

Grin manual

Оглавление

Menus	2
File	3
Edit.....	5
Property.....	7
Graph View options.....	8
Selection.....	9
Delete elements	10
Options.....	11
Add elements	12
Move elements	13
Size of the graph.....	14
Set attributes	16
About	17

\$#KMenus

Graph Interface is a powerful tool with many capabilities which enables you to investigate and handle Graph theory. Graph Interface is easy to learn; you do not need any computer experience to get started. You can use Graph Interface to create, edit, print and research graphs. Graphs can be stored on disk and loaded from any disk of your choice. The system has an advanced user interface.

File

Edit

View

Property

About Autor

Ordering

\$ Contents

Contents

K Contents

\$#KFile

Commands for operations on the files.



Creates a new, untitled Graph (NoName). To create a new, empty Graph, you should:

- Select "New" from the File Menu
- Click on the New Button in the Toolbar.

Grin will create the New empty Graph. The default type of the graph is Undirected graph (undirNet). You can change the Type of the graph by clicking on Retype button.

You cannot change the type of the graph if the graph has edges or the graph has been decomposed.



Opens an existing graph (extension of the file NET) or report file (extension of the file TXT).

Note: You can open many Graphs at a time.

You can close a single file by

1. Selecting the Graph window.
2. Clicking on the Graph window's Close Button. If you have edited the file and haven't saved it, you will be prompted to confirm your decision.

Save As...

Saves the graph or report file under a new name, on a different disk, or to a different folder. Scroll the directory window and click on the folder where the graph or report is to be saved. To save an existing graph with a new name, click Save As, and then type a new name in the File Name box. Saving under a new name is a good way of making backup copies, since the original file is not removed. Grin saves files of the graphs in internal special format; the default extension of the file is NET.

^kIt is possible to save graph as ^kBMP (BitMap) and ^kWMF (Windows Meta File) file. Select the extension BMP (WMF) from filter box on the panel Save As and enter the name of the file. Grin Professional can save information to MS Excel file (XLS).



Saves a copy of the current graph or report to disk. If the current window is untitled(NoName), the Save As dialog appears, prompting for a name.

There are two main file format for program Grin now - "*.net" and "*.next"

The first format (net) is very compact.

The second format (next) allows storing more information on a graph (descriptions, fonts) and represents textual XML file, which can be looked through and edit in any text editor.

To save the changes to the active Graph, you can:

1. Select "Save" from the File Menu.
2. Click on the Save Button on the Toolbar.

If you are saving a new file (NoName), Grin will open the Save As Dialog Box.

\$KPrint

Prints the graph or report text according to Print Setup (File menu) options and the settings in the Printers dialog in the Windows Control Panel.

\$KPrint Setup

The choices here determine how the information is printed. Specifies either the default printer or a specific printer chosen from the list of available printers. Specifies the orientation of Paper. Specifies the size of printer

\$ File menu

File_menu

K File menu

K Save as BMP, WMF

k BitMap File

k Windows Meta File

\$ Print

K Print the Graph

\$ Print Setup

K Print Setup

paper and its source. Both size and source are selected from choice lists. To change printers and printing options

1. On the File menu, click Print Setup....

2. To change paper size, page orientation, or margins, change settings here. To change printers, click Printer, and then select a printer from the Name list.

KOptions...

Exit

Exits Grin. To exit Grin, select "Exit" from the File Menu. Grin will close all of its open windows and leaves the Grin application. If final changes have not been saved, a dialog appears, prompting for a save before closing the graph.

#KEdit

The commands in this menu apply to the active graph.

Edit commands for graphs are:

Add elements of the graph (Points and Edges)

Delete elements of the graph (Points, Edges, Components and whole Graph)

Move elements of the graph (Points and Components)

Change the size of the graph (Increase, decrease and Auto Size)

Retype the Graph (directed or undirected)

Edit the attributes of the edges and Points (Name, Color, Weight, Type...)

You can Copy graph to Clipboard and Paste graph from clipboard. If graph has selection then only selected points will be copied to Clipboard.

Add elements

Delete elements

Move elements

Change Size Commands

Retype

Set Attributes

Decomposition of the edge

Edit_menu

⌘ Edit menu

^k# You can decompose the edge of the graph. To do this press ALT and double click on edge label (in the middle of the edge). If the edge has decomposition then Grin shows a decomposition of the edge. If the edge doesn't have a decomposition, a confirmation box will appear. If you click "Yes" Grin creates a decomposition of the edge with two points.



To go to Up level of the decomposition click on button

^k Decomposition of the edge
[#] Decomposition

#KProperty

The commands apply to active graph.

NetWork

Procedures on Network properties (Shortest paths, Salesman problem, Maximal Flow...). These procedures use the weight of the edges.

Graph

Procedures on graph properties (Metrics, Paths, Colorations ...). These procedures don't use the weight of the edges.

Simulation

⌘To Start simulation (only for directed and dichromatic graphs) select command Property>Simulation>Ordinary Petri Net. If there are "live" transitions they will be Blink. To execute transition click it with the mouse cursor.

⌘GetInfo

Writes common information about current graph to the result window: names of the points, edges; values of the weights for edges.

⌘Report

To add information to report press button **Add to Report** in Result window. You can edit the content of the Result window, then add it to report file.



You can show contents of the Report File at special Report window. Report is a special text file associated with Graph file. If the graph file has name Euler.net then the report file has name Euler.txt.

Select command Show report when the graph is active or press the special Button.



If you want to clear the report file select command Clear Report. All information in the report file will be deleted.

#Property_menu

⌘Property menu

⌘Start Petri simulation

⌘Get Info about Graph

⌘Report

#**K**Graph View options

The first section of this menu allows you to show and hide the tool panels of Grin. These panels are **Toolbar** with buttons for easy access to the main commands of Grin, **New element options palette** for setting the options for added elements of the graph and **Alignment palette** to align selected points of the graph.

KRefresh Net

Draws Graph by Default Fore Color (see Options...)

Show Edge Name - Shows all names of the edges

Show Edge weight - Shows values of Edges Weight (see Set Attributes)

Show Flow - Shows values of Edges Flow

Show Point name - Shows all names of the points.

Show Tokens - Shows the number of Tokens for Places of the Petri net. These values are used in Petri simulation.

You can move the name of the point by using the mouse cursor. Set the mouse cursor on the name of the point and drag it to the new position around the point.

View_Menu

K View

K Graph View options

K Refresh Color of the Graph

#^KSelection

You can select points of the graph in two ways. Firstly – cancel any operation and select some region on the graph window. All points inside region will be selected. Secondly - cancel any operation, press and hold the Shift key then click on the point with the left mouse button.

^KYou can drag selected points of the graph – set the mouse cursor to any selected point, press and hold the left mouse button and move the point to a new position.

Operation with selected point

You can apply any operation from alignment palette to selected points.

You can move selected points with step assigned on the toolbar by hot keys (arrow buttons): **Ctrl +Left** (Move to Left), **Ctrl +Right** (Move to Right), **Ctrl +Up** (Move to Top), **Ctrl +Down** (Move to Bottom).

If you activate the command Copy to Clipboard, then only the selection will be copied to the Grin clipboard.

If you have selected some points on the graph and then selected any Size command operations, it will be applied only to that selection

Selection

^K Selection of the points

^K Drag selection

#KDelete elements

Use these commands to delete graph elements. These elements are points (Delete Point), edges (Delete Edge), connected components (Delete Component), and whole graphs (Delete Graph).



KDelete Point

Used to delete the points from the graph. Select the point with the mouse cursor you want to delete and click. If options Edit Confirmation is checked you will be prompted to confirm your decision. Click on the button Yes of Confirmation Box to delete the point or click No to cancel command. The point and all its edges disappear. To reset command press Escape or click on Reset Command Button on Status panel of the Graph Window.



KDelete Edge

Select the first point of the graph (the beginning point of the edge) with the mouse cursor and click to set the first point number. Then select the second point (the end point of the edge) and click. If options Edit Confirmation is checked you will be prompted to confirm your decision about the choice to remove the Edge. The edge disappears. To reset command press Escape or click on Reset Command Button on Status panel of the Graph Window.



KDelete Component

Used to delete a connected component from the graph. Select the point of Component with the mouse cursor and click to set point number. If the Options Edit Confirmation is checked you will be prompted to confirm your decision to remove the component. The connected component disappears. If the graph is connected then the whole graph will be deleted. To reset command press Escape or click on Reset Command Button on Status panel of the Graph Window.



KDelete All

The Delete All Command removes the current graph and replaces it with the background color. If options Edit Confirmation is checked then you will be presented with a dialog to confirm the choice to remove the whole graph.

If option CONFIRMATION is checked, then Confirmation Box appears before the real editing of the graph. You can execute the operation or cancel it. If option CONFIRMATION is unchecked, then edit operation executes instantly.

Delete_commands
K Delete_commands
K Delete Point
K Delete Edge
K Delete Component
K Delete All

#KOptions

Use options Dialog Box to set the options of Grin. These options affect the characteristics of the current graph and software mode.

Edit Confirmation

If checked then program presents a dialog to confirm the choice on any transformation of the graph.

Select Confirmation

If checked then program presents an information message about selected Sources and Sinks.

Show Edge Labels (Edit Weight)

If checked then the program shows edge labels. Use these labels to set edge attributes. To hide (show) edge labels use pop-up menu (right mouse button click on the graph window) and then select command **Show Edge Labels** (this command checked or no).

Load Graph with settings

Default - Loads new graph with default attributes of points (Radius=10, Font Size=8)

Current - Loads new graph with points attributes at section Current Settings

Own - Loads new graph with own points settings

Set Report Font

Defines the current font for Report Window.

Set Result Font

Defines the current font for Result Window.

#KFore Default Color

Sets the color for command Refresh Net (draw all elements of the graph by default color).

Set_options
K Set options
Fore_Color
K Fore Color

#KAdd elements

You can Select two commands: **Add Point** and **Add Edge**.

Info about actions you can read at the status bar of the graph Window (the top of the graph's window).



KAdd Point

Adds points to the current Graph. The status bar displays: Select position for the Point and Click. Select a position for new Point and Click with the right mouse button. This automatically places a number of a point for the current graph. The maximum number of points allowed per graph as set in the internal Grin parameter. You can see this parameter on the About dialog of Help menu. Points are automatically numbered according to the current maximal number. You cannot change this Number.



KAdd Edges

Adds edges to the current Graph. The status bar displays: Select first Point of the Edge. Select the first point of the graph (the beginning point of the new edge) with the mouse cursor and click the right mouse button to set the first point number. The status bar displays: Select second point. Then select second point (the end point of the new edge) and click. If options Edit Confirmation is checked then you will be presented with a dialog to confirm the choice to add the new edge. To reset command press Escape or click on Reset Command Button on Status panel of the Graph Window.

Add_commands

K Add_commands

K Add Point

K Add Edge

#**K** Move elements

Use these commands to move elements of the graph.

If you select command, you can move a point (component) to another position on the same window.



K Move Point

Used to move point to another location on the screen. The status bar displays: Select Point. Set mouse cursor to the point and click the left button and hold it. The status bar displays: Drag point to another position. Drag point to a new position of the screen then release button.



K Move Component

Used to move the connected component to another location on the screen. The status bar displays: Select point. You can select a point from component. Click on the point to set the point number. The status bar displays: Select new position for point. Move the mouse cursor to a new position for this point then click again. The connected component disappears, but the next time it will be in its new position. If the graph is connected then the command moves the whole graph.

You can move the graph with step assigned on the toolbar by hot keys (arrow buttons): **Ctrl+Left** (Move to Left), **Ctrl+Right** (Move to Right), **Ctrl+Up** (Move to Top), **Ctrl+Down** (Move to Bottom). Step will be equal to 1 if you press and hold Shift key.

If option CONFIRMATION is checked, then Confirmation Box appears before the real editing of the graph. You can execute the operation or cancel it. If option CONFIRMATION is unchecked, then edit operation executes instantly.

Move_commands

K Move_commands

K Move Point

K Move Component

#^KSize of the graph

Use these commands to change the size of the graphs along the axis X and axis Y.



Increment X - Increments the X size of the graph



Increment Y - Increments the Y size of the graph



Increment X and Y - Increments the X and Y size of the graph



Decrement X - Decrements the X size of the graph



Decrement Y - Decrements the Y size of the graph



Decrement X and Y - Decrements the X and Y size of the graph



Fit to screen - Adjusts the size of the current graph so that it fit entirely into the viewing area

If the graph has selection size operations are applied only to selected points.

Note: All these transformations change the actual graph size and coordinates of the points. The size of the points can be changed in Option's dialog (Current settings).

#K You can change the Type of the current graph if it doesn't have edges and it isn't a decomposition.



Retype - use this command to change the type of a Graph, **dirNet** type changes to **undirNet** and vice versa.

Retype
K Retype

#K Set attributes

Attributes of the point.

To set attributes of the point reset current command (Escape) and double click on the point. This displays a dialog in which you can specify the Point's attributes. Can affect the one point only.

Info section

Contains information about the number of points and values of coordinates for the point (in pixels).

Point Attributes

Has a two fields: Name of the point and value of the point mark. You can edit these parameters.

Point Color

Has a button to activate color grid to set the point color.

Point Type

Sets the type for point. There are 8 points types: Circle, Square, Rounded Square, Transition Vert, Transition Hor, Diamond, Triangle Up and Triangle Down.

{bml PointTypes.bmp}

Attributes of the Edge

To set attributes of the edge, reset current command (Escape) and double click on edge label (in the middle of the edge).

This displays a dialog in which you can specify the edge's attributes. Can affect the one edge only.

You can hide and show edge labels by the command "Show edge labels" from the pop-up menu when the user clicks the right mouse button on the Graph Window.

Edge Attributes

Has two fields: Name of the edge and value of the edge weight. You can edit these parameters.

Edge Color

Has a button to activate color grid to set the edge color.

Edge Type

Sets the type for edge.

Set_attributes
K Set_attributes
Set_Point_Attributes
Set_Edge_Attributes

#KAbout

GRAPH INTERFACE
KGRIN
Welcome to the Graph Theory

With Grin, you can travel across Graph and Network theory. You can use Grin to create, edit, and research Graphs and Networks. Graphs can be stored on disk and loaded from disk. You can edit graphs at any time.

Editing graphs

- Add elements of the graph (Points and Edges)
- Delete elements of the graph (Points, Edges, Components and whole Graph)
- Move elements of the graph (Points and Components)
- Change the size of the graph (Increase, decrease and Auto Size)
- Edit the attributes of the edges and Points (Name, Colour, Weight...)
- Retype the Graph
- Copy to clipboard and Paste from clipboard

Solving problems

- Metrics of the graph (Density, Undensity and so on...)
- Paths and cycles (Eulerian and Hamiltonian)
- Bridges and cut points
- Coloration (Point's Coloration)
- Automorphism group
- Minimal spanning tree
- Shortest paths
- K Shortest paths
- Salesman problem
- Maximal flow
- Critical path

You can save information about your graph to a report file. All contents of the result window will be added to the report file when you click "Add to report" button. To show information about your graph press the speed button "Show Report" on the tool panel.

To save a "Picture" of the Graph (BMP, WMF) choose File | Save As..(bmp, wmf).

You can see the Max number of points for the current version in the About dialog of the Help menu. You Can Show Weight, Flow, Name for all edges (commands Show Marks and Show Flow) of the Graph.

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About

^K About

^K Grin

^K Mail of the Author

^k WWW Home page