Using the Editors for Relations and Graphs in the RelView System*

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1 Introduction

This note gives a short introduction into the editors for relations and graphs of the RelView system. For simplicity we make use of some abbreviations:

LMB	:	left mouse button
MMB	:	middle mouse button
RMB	:	right mouse button

2 The Relation-Editor

The relation editor can be invoked by pressing the push button "RELATION" in the main window of the RelView system. In the following by "item" we mean a single entry of a relation unequivocal defined by a row and a column of a relation. In the relation editor such an item is graphically represented by a square.

An item is "set" if it describes a "true-entry" of a relation. The corresponding square of the graphic representation is a grey one. A "false-entry" of a relation is represented by a white square. In this case we speak of a "cleared" item.

A "line" can be a complete row or column or diagonal of a relation. The kind of line can be determined by selecting a menu entry; for details see below. We speak of a "completely set" line, if all items on a line are set and of a "completely cleared" or "empty" line, if all items are cleared.

2.1 Actions Invoked by Mouse Buttons

If the mouse pointer is located on an item of a relation, the mouse buttons invoke different actions:

LMB	:	If the item is cleared, it will be set If the item is set, it will be cleared.
MMB	:	Set the line determined by the mouse position completely, if it is not set completely (e.g. empty). If the line chosen by the mouse pointer is set completely, then the line is cleared completely.
RMB	:	Pops up a menu. All actions within the menu are selected with the right mouse button.

*WWW: http://www.informatik.uni-kiel.de/~progsys/relview.shtml

2.2 Pop Up Menu

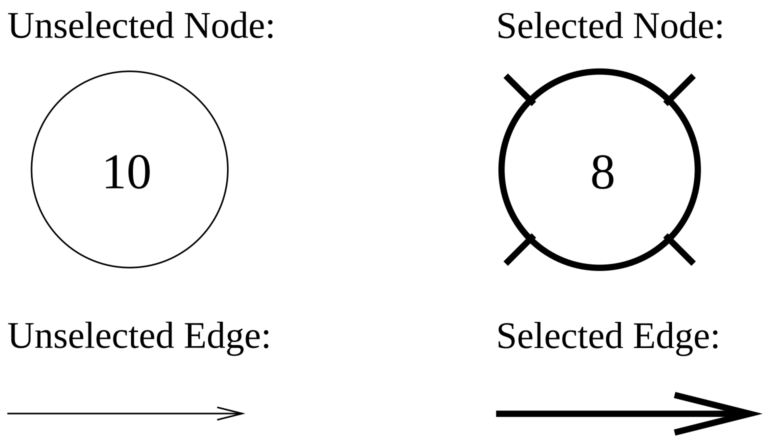
We give a short overview of the menu entries in the pop-up menu reachable by pressing the RMB in the relation editor:

- NEW : Opens a dialog window which allows to define a new relation.
- DELETE : Deletes the relation from the work space after prompting.
- RENAME : Pops up a window for entering a new name for the relation visible in the editor window.
- CLEAR : Clears the whole relation, i.e. all items are cleared.
- RANDOM FILL : Opens a window for entering a factor for filling the relation randomly.
- RELATION $\rightarrow$ GRAPH : Creates a graph from the relation with the same name.
- PRINT : Outputs the relation as a postscript-file.
- LABEL : Pops up a submenu which allows to add/remove labels to the rows and/or columns of a relation.
- DRAW_MODE : Opens a submenu for selecting a draw mode for lines. Four different modes can be choosen: horizontal, vertical and two types of diagonal lines.

3 The Graph-Editor

In the following we give a short survey on the graph editor of RelView. The graph editor can be invoked by pressing the push button "GRAPH" in the main window of the system.

Nodes and edges of graphs are displayed in the editor as follows:



As you can see, we speak of selected and unselected nodes and edges. Each node is surrounded by an "selection area". Clicking with the mouse into this area selects the corresponding node and performs a special action with this node. In this case we use the term that the mouse pointer is "nearby" a node. In the other case where the mouse pointer does not point into a selection area, we say that the mouse is "not nearby" a node.

3.1 Actions Invoked by Mouse Buttons

The different mouse buttons invoke the following actions depending on the state of nodes and egdes and the mouse position:

- Actions initiated by pressing the LMB:
  If the mouse pointer is not nearby a node:

  - If **no** node is selected, then a **new** node will be placed at the pointer position.
  - If a node is selected, then the selected node will be **moved** to the position of the pointer.

  If the mouse pointer is nearby a node N:

  - If no node is selected, then the node N nearby the pointer **is selected**.
  - If a node M is selected:
    * If no egde exists from the selected node M to the node N nearby the pointer position, then a new egde is created from the selected node M to the node N nearby the pointer.
    * If there exists an edge from the selected node M to the node N nearby the pointer, the egde will be selected.

- Pressing the MMB **deletes** the selected node together with all edges connected to that node, the selected edge or the last created egde. **Please be careful:** There is no undo-function!
- The RMB pops up a menu. All actions within the menu are selected with the right mouse button.

3.2 Pop Up Menu

We give a short overview of the menu entries in the pop-up menu reachable by pressing the RMB in the graph editor:

- NEW : Opens a dialog window which allows to define a new (name of a) graph.
- RENAME : Pops up a window for entering a new name for the graph.
- GRAPH $\rightarrow$ RELATION : Creates a relation from the graph with the same name or updates an existing relation with the same name like the graph.
- PRINT : Outputs the graph as a postscript-file.
- MARK NODES : Opens a pop up window for entering a name of a vector which is used to mark some nodes of the graph.
- MARK EDGES : Opens a pop up window for entering a name of an existing relation describing a subset of all edges of the graph which is used to mark these edges.
- UNMARK GRAPH : Removes all markings added using the previous menu entries.
- FIT IN WINDOW : Adjusts the size of the graph to the size of the window of the graph editor.

- TOGGLE GRID : Switches on or off a grid in the graph editor window. If the grid is displayed, all positions of subsequently placed nodes are aligned to grid positions, i.e. crossings of the grid lines.
- GRAPH–DRAWING : Opens a submenu from which different graph drawing algorithms can be choosen.