	150	
Product B	100	150	200	
Product C	150	200	250	
4				
5				
6				

DIF Document After Using Edit Menu Commands

You can use the Edit Menu commands on a selected box, row, column, or block of data in the Data Window. See the Edit Menu on page 4-5 for instructions on how to select parts of the Data Window to use with each Edit Menu command.

Follow these steps to select and move data.

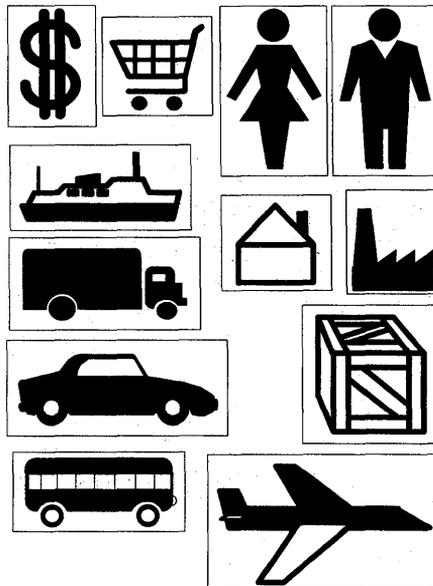
1. Select the data you want to move. GEM Graph highlights the selected area.
2. Select the **Cut** command from the Edit Menu. The selected data disappears.
3. Click on the box at the top left of the area to receive the data. This box is now highlighted.
4. Select **Paste** from the Edit Menu. The data you cut is pasted into the appropriate boxes.

End of Section 5

Making Your Own Symbols With GEM Draw

Your GEM Graph software includes the document GRAPH.SYM. This is a GEM Draw document that contains the symbols GEM Graph displays in the Toolkit when you are making a symbol graph.

The picture shows the contents of the GRAPH.SYM document.



Symbols in GRAPH.SYM

You can use GEM Draw to make a document containing your own set of symbols to use with GEM Graph.

To use the instructions that follow, you should be familiar with Section 1, "Getting Started," in the GEM Draw manual.

Keep the following in mind when you design your symbol.

- **Simplicity is the key to a good symbol.**
- **The more detail in the symbol, the longer it takes to draw it on the screen or the printer, and to store and retrieve it from disk.**
- **The basis of a symbol is a box of any size. The box contains your symbol.**
- **The size of the box affects the size of the final symbol, so if you want all your symbols to be the same size, make all the boxes the same size.**
- **The space between the symbol and the edge of the box is part of the symbol, so you might want the same amount of space around each symbol. The space appears as a gap between symbols in the symbol graph.**
- **You can put up to twelve symbol boxes in one GEM Draw document. The boxes can overlap each other.**
- **GEM Graph scales your symbol down to an appropriate size for the graph.**
- **Avoid text. After scaling, it is too small to read.**
- **Avoid the "Sketch" tool, because it uses a large amount of data points, and therefore takes longer to draw.**

Start GEM Draw and follow the steps below to make and use a GEM Graph symbol.

1. Draw a rectangular box. This box defines proportion of height to width of your symbol. If you want a tall thin symbol, make a tall thin box.
2. The box must be the background element of your symbol, so it is easiest to draw it first. The elements composing your symbol must be "on top" of the box.
3. Draw your symbol in the box. The symbol can contain several elements.
4. You must group all the elements of the symbol and the box itself together in one group. You can do this by selecting the whole box and choosing the **Group** command from the Arrange Menu.
5. Save your GEM Draw document and Quit GEM Draw.
6. Use the **Show Info...** command in the GEM Desktop File Menu to change the document type from GEM to SYM.
7. Copy your new symbol document to the GRAFSYMS folder in the root directory of your hard disk, or on the floppy GEM Graph DATA Disk.
8. Use the **Load Symbols...** command in the GEM Graph File Menu to open your new symbol document.
9. Make a symbol graph. GEM Graph now displays your new symbol(s) in the Toolkit.

End of Section 6

Modifying Graphs With GEM Draw

You can use GEM Draw to add finishing touches to a graph, or to place two or more graphs into one picture.

To make a graph small enough to fit two on a page, use the **Page Format...** command in the GEM Graph Options Menu to create your graph in quarter page or half page size.

The GEM Draw guide tells you how to use GEM Draw. For a quick review see "Elements" under "GEM Draw Concepts."

The following directions apply when using GEM Draw:

- You must use the graph document of type GEM with GEM Draw.
- Note that GEM Draw makes a backup document of type BAK.
- To combine two or more graphs into one picture, follow the GEM Draw directions in "GEM Draw Concepts, Multiple Pictures" and "GEM Draw Menus, the **Open...** command."
- Be sure to **GROUP** all the elements in a graph before you move the graph into another window. To group elements, drag-select around all the graph elements, or use the **Select All** command in the Edit Menu, then use the **Group** command in the Arrange Menu.
- Remember that some graph elements are composed of several layers. You can use the Ctrl-click "Select

Through" technique in GEM Draw to select a bottom layer.

Use the **To Output** command to display or print the new document of type GEM.

End of Section 7

GEM Map Editor

The GEM Map Editor is a special program that you can use to customize the maps you receive with your GEM Graph software. Each map is divided into named regions.

You can use the Map Editor to:

- Set patterns and colors for regions.
- Combine two or more regions into one region.
- Set font characteristics for region names and data.
- Add standard map symbols to a map.
- Place your own comments on a map.

You can save your map under a new name and select it with the **Load Map...** command in GEM Graph's File Menu.

Note: Once you combine regions in a map and save the map, you cannot retrieve the original regions on that map. Your original maps are in the GRAFMAPS folder on your GEM Map Editor MASTER disk.

You can keep the original map on your current disk intact even after you edit it. Simply use the **Save As...** command to save your new map under a new name. The original map remains unchanged under the original name.

Follow these steps to use the GEM Map Editor.

1. Open the GEMAPPS folder and double-click on the MAPED.APP icon.

The Map Editor screen appears. The menu bar and window borders work the same way as in GEM Graph. The left side of the Map Editor screen contains a Toolkit which looks like the GEM Graph Toolkit.

The commands in the Desk, File, and Font Menus work the same way as in GEM Graph.

The document name of the map is UNTITLED. The document type is MAP.

2. Display the File Menu and select the **Open** command. The Item Selector appears showing the names of map documents in the GRAFMAPS folder. The Selection line shows USMAP.MAP, which is a map of the United States.
3. Select the map document you want to use from the Item Selector.

If your map is in a different folder, you might have to click on a folder name or change the Directory line in the Item Selector. See page 3-21 for instructions.

The selected map appears in the Map Editor window. The map shows a region name and a box for data in each region. The regions in the United States map are states.

To select a region, move the pointer inside a region and click. Selectors appear to show the region is selected.

To select more than one region at the same time:

1. Move the pointer to a region and click.
2. Move the pointer to another region, hold down the shift key and click.

You can select the region name or data box to change the font characteristics. When you change a font characteristic on one region name or data box, the Map Editor changes all the region names or data boxes to the same size or style.

You can drag a region name or data box outside the map to make a callout.

The Map Editor Toolkit contains the same Pointer icon, TEXT icon, numbered color boxes, and fill patterns as the GEM Graph Toolkit. These work the same way as they do in GEM Graph.

The Map Editor Toolkit also contains some standard map symbols. You can drag these symbols to any location on the map. You can select the symbol and use the **Delete** command in the Edit Menu to delete it.

The document MAP.SYM contains the symbols in the Toolkit. MAP.SYM must be in the GRAFSYMS folder for the symbols to appear in the Toolkit.

The table describes the commands in the Edit Menu.

Command	Description
Make Region	Displays a dialog you use to name the selected region. You can select several regions and combine them into one region. The map displays the new region name.
Break Region	Returns the selected region to the original regions.
Delete	Deletes selected region from the map. Deletes selected symbol from the map.
Undelete	Returns the last deleted region or regions to the map. You can undelete until you make another deletion.
Hide/Show Text	Switches between showing and not showing the region names and data on the map.
Magnify On/Off	Switches between showing an enlarged portion of the map and the whole map. You can use the scroll bars, sliders, and arrows to view different sections of the magnified map.

End of Section 8

Design Hints

We recommend that you do the following when creating your graph:

1. Decide what point you are going to make with your graph. This point, stated in a few words, can be an effective title for your graph. It is generally most effective to make only one point per graph.
2. Decide whether you are going to show the relationship of one or more items over a period of time, or as parts of a whole, or the relationship of different items all at the same time.
3. Decide which type of graph best lends itself to your subject. With GEM Graph, you can enter your data and see what it looks like with each kind of graph.
4. Design your graph to be as simple as possible, with carefully chosen labels to make your point clearly.
5. Consider changing the scale of the X or Y axis if the degree of change your data shows is too slight to read easily. Use the **Axis...** command to make this change.
6. Color and pattern your graph from darkest on the left or bottom, to lightest on the right or top. This applies to clustered and stacked graphs.
7. To make the background stand out in a three-dimensional graph, make it lighter than the foreground.

End of Appendix A

Suggested Reading

- Dreyfuss, Henry. Symbol Sourcebook. New York: McGraw-Hill, 1972.
- Holmes, Nigel. Designer's Guide to Creating Charts and Diagrams. New York: Watson-Guptill Publications, 1984.
- Tufte, Edward. The Visual Display of Quantitative Information. Cheshire, CT: Graphics Press, 1983.

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