

## SOFTWARE

### **KrackPlot: A Picture's Worth a Thousand Words**

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### **What Is KrackPlot?**

KrackPlot is a program that allows the user to draw and modify sociograms very easily on any DOS machine. Among other things, the user can move nodes, add or delete nodes and lines, rotate the graph, arrange the nodes in a circle, and draw full or dashed lines with or without arrowheads to indicate directional relations. Once the sociogram appears on the screen as the user would like it, a printer file can be created which can be printed on almost any printer or plotter currently available to make a high-quality hard copy of the sociogram.

### **How to get a Copy of KrackPlot**

KrackPlot is available through Steve Borgatti at the following address:

Steve Borgatti  
Analytic Technologies  
306 South Walker Street  
Columbia, South Carolina 29205

The price of the program for INSNA members is \$20 (plus \$5 shipping and handling within the Americas, \$11 within Europe, or \$14 elsewhere). The shipping and handling fee for KrackPlot is waived if UCINET is purchased at the same time. Payments may be made via a check made out to Analytic Technologies or through a Visa or MasterCard credit card number.

Borgatti has rewritten UCINET to make it easier to communicate back and forth between UCINET and KrackPlot. You can use UCINET's EXPORT routine to create data files that can be read directly into KrackPlot. Thus, data can be read into either program then transferred to the other program fairly easily.

### **Using KrackPlot**

There are two ways to input data to KrackPlot. The user can create an input file that contains the data that KrackPlot uses to plot the points and draw the lines on the screen. Or, alternatively, the user can input the data by running KrackPlot and adding nodes and lines to an otherwise blank screen. In this latter case, one would "open" a non-existent file (which will appear as a blank screen), and then "modify" it by adding nodes and lines. When the picture is complete, the user can "save" it; the resulting output file will contain all the node and line information in the format required to replicate the picture in the future.

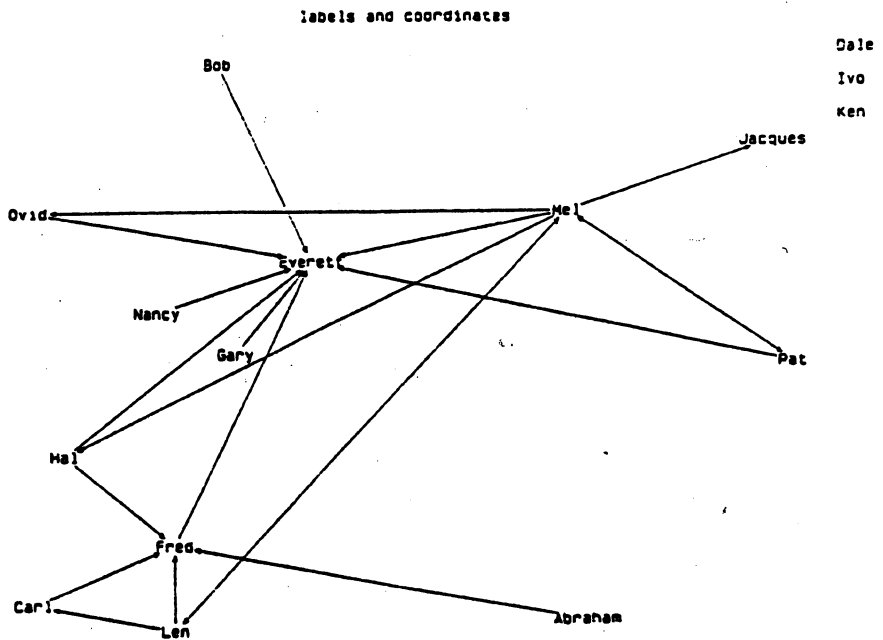
The following pages show through example how input files may be created for KrackPlot.

**How to Create an Input File:**

The following is a sample input file. The first line contains the number of nodes (=N, or "16" in this case). The next N lines each contain a pair of numbers followed by a node label. The pair of numbers are the initial (x,y) coordinates for the placement of that node. These coordinates are automatically rescaled by the program, so their original values can take on any arbitrary range. The matrix of 1's and 0's that follow represent the adjacency matrix, that is, the presence or absence of lines connecting the nodes.

```

16
511.3  9. Abraham
160.6  438. Bob
-29.2  23. Carl
-772.8  440. Dale
249.4  284. Everett
102.1  64. Fred
174.1  214. Gary
0. 137. Hal
772.7  420. Ivo
689.3  379. Jacques
772.4  400. Ken
110.5  0. Len
488.3  325. Mel
87.1  246. Nancy
-30.2  324. Ovid
715.3  205. Pat
00001000000000
00001000000000
00000100000000
00000000000000
00000000000000
00001000000000
00001000000000
00001100000000
00000000000000
00000000000000
00000000000000
0010010000001000
0000100101010011
0000100000000000
0000100000000000
0000100000001000
    
```



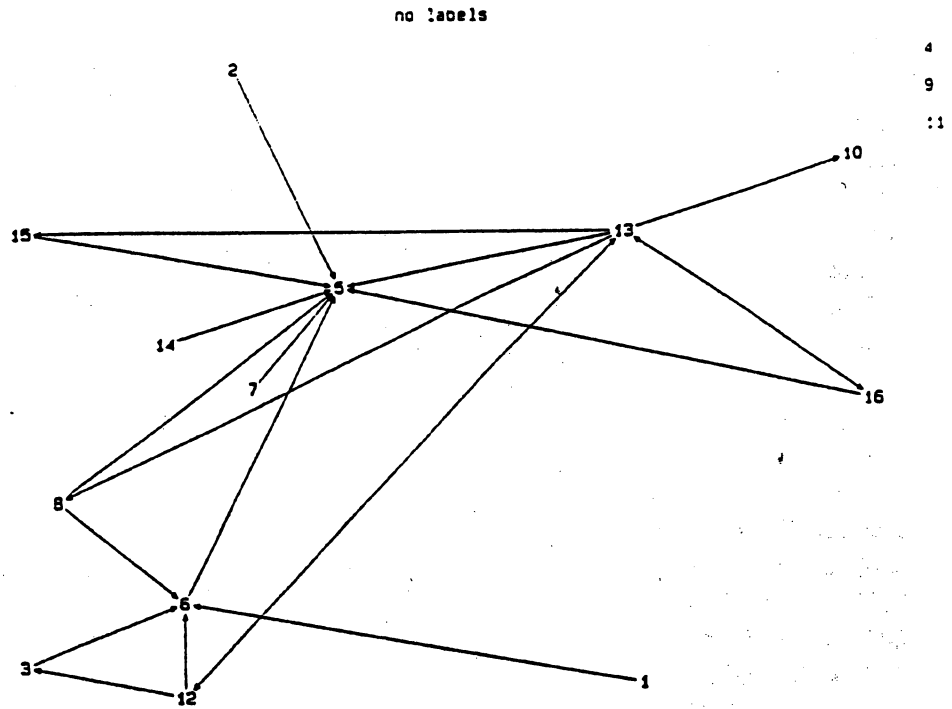
Some points to note about the format of the input file:

Neither the node numbers nor the names need to be directly lined up vertically. Nor do the coordinates need decimal points. Each (x,y) pair and associated node must occur on a separate line.

The node names themselves are also optional. That is, an input file does not need to contain any node names. In this case, the program will assign the numbers 1 to N as labels for each of the nodes. See the following sample input file.

```

16
511.3 9.
160.6 438.
-29.2 23.
-772.8 440.
249.4 284.
102.1 64.
174.1 214.
0. 137.
772.7 420.
689.3 379.
772.4 400.
110.5 0.
488.3 325.
87.1 246.
-30.2 324.
715.3 205.
0000010000000000
0000100000000000
0000010000000000
0000000000000000
0000000000000000
0000100000000000
0000100000000000
0000110000000000
0000000000000000
0000000000000000
0000000000000000
0010010000001000
0000100101010011
0000100000000000
0000100000000000
0000100000001000
    
```



It is also possible to omit assigning specific (x,y) coordinates to the nodes. In the example below, "inc" tells the program that there are "no coordinates." The program will automatically put the nodes in a circle.

```

16
!nc Abraham
Bob
  Carl
  Dale
  Ev
  Fred
  Gary
  Hal
  Ivo
  Jack
  Ken
  Len
  Mel
  Nancy
  Ovid
  Pat

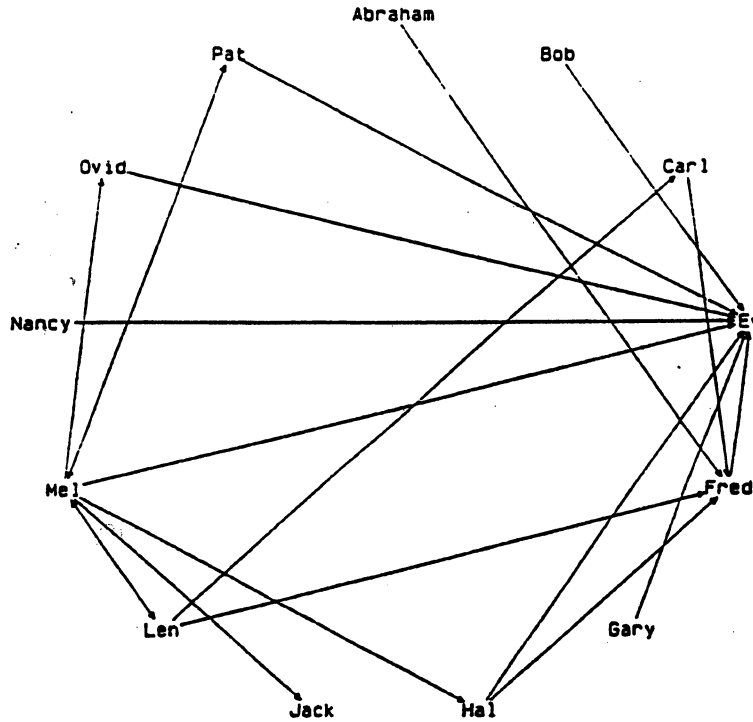
```

```

0000100000000000
0000100000000000
0000010000000000
0000000000000000
0000000000000000
0000100000000000
0000100000000000
0000110000000000
0000000000000000
0000000000000000
0000000000000000
0010010000001000
0000100101010011
0000100000000000
0000100000000000
0000100000001000

```

!nc = no coordinates



```

Dale
Ivo
Ken

```

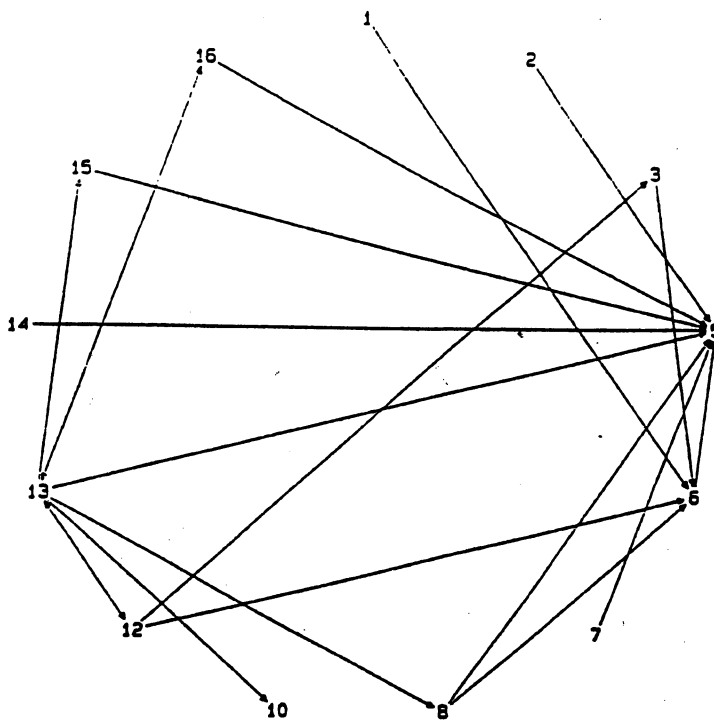
In addition to omitting the assignment of (x,y) coordinates, it is also possible to omit both labels and coordinates. As seen in the example below, "!nc !nl" is the command "no coordinates, no labels." The program will automatically put the nodes in a circle as well as assign the numbers 1 to N as labels for each of the nodes.

```

16
!nc !nl
0000100000000000
0000100000000000
0000010000000000
0000000000000000
0000000000000000
0000100000000000
0000100000000000
0000110000000000
0000000000000000
0000000000000000
0000000000000000
0010010000001000
0000100101010011
0000100000000000
0000100000000000
0000100000001000

```

!nc !nl = no coordinates, no labels



4  
9  
11

Finally, the following example shows the placement of the nodes around one central node ("El Centro"). The lines each connect from the outer nodes to El Centro only, forming a spoked wheel design (without the surrounding "wheel"). This file differs from the previous files in that the adjacency matrix has taken on values from 0 to 9 (they must be integers in this range only). These values can be used optionally to create lines of varying thickness or "textured" lines (lines comprised of patterns of dashes.)

```

10
299 321 1
434 284 2
503 188 3
479 80 4
369 12 5
226 12 6
120 80 7
96 188 8
165 284 9
299 165 ElCentro

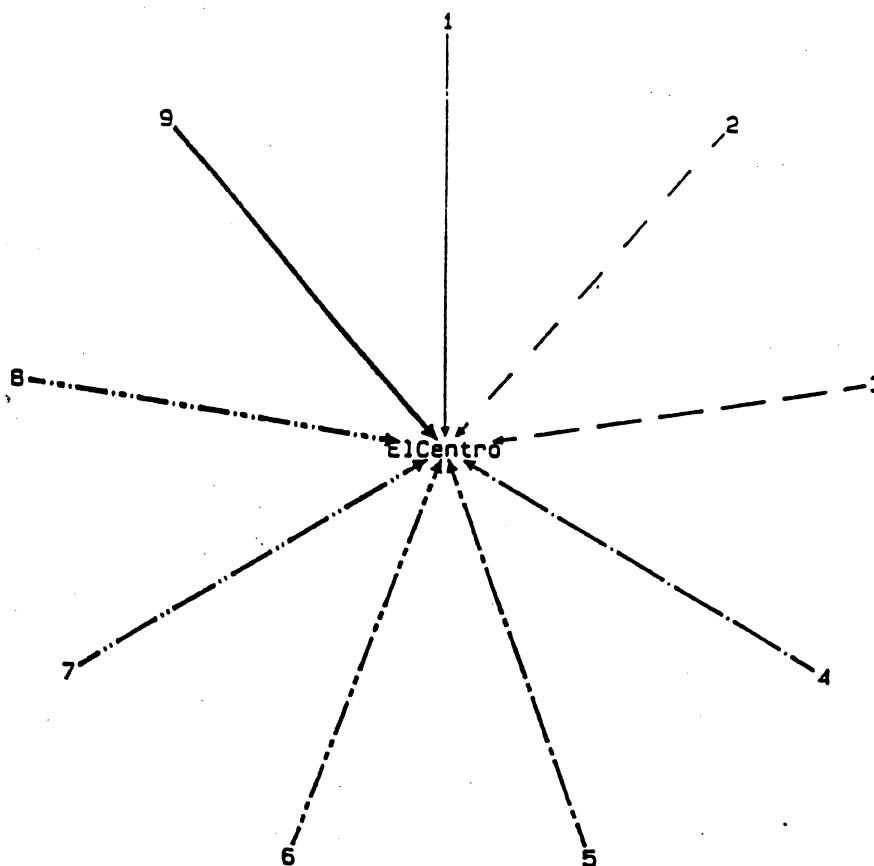
```

```

0000000001
0000000002
0000000003
0000000004
0000000005
0000000006
0000000007
0000000008
0000000009
0000000000

```

El Centro Input File



## Getting Started:

To begin, insert floppy disk containing the Krackplot application and type "a:", Enter. Then type "kp." (Or, you may copy the KP files from the disk to the hard drive and run KrackPlot from there.)

A few seconds after entering kp, "Welcome to KrackPlot 1.5" will come up on the screen briefly, then a menu with two options, "open" and "quit."

### OPEN

*Note: always press the first letter of the desired menu option.*

Press the letter "o" to open a new or existing file. The computer will prompt you for the name of the file you wish to open. Enter one of the files from the directory list (such as "EX.PIC") or, type in the name of a file you would like to create.

If the filename does not exist on the directory, the computer will ask you if you wish to create one. Press "y" for yes. At that point, you may enter data for a picture via "AddNode" and "AddLine" under the "Modify" submenu. (See section below on "Modify").

### QUIT

Press "q" to quit.

## Main Menu Options:

Once a file has been opened, the following menu will appear:

File Display(y)    Modify    GraphingOptns    PrinterOptns    InitOptns    Color:n    TypePrn:HPiII

When entering any of these main files, submenus will appear.

### I. FILE

By pressing "f," the following sub-menu will appear:

Save                                  History                                  Close                                  Quit

**Save ("s"):** saves a file under a certain name. This file is in the format that KrackPlot can read and open at any time in the future. The computer will prompt you for a file name. If you hit "Enter" in response to this inquiry, it will save the file using the default filename. The default filename is the same as the original input filename except that it adds an underscore "\_" to the beginning of the filename. For example, EX.PIC will be saved by default as EX.PIC.

The file is saved in the same format as in the input files, plus two additional lines are added to the file. These two lines store various parameters set in the course of running KrackPlot (e.g. the width or height of margins, whether the filename is to be printed on the hard copy, and whether arrows are to be included—SEE Graphing-Optns.)

**History ("h"):** gives you the status of the file you are presently in, such as whether it has been saved and under what name, and whether a printer file has been created.

**Close ("c"):** closes this file and allows you to open another file.

**Quit ("q"):** to quit KrackPlot and return to DOS.

*Note: pressing Return or Escape gets you back to the previous menu.*

## II. Display(y)

By typing "d," or "y," the screen will redraw the graph, allowing you to view whatever changes you made to your graph. This function makes the screen easier to read by "cleaning it up"; it also places nodes to the side of your graph if there are no lines attaching these nodes (see NODES). *Note: "y" is a hot key that works at any menu. That is, you may press "y" at any submenu location, to see changes you have made to the graph.*

## III. Modify

By typing "m," a submenu will appear, giving you the option to modify either of the following:

Nodes

Lines

Nodes ("n") are names on your graph (e.g. "Mary").

*Note: this program is case sensitive.*

In other words, the computer will read "Mary" and "mary" as two distinct entities. The following menu will come up under Nodes:

AddNode

DeleteNode

MoveNode

RenameNode

**AddNode ("a"):** adds a node name. The computer will prompt you for the name you want to add. Type it in then press Enter. Crosshairs will come up on the screen. Move the crosshairs around with your arrow keys until you find the desired location, then press Enter. The node name will land at the intersection of the crosshairs.

*Note: you may hold down the Shift key while using the arrows keys to speed up movement of the crosshairs.*

**DeleteNode ("d"):** gets rid of a node. The computer will prompt you for the name you want to delete. Type it in, then press Enter. The node and its associated lines will disappear.

**MoveNode ("m"):** places a node in a different location on the graph. The computer will prompt you for the node name you want to move. Crosshairs will again come up. Use the arrow keys (and optionally hold down Shift key to speed up the movement) to move the crosshairs to a desired location, then press Enter. The node will move to the new location, and its associated lines will be redrawn to this new location.

**RenameNode ("r"):** to rename a node or correct its spelling. The computer will prompt you to enter its present name, then will ask you what you would like the new name to be.

**Lines (the letter "l")** actually draws a line from one node to another. The following menu will appear:

AddLine DeleteLine

**AddLine ("a"):** draws a line from one node to another. The computer will prompt you for the name of a node where the line begins. After entering that name, you will be asked for the name of the node where the line ends. If the "arrows" option is "on", then the directionality of these added lines will be apparent from the arrowhead drawn on the screen.

**DeleteLine ("d"):** erases a line. The computer will prompt you for the name of the node that is at the beginning of the line, and then the name of the node at the end of the line. If you have one node connecting to another node and then back again, you will need to delete both of these directional lines separately to erase the line.

## IV. GraphingOptns (GRAPHING OPTIONS)

By entering "g", a secondary menu will come up, allowing you to further visually modify your graph:

Orientation

Margins

Circle:N

Arrows:off

Lines:on

Isolates:off

**Orientation ("o")** changes the position of the nodes in various ways. The following menu will appear:

EastWestFlip

NorthSouthFlip

Rotation



**EastWestFlip ("e"):** flips the graph from left to right (as if it were looking into a mirror).

**NorthSouthFlip ("n"):** flips the graph upside down.

**Rotation ("r"):** rotates the graph around clockwise (e.g. to rotate the graph a quarter turn, enter "90", for ninety degrees).

**Margins ("m")** allows you to change the margin size of your graph. The following menu will come up:

**Width Height**

**Width ("w"):** controls how "skinny" you want the graph to be. The computer will prompt you for a width size. Normal width on the screen is 1. A width of .5 will cause the graph to be squeezed into one half of the horizontal screen size.

**Height ("h"):** controls how "tall" you want the graph to be. Normal width on the screen is 1. A height of .5 will cause the graph to be squeezed into one half of the vertical screen size.

**Circle ("c")** allows you to put the nodes in a circle. The computer will prompt you to enter the following:

**N=Normal ("n"):** draws the graph with nodes placed in the (x,y) location described in the input file (or as modified by moving the nodes using **KrackPlot**). This is also the default command.

**C=Circle ("c"):** ignores the (x,y) coordinates and places the nodes in a circle in the same order as found in the input file.

**A=Alphacircle ("a"):** ignores the (x,y) coordinates and places the nodes in a circle and in alphabetical order.

*Note: Be sure to press "y" to see the changes you have made.*

**Arrow:off ("a")** sets a switch to add or erase arrowheads from the screen (and output). Pressing "a" will simply reverse the switch from "off" to "on" or vice-versa. The default command leaves the arrowheads off the screen (and output). The screen will not change immediately after resetting this arrow switch. That is, if arrows are currently not on the screen, and the arrow switch is set to "On," arrowheads will still not appear on the screen until the screen is re-displayed by typing "y".

*Note: Be sure to press "y" after you have reset this switch to see the arrows drawn on (or erased from) the picture.*

**Lines:on (the letter "l")** sets a switch to add or erase the lines to or from the screen (and output). Pressing the letter "l" will simply reverse the switch from "on" to "off" and vice-versa. The default command leaves the lines on the screen (and output).

*Note: Be sure to press "y" after you have reset this switch to see the lines drawn (or erased from) the picture.*

**Isolates:off ("i")** are nodes that have no lines associated with them. Ordinarily, isolates are automatically placed on the very right edge of the screen. To place the isolates on the screen with the other nodes, type the letter "i" at this menu. This will set the isolates switch to "on". They will be placed on the graph in a location determined by their associated x,y coordinates. "off" is the default isolate condition.

## V. PrinterOptns (Printer Options)

Once you have created a printer file, you may print a hard copy of your graph on any HPLaserJet III printer. Press "p" for the following menu selections:

LineWidth:0.1-0.3    TexturedLines:off    Boldface:+0    CharSize:9.0    Filename:on Print

**LineWidth:0.1-0.3 (the letter "l"):** sets pen width of lines in millimeters (see examples of LineWidth). The computer will prompt you for a decimal number between 0.1 and 0.3 for the thinnest line on the graph. Once you have entered this, the computer will prompt you for the thickest line on the graph. The default line width is 0.1 for the thinnest line, and 0.3 for the thickest line. Quite often, the data are binary. That is, a line either exists or it does not exist between two nodes. When such binary conditions exist and are represented by 0 and 1, then the lines will be the thickness of the *thinnest* line. If the binary condition is represented by 0 and any number *other than 1*, then the lines will be the thickness of the *thickest* line. If the raw data are comprised of several values (for example: 0, 3, 4, 6), then the program assigns the thickest value to the highest number (6 in this example), the thinnest value to

"1", and all other values in between will take on the interpolated thickness suggested by the number. (In this example, 3 would be  $(3-1)/(6-1)$  or  $2/5$  the thickness between the thinnest and thickest line).

*Note that the screen will only display two line thicknesses, one for any value up to 1, and the other for any value above 1.*

**TexturedLines:off ("t"):** creates various types of dotted lines on the output (see examples of TexturedLines on page 6). Simply press "t" to turn this option "on" if it is off, and vice-versa. The default condition is off. Values of 1 and 9 are solid lines; the values 2 through 8 take on different textures (see examples in "input file" description).

*Note that the textured lines will not be visible on the screen, only on the output.*

**Boldface:+ 0 ("b"):** sets character stroke weight. The computer will prompt you for a number between -7 and +7 (including 0). (See examples of Boldface in Appendix.) The default weight is 0.

**CharSize:9.0 ("c"):** sets size of node labels in characters per inch. (See examples of CharSize.) The values can be any real numbers, although numbers outside the range of 5 to 15 tend to produce awkward output. The default size is 9.

**FileName:on ("f"):** prints the name of your file directly onto the printed output in the lower left corner. Simply press "f" to turn this option "off" if it is on, and vice-versa. The default condition is on, and will print the file name on the output.

**Print ("p"):** When you are ready to print, press "p" and the computer will ask you for an output file name. If you do not wish to enter a file name, you may simply press "Enter", and the computer will save the printer file using the default printer filename. The default printer filename is the same as the original printer filename except that the extension is changed to either ".hp3" (for output headed for the HPLaserJet III) or ".hgl" (for output headed for any other printer). For example, a printer output file for the EX.PIC program will be saved as EX.HP3 (if you have selected the HPLaserJet III printer).

If you are using an HPLaserJet III, then it is easy to make a hard copy of the graph after you have created the printer output file (EX.HP3 in the above example). Simply "quit" KrackPlot (one of the "File" menu options) and at the DOS level type "print EX.HP3".

## VI. InitOptns (Initialize Options)

This option allows you to erase any changes made while operating KrackPlot and return to all the default conditions. As a safety feature, after pressing "i" the computer will ask you to enter "y" for "yes" if you wish to erase all non-default changes made. (Press "n" for "no" if you do not wish to do so.)

If the user prints the outfile using only initialized options, the resulting hard copy will have:

- \* a line width of .1 (thinnest) to .3 (thickest)
- \* no textured lines
- \* character weight will be 0 (no boldface)
- \* character size will be 9 characters per inch
- \* width and height margins will equal 1
- \* the file name will be printed on the output
- \* arrows will not appear
- \* lines will appear.

## VII. Color

If you want to change your status from color ("y") to non-color ("n"), or vice versa, then press "c". The program will then ask: "Do you have a color monitor?" To which you respond "y" or "n".

## VII. TypePrn

If you have an HPLaserJet III at your disposal, then you can create hard copies of KrackPlot pictures directly from the printer files outputted by KrackPlot itself. If you have another type of printer, then KrackPlot can create an HPGL file that can be read by many types of printers. Which type of files are created depends on the TypePrn switch that you choose. When you type "t" at the main menu, the program will ask you "Use HPLaserJet

III output (y or n)?". If you respond "y", then any printer files created under the PrinterOptions menu will be created for the HPLaserJet III. If you respond "n", then printer files created under the PrintOptions menu will be in standard HPGL, which can be used to print on many standard printers or read into standard word processing programs like WordPerfect. After you have made your selection, the choice appears in the main menu and remains there until you change it again (your choice is saved in a configuration file on disk). If you responded "y", then the printer type will appear as "TypePrn:HPIII" on the main menu. If you responded "n", then the printer type will appear as "TypePrn:Other" on the main menu.

I have found that the best way to ensure that you can create a hard copy on a type of printer other than the HPLaserJet III is to process the KrackPlot printer output file through PrintGL. PrintGL is a shareware routine created by Ravitz Software, Inc., P.O. Box 25068, Lexington, KY 40524-5068. Cary Ravitz (president of Ravitz Software) has agreed to let Borgatti distribute PrintGL as shareware for no extra charge (note: while distribution is free, you are asked to send Ravitz Software a check for \$50 if you decide you like PrintGL and want to keep using it. What it enables you to do is read in the KrackPlot output files and convert them into a file that can be printed on any of a wide range of printers. I can print KrackPlot files on an HPLaserJet II, Canon Bubblejet printer, and Postscript printers using PrintGL. I quote from the PRINTGL.DOC (the user manual for this software):

PrintGL is a shareware pen plotter emulator for IBM/DOS systems. It prints or displays an HP-GL (Hewlett-Packard Graphics Language - HP 7475 and 7440/17440 subset) plotfile on most PC graphics devices. PrintGL will print on Epson and IBM compatible 9 pin printers, Epson, IBM, NEC, and Toshiba compatible 24 pin printers, HP LaserJet, DeskJet, color DeskJet, PaintJet, QuietJet, and plotters, IBM ExecJet, Quietwriter 2 and 3, LaserPrinter, and plotters, Canon LBP, BJ, and BJC printers, Kodak Color 4, and PostScript printers.

A brief description of how to use PrintGL with KrackPlot files is in an included file, "README.KP6".

## To Quit

Get back to File option, then Quit (or Save first). If you close or quit without saving, the program asks you if you want to save the file as modified during this run of KrackPlot.

## What To Do If...

### **Only Half of the Picture Comes Out On the Printer:**

An "error 21" message should appear in the window of the printer. This means that you do not have enough memory in the printer for the picture. There is an HPLaserJet III fix for this without more memory and it is described in the HPLaserJet III manual. You may have to do the following one time only for the printer to print any picture you give it from now on:

press the "Menu" button until "Device Config" appears in the window; press "Enter"; press "menu" until "Page Pro" appears; press "+/-" until "letter" appears; press "Enter".

### **You Have Deleted a Line Connecting Two Nodes, Yet a Line Still Appears To Connect Them:**

This simply means that there is one line connecting a node to another node, and a second overlapping line connecting that node back to the first. For example, if you have a line connecting node A to node B and another line connecting node B to node A, only one line between connecting nodes A and B will appear on the screen. It is necessary to delete *both* lines connecting nodes A and B to delete the line completely from the screen (and output).

### **You Have Input Lines Connecting Nodes But the Lines Do Not Appear On the Screen/Output:**

Be sure that

- a) the "switch" for arrows or lines is "on"
- b) you have pressed "y", to see the changes appear on the screen.