SIS - Graphical Analysis Interface
User's Manual

Version 2.3

Institute of Computer Science

Foundation for Research and Technology - Hellas

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1. Introduction

1.1 General information

The SIS system was developed at the Institute of Computer Science, Foundation of Research and Technology - Hellas, as a generic user interface for information retrieval from a SIS base. Information is organized in SIS as a knowledge base according to a specifically designed semantic model. The construction of SIS allows extremely dense linking of information, access by unlimited chained references, expression of specific context (e.g. historical and cultural context) as well as of abstract properties, joint temporal and spatial assignment in absolute or relative terms, and recording alternative, possibly conflicting information along with the respective sources. Information is presented in graphical or textual form. An extensible list of predefined queries is offered. A particularly important feature is the uniform treatment of schema and data, enabling the immediate extension and modification of the schema by the users themselves. SIS can be characterized as "open" system, in the sense that it involves a variable system of knowledge chiefly addressed to the museum curator or the researcher, and from which closed information bases for the public can be generated. Finally, it offers an interface to an administrative documentation system.

1.2 Knowledge representation in the SIS system

The formatted documentation data are structured according to a model that renders an appropriate ontology and is expressed in a particular knowledge representation language. The structural part of the Telos knowledge representation language is used for representing knowledge in SIS. This offers the general mechanisms of attribution, classification and generalization, common in all the so called semantic, conceptual or object-oriented representation methods, and, in addition, it supports unbounded classification hierarchies and equal treatment of relations and entities, resulting in great expressiveness and flexibility.

Attribution is a general mechanism for representing the properties of an object as relations between the object and the value ranges of the properties, also considered as objects. Classification defines classes of objects on the basis of common properties. An atomic object is declared as instance (member) of one or more classes. Classes are themselves considered as objects (sets), instances of meta-classes (sets of sets), and so on. Thus, levels of classification are distinguished: tokens, classes, meta-classes, etc. Generalization defines a subclass-superclass relation between classes at the same level of classification, characterized by the inheritance of properties: when class A is subclass of B, it inherits all the properties of B and is differentiated from it either by having additional properties of its own, or by restricting the value ranges of the inherited ones. Finally, every object (entity or relation) has a unique identifier.

1.3 The SIS User Interface

The SIS User Interface cooperates with the query processor of the SIS base. Information can be retrieved from the SIS base, by executing one of a set of built-in queries that are offered as a menu of Choices by the interface. The query processor extracts data from the SIS base and displays the result on the screen. The result can be seen in two ways: graphically, on the window of the graphical subsystem (explained below) or textually, on a text-window. There are many types of predefined queries; some of them are graphical (display the result in graphical mode), while others are textual (display the result in textual mode). The current selection of the query type is displayed by the query type field, which is always visible. A query may have one parameter on which it operates or may have none. This parameter, referenced in the following as *Query Target*, must be an object existing in the SIS base. The Query Target is always visible and can be changed in multiple ways by the user.

2. Design and usage of the User Interface

Initially, the window shown in Figure 1 is created. It is a window with frame, title bar, minimize, maximize and menu buttons, with default behavior.

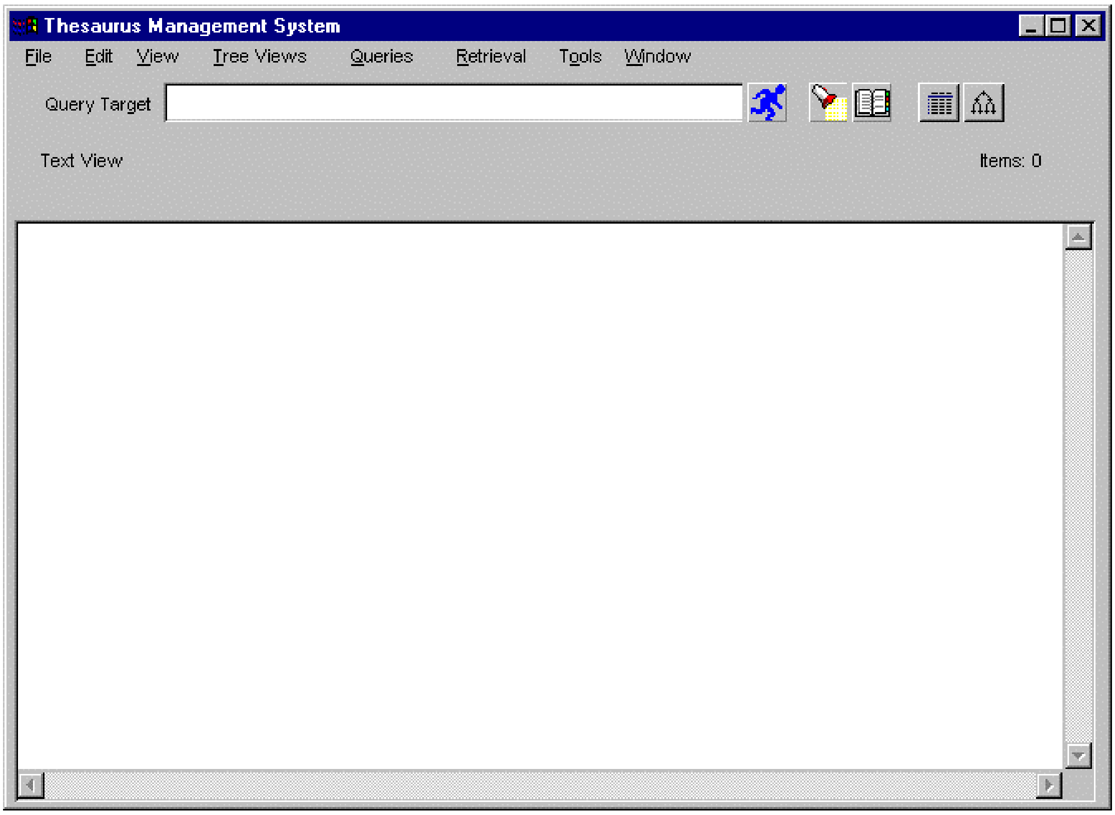


Figure 1: Initial window of the User Interface.

The window is divided in the following areas:

2.1 Menu Bar

The basic options that the SIS User Interface provides, appear in a Menu Bar, consisting of eight menus.

File

a pulldown menu with options that are used for file and program operations

Edit

a pulldown menu with options offering text operations on the Query Result Area

View

a pulldown menu containing options for controlling the appearance of User Interface and also settings that affect the graph and text output

Tree Views

a pulldown menu with options that are used for controlling the display mode and executing predefined recursive queries displayed in graphical mode

Queries

a pulldown menu with options that are used for executing predefined queries shown in textual mode

Retrieval

a pulldown menu with options that are used for queries by classification facets

Tools

a pulldown menu with options for communication with external tools

Window

a pulldown menu with options that give all the available output representations

In section 7 the above options are described in detail.

2.2 Query Info Area

The Query Info Area displays the current state of the tool. It consists of the following subareas:

The ***Query Target*** is a single line text-editor, with common behavior, used to display and update the query target i.e. the SIS base object or link on which a query is applied on. To change the query target (initially empty), clear the current query target by using the BackSpace or Delete keys, and write a new one. The first query that will use the Query Target will check if the string is a name of an object or a link existing in the database. If not, a warning appears and the query target has to be changed. In case of a link-target, the full name of the link must be written: starting with the name of the from-object, following with the "->" symbol and the link name(s) (e.g. Object_name->link_name). The Query Target may also be changed automatically by operations that are explained below.

The button ***Exec*** used for executing the last graphical query type selection on the Query Target again. This is useful especially when the Query Target has just been changed and we want to execute the last graphical query selection on the new target, or when the SIS base contents are modified during a working session.

The button ***History***, a popup frame is used for retrieving previous query commands (see section 6.1).

The button ***Find*** is used to display the Pattern Search Card, which is used to search a pattern in the textual or graphical window (see section 4.3).

The label beneath the Query Target, used for displaying the current query type (see e.g. "StarView" in Figure 22). At startup the query type is TextView.

The label ***Items*** and a number which indicates the cardinality of the answer set of a query. Initially there are 0 items.

2.3 Query Results Area

The Query Results Area is the area where the result of a query is displayed. This area can be scrolled left-right or bottom-up, in case that the result is too big to fit in the given window size. A query is either textual or graphical i.e. its results are displayed in text or in graph form. In order to display the results of a textual query we use a scrollable text window, while to display the results of a graphical query a graphical subsystem is used to draw the graphs. The Query Results Area can be toggled between the two windows with different display modes, without loosing the contents.

2.4 Output Control Area

The button ***Text*** switches the Query Results Area in textual mode. Whenever this button is pressed, the display mode is switched in textual mode (if already in textual mode nothing happens) and the result of the last executed textual query appears on the Query Results Area.

The button ***Graph*** switches the Query Results Area in graphical mode. Whenever this button is pressed, the display mode is switched in graphical mode (if already in graphical mode nothing happens) and the result of the last executed graphical query appears on the Query Results Area.

3. Mouse Button Usage Conventions

The mouse button is used uniformly. When the mouse is in a sensitive area, like the "Object Card" or the "Query Result Area", buttons work as follows:

∗ the ***left-button*** sets the name of the selected node/link to the current query target,

∗ the ***middle-button***[1] sets the name of the selected node/link to the current query target and the query type (reflected by the current graphical query label) is executed on this query target,

∗ the ***right-button*** pops-up a window (the "Object Card") containing the textual description of this node/link.

On any other case the mouse works as follows:

∗ the ***left-button*** triggers the command push buttons thus initiating the actions attached to them,

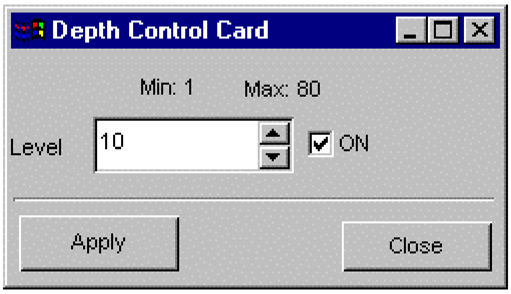
[1] With two-button mouse devices by double-clicking the left button simulates the middle-button.

4. Output Control Functions

4.1 Controlling the Depth of Recursive Queries

GAIN provides a mechanism for controlling the query depth level i.e., the maximum number of levels of a graph which are to be retrieved and displayed. This mechanism is accessible through the Depth Control Frame, which consists of the following elements:

- The ON/OFF toggle button, which enables or disables the depth control mechanism.
- The Level Box, which displays the query depth level. You can set the desired depth level by either using the Up and Down Arrow Buttons or typing a number between 1 and 80 and pressing Enter.
- The Apply button is used to re-execute the current query and refresh the display according to any new settings.
- The "Close" button used to close the frame.


Depth Control Card

Min: 1 Max: 80

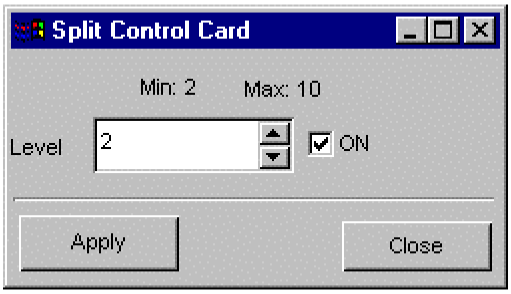
Level 10 ☑ ON

Figure 2 The Depth Control Frame.

4.2 Splitting Graphs

In some cases the layout of specific graphs lacks readability due to a number of nodes with high fun-in (number of links pointing to them). GAIN provides a graph splitting mechanism for improving the readability of such graphs. Tuning of this mechanism can be done using the Split Control frame, which consists of the following elements:

- The ON/OFF toggle button, which enables or disables the splitting mechanism.
- The Level Box, which displays the maximum node fun-in. You can set the desired maximum node fun-in by either using the Up and Down Arrow Buttons or typing a number between 2 and 10 and pressing Enter.
- The Apply button is used to re-execute the current query and refresh the display according to any new settings.
- The "Close" button used to close the frame.



Min: 2 Max: 10

Level 2 ☑ ON

Figure 3 The Split Control frame

The query depth and graph spitting mechanisms are discussed in further detail in Section 7.4.2 since their affection is better understood within the context of the Tree Views provided by GAIN.

4.3 Find

The user has the possibility to search for a pattern in either the textual or the graphical subwindow. By pushing the Find button, a card is opened which consists of the following parts (see Figure 4):

- A single line text editor where the user can enter the string he or she wants to search for. By pressing ENTER or the pushbutton "Find" (see below) the first occurrence of the pattern in the textual or graphical window (whichever of the two is mapped on screen) is found, displayed and highlighted. If the pattern does not exist in the current window, the user is appropriately warned.

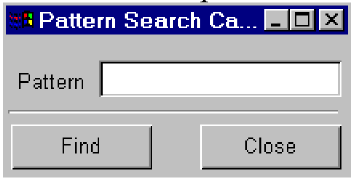


Figure 4 The Find window

- A pushbutton "Find" used to repeat the search for the pattern, as many times the user wants. By pressing repeatedly on this button, the next occurrences of the pattern on screen are found and highlighted. This can also be achieved by pressing ENTER in the text editor of the card. When the last word containing the pattern is found, the search continues from the beginning of the screen, that is, the search is performed in circular mode.
- A pushbutton "Close" used to close the Find card.

One "Find" button with just the same functionality is also attached to every Object Card (see section 5.1) and Many List Card (see section 7.4, Figure 24) for searching a pattern within each of their text windows.

5. Query Results Display

There are two modes in which the system can be: textual and graphical. As a consequence, there are also two kinds of queries: textual and graphical. The textual queries are found under the menu option Queries and the graphical queries are found under the menu option Tree Views. (See sections 7.4 and 7.5 respectively, for more details.)

For each of the two modes there are internal variables that store the name of the last executed query and the cardinality of the resulting answer set. These variables, displayed on the current query type label and the item label, are updated every time a new query is executed (either textual or graphical). (See Figure 1)

As mentioned above the user can switch between textual and graphical mode by using the Text-Graph toggle button. When the mode changes, the current query label and item label are also changed to be consistent with the query result currently displayed.

Apart from this explicit mechanism of changing mode, there are also implicit ones: When the system is in textual mode and a graphical query is executed, the system automatically switches to graphical mode and vice versa.

Another implicit mechanism for changing mode is provided by the History option (see section 6.1).

Textual queries are displayed in a standard scrollable text window. In order to display the result of a graphical query, the LABY graphical subsystem is used. It consists of a window with horizontally and vertically scrolling ability. In this window the result of a graphical query is displayed as a graph (of nodes and links).

The following selections can be made in both display modes.

1. Click the left mouse button on a node/link
   The node/link becomes query target and the Query Target field in the Query Info Area is updated to display the new selected value.

2. Click the middle mouse button on a node/link
   The node/link becomes query target, the Query Target field in the Query Info Area is updated to display the new selected value and the current query type is executed on the new query target. Selection (2) has the same result as choosing selection (1) and left-clicking with the mouse on the Exec button.

3. Click the right mouse button on a node/link
   A textual description of this node/link, the object's *Object Card* appears on the screen (see Figure 5).

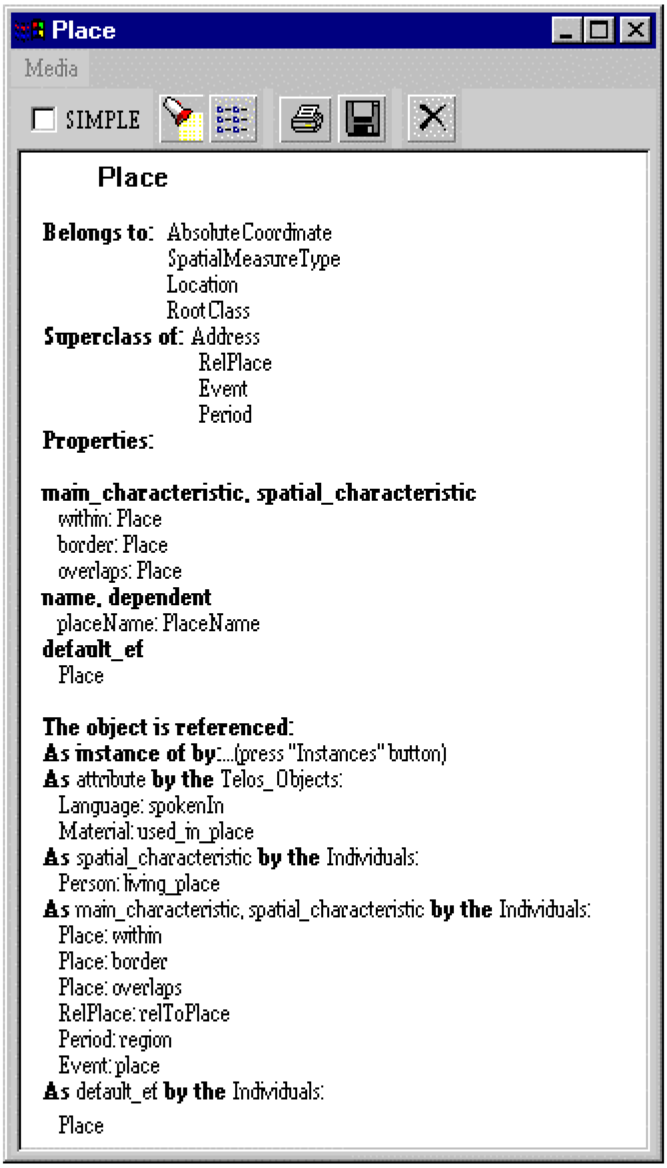
In the current implementation of the system links are also selectable, so when we refer to objects we consider nodes or links.

5.1 Object Card

The Object Card of an object contains the textual description for this object. The object card shows the complete information that is immediately related to this object. On the top of the card is declared the name of the object. The rest is divided into two main fields, the DESCRIPTION field, with the description elements of this object, and the REFERENCED field, with all the description elements of other objects, which refer to this object. The DESCRIPTION field is subdivided into the following areas:

The superclasses of the object.

If the object is a class, then all it's superclasses are listed by the *label Has as superclasses*. In , class *Place* does not have any superclasses, so there exists no such label. The ObjectCard, does not show *all* the applicable fields of an object, but only those which have values.



Place

Belongs to: AbsoluteCoordinate
SpatialMeasureType
Location
RootClass
Superclass of: Address
RelPlace
Event
Period
Properties:

main_characteristic, spatial_characteristic
within: Place
border: Place
overlaps: Place
name, dependent
placeName: PlaceName
default_ef
Place

The object is referenced:
As instance of by:...(press "Instances" button)
As attribute **by the** Telos_Objects:
Language: spokenIn
Material: used_in_place
As spatial_characteristic **by the** Individuals:
Person: living_place
As main_characteristic, spatial_characteristic **by the** Individuals:
Place: within
Place: border
Place: overlaps
RelPlace: relToPlace
Period: region
Event: place
As default_ef **by the** Individuals:
Place

Figure 5 "Object Card" window

The classes the object belongs to.

They are listed by the label *Belongs to*. For example, in Figure 5, the Metaclasses that class *Place* belongs to are: *RootClass*, *AbsoluteCoordinate*, SpatialMeasureType and *Location*.

The attributes of the object.

> They are listed in the following format: the categories of the attributes (i.e., the classes the attribute belongs to), are listed by the label *Properties*. If they are more than one, they are separated by commas. In the next line follows the name of the attribute (if there exist one), and the value of the attribute separated from the name by a semicolon (':'). In Figure 5, the attribute *placeName* of class Place belongs to the categories name and *dependent*, and takes values from class *PlaceName*.

The REFERENCED field is subdivided into the following areas:

The subclasses of the object.

> If the object is a class, then by the label As *subclasses* by are listed all it's subclasses. In Figure 5 the subclasses of class Place are *Address*, *RelPlace*, *Event* and *Period*.

The instances of the object.

> If the object is a class, then by the label As *instance of by* are listed all it's instances. In Figure 5 the instances of class Place are: *Sfakia*, *Souli*, *Kallarites*, *Ithaca* ....

The attributes of other objects that have the object as a value.

> They follow the format *As <category or categories separated by comma > by the < kind of referencing object> : <name of the referencing object> : <name of the attribute>*. For example class *Place* has is referenced (among others), by attribute *place* of class *Event* (not shown in Figure 5). This is presented in the ObjectCard in the following manner: *As mainCharacteristic, spatial by the Individuals: ... Event: place*. Attribute categories *mainCharacteristic* and *spatial* are the classes the attribute belongs to, system class Individual is the kind of the referencing object, i.e. class Event, which is the name of the referencing object, and finally place is the name of the attribute itself.

The above description holds when the toggle button on the top-left of the ObjectCard is at state *SIMPLE*. In the alternative state FULL, is presented additional information about the system classes the object belongs to, the classes the attributes are inherited from and the references-to that the object inherits.

On the right of the *SIMPLE-FULL* toggle button, exists a search bitmap pushbutton, which offers search facilities and has the same functionality described in section 5.1, its scope, however, is limited within the ObjectCard.

The button *Instances,* a popup frame is used for giving the instances of the object (see section 7.4.1).

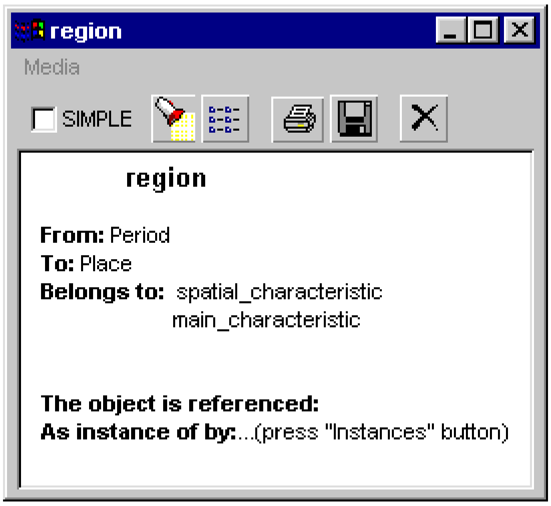
The button *Save,* a pushbutton opening a file chooser that used for selecting a file for saving the contents of the object (see section 7.1.1).

The button *Close,* a pushbutton that closes the Object card.

For uniformity and consistency of the user interface, the three possible mouse selections that can be made in the Query Results Area (see section 3) are valid in the Object Card :

1. By clicking the left mouse button on a node/link, the current query target is updated to the name of this node/link.
2. By clicking the middle mouse button on a node/link, the current query target is updated to the name of this node/link, and the query type reflected by the current graphical query label is executed on the new query target
3. By clicking the right mouse button on a node/link a new Object Card appears on the screen. The maximum number of Object Cards that can be opened simultaneously is 20.

The Object Card of a link contains the same information as in the case of a node and additionally, the from and to – values of this link (see Figure 6):



region

From: Period
To: Place
Belongs to: spatial_characteristic
main_characteristic

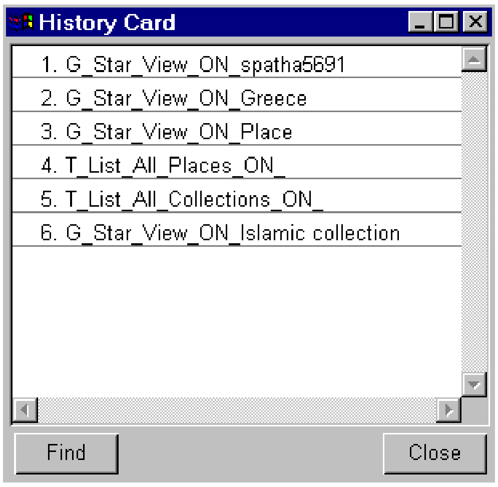
The object is referenced:
As instance of by:...(press "Instances" button)

Figure 6 "Object Card" window of a link

6. History

6.1 History

By pressing the History button, a window called "History List" appears on the screen (see Figure 7).



1. G_Star_View_ON_spatha5691
2. G_Star_View_ON_Greece
3. G_Star_View_ON_Place
4. T_List_All_Places_ON_
5. T_List_All_Collections_ON_
6. G_Star_View_ON_Islamic collection

Figure 7 The "History List" window

You can scroll it bottom-up. You can close the "History List" using the Close button, placed on the bottom-right of the window, which is provided for this reason. This button does not minimize the window to an icon, as the Close button from the frame menu. By clicking the left mouse button on it, the history window disappears. If you press the History button while the history window is already on the screen, then the current window disappears and a new one appears with the same characteristics.

The History List is updated whenever you execute a graphical or textual query. The format of a query in the list is

[State]_[Query]	when the query does not need a target
[State]_[Query]_ON_[Target]	when the query needs a target

State is T or G for textual or graphical query respectively.
Query is the type of the query (e.g. StarView, List_All_Files)
Target is the target on which the query is executed

You can re-execute a previously selected query by clicking the left mouse button on the respective line of the History List. Then the query type is changed to [Query] and the query target is updated to [Target] (if the currently selected query needs a target, otherwise it is not changed). The textual queries set the display mode to text and the graphical queries set the display mode to graph. This causes the result of the selected query to be displayed on the screen immediately.

So, by choosing a previous query, you can change implicitly the query target, the current query type and the current display mode.

7. Menu Bar Functions

7.1 File

By pressing the File button, a pulldown menu appears on the screen (see Figure 8).

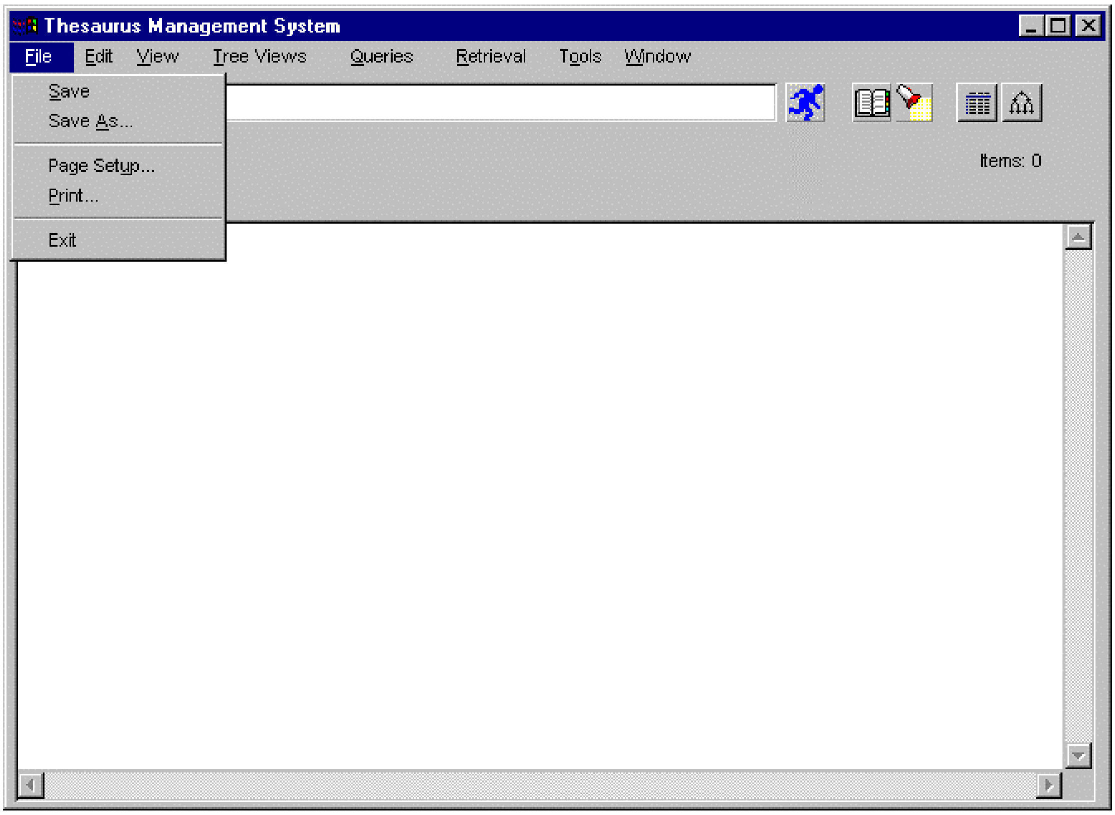


Figure 8 "File" Menu

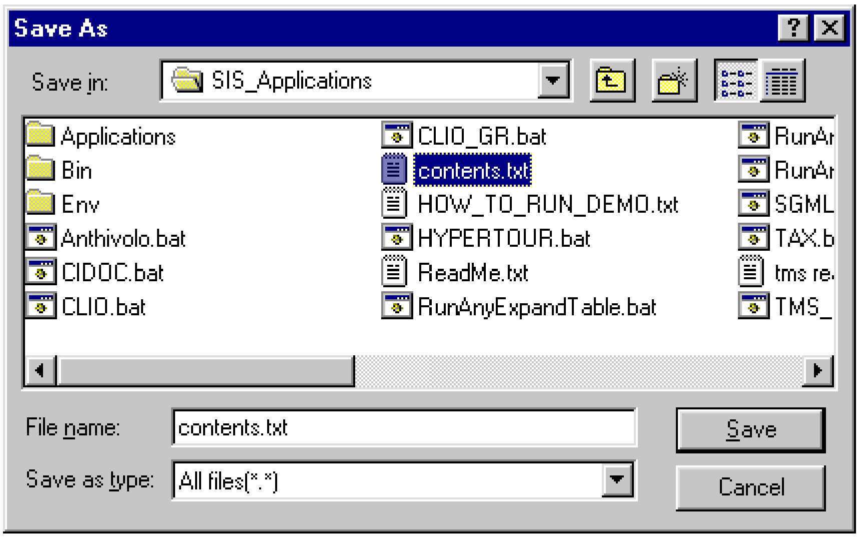
7.1.1 Save

This option is provided in order to give the ability to the user to save the result of a query in a file. By selecting the Save button, a window called "Save File" appears on the screen (see Figure 9).

It is a file selection box, with standard behavior. If you select this button while a "Save File" window is already on the screen, then the current window disappears and a new one appears with the same characteristics.

When the system is in textual mode, the Save option provided in this window causes the last textual query result to be saved in the selected file, having the same format as it would be displayed on the screen (see View menu, Text Output choice)

When the system is in graphical mode the Save option causes the last graphical query result to be saved in the selected file in postscript format.



Save in: SIS_Applications

File name: contents.txt

Save as type: All files(*.*)

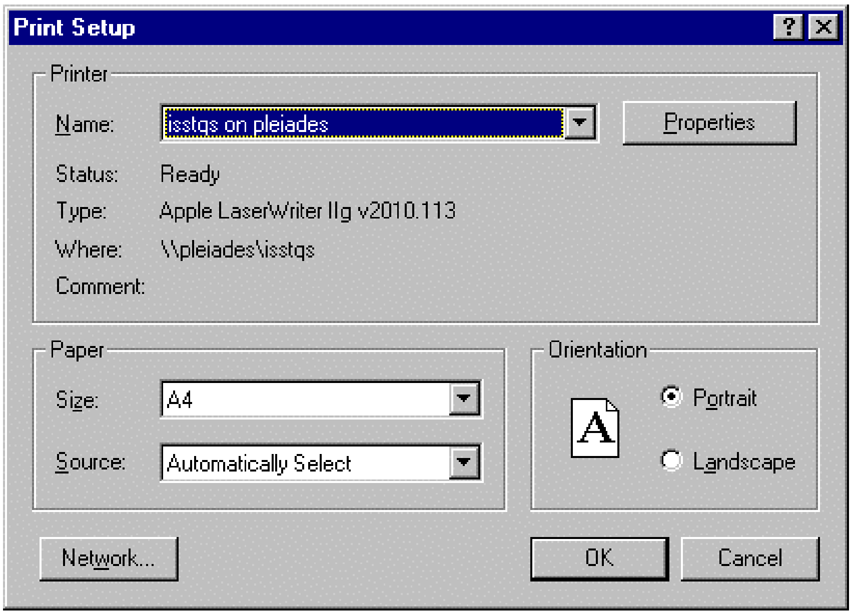
Figure 9: The "Save" window

7.1.2 Save As

This option is provided in order to give the ability to the user to save the result of a query in a different file than the previous one. By selecting the Save As button, the window called "Save As" appears on the screen (see Figure 9).

7.1.3 Page Setup

This option is provided in order to give the ability to the user to setup the printer and the paper layout (see Figure 10). Note : This window appears under WIN32 system).



Print Setup

Printer

Name: isstqs on pleiades

Status: Ready

Type: Apple LaserWriter IIg v2010.113

Where: \\pleiades\isstqs

Comment:

Paper

Size: A4

Source: Automatically Select

Orientation

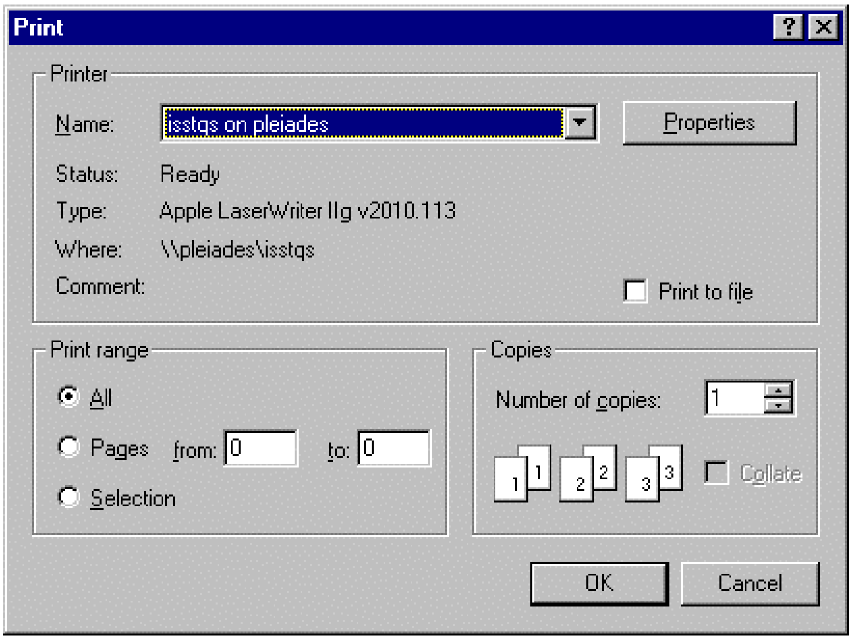
● Portrait

○ Landscape

Figure 10 “Page Setup” window

7.1.4 Print

This option is provided in order to give the ability to the user to print the result of a query on a printer (see Figure 11). Note : This window appears under WIN32 system).



Print

Printer

Name: isstqs on pleiades

Status: Ready

Type: Apple LaserWriter IIg v2010.113

Where: \\pleiades\isstqs

Comment:

□ Print to file

Print range

● All

○ Pages from: 0 to: 0

○ Selection

Copies

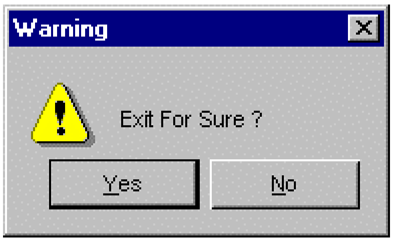
Number of copies: 1

□ Collate

Figure 11 “Print” window

7.1.5 Exit

This option exits the program. The user is warned if (s)he wants to cancel (see Figure 12).



Warning

Exit For Sure ?

Figure 12 "Confirm Exit" Window

7.2 Edit

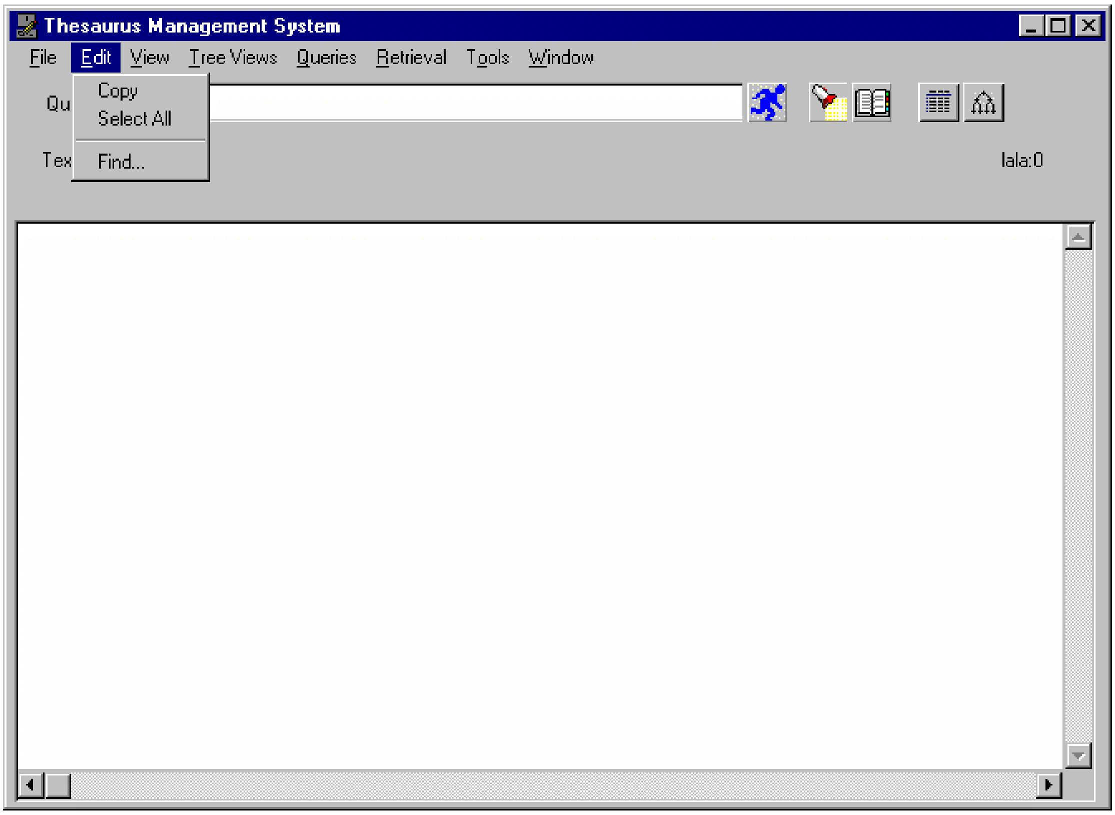


Figure 13: Edit menu

7.2.1 Copy

Copies the contents of the Query Results Area in the clipboard.

7.2.2 Select All

Selects the contents of the Query Results Area.

7.2.3 Find

See section 4.3

7.3 View

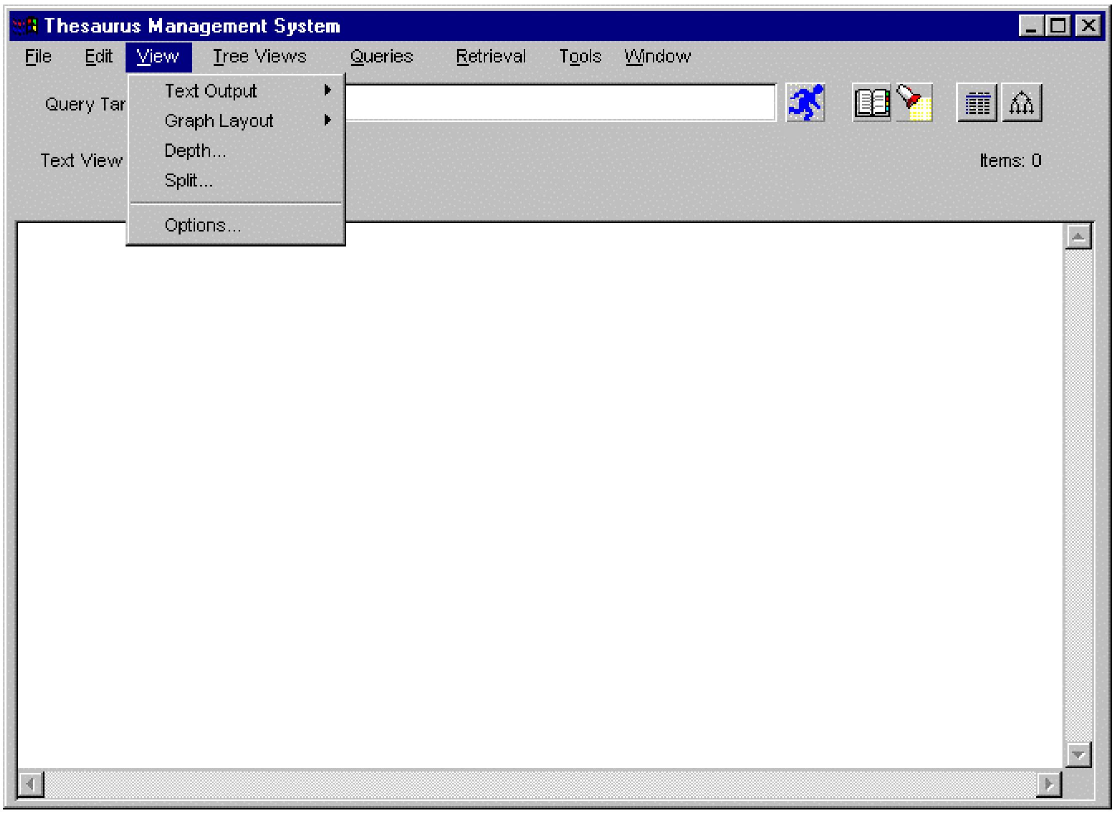


Figure 14 "View" menu

7.3.1 Text Output

By selecting the Text Output button a pulldown menu appears on the screen (see Figure 15), which gives two choices, named Formatted and Unformatted. You can set the text output to be in one of these two states.

When you select the Unformatted state, the result of textual queries are displayed in simple form, which consists of the presentation of only the nodes existing in the answer set. In this case, the full names of the nodes are displayed on screen.

When you select the Formatted state, additional information about these nodes is displayed. This information is presented in form of columns. Each column corresponds to an attribute of the nodes in the answer set. In this case, the kind of each attribute appears as a label above the corresponding column. Long names may be abbreviated before they are displayed on screen.

The default text output state is Formatted.

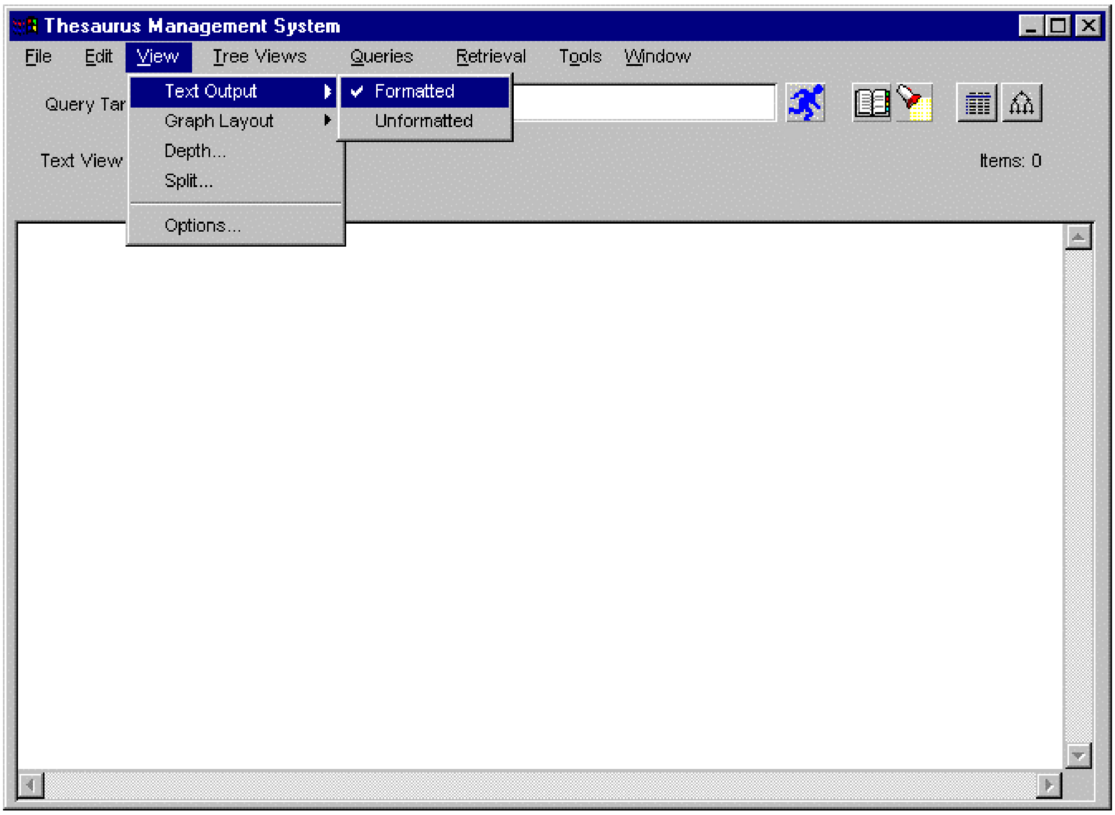


Figure 15 "Text Output" submenu

7.3.2 Graph Layout

By selecting the Graph Layout button a pulldown menu appears on the screen (see Figure 16), which gives two choices, named Simple Lines and Bended Lines. You can set the graph output to be in one of these two states.

When you select the Simple Lines state, the result of graphical queries are displayed with straight lines. In this case, lines overlap with nodes.

When you select the Bended Lines state the result of graphical queries are displayed with bended lines. In this case, a line becomes two or more in order to have minimum overlapping with the nodes.

The default graph output state is Simple Lines.

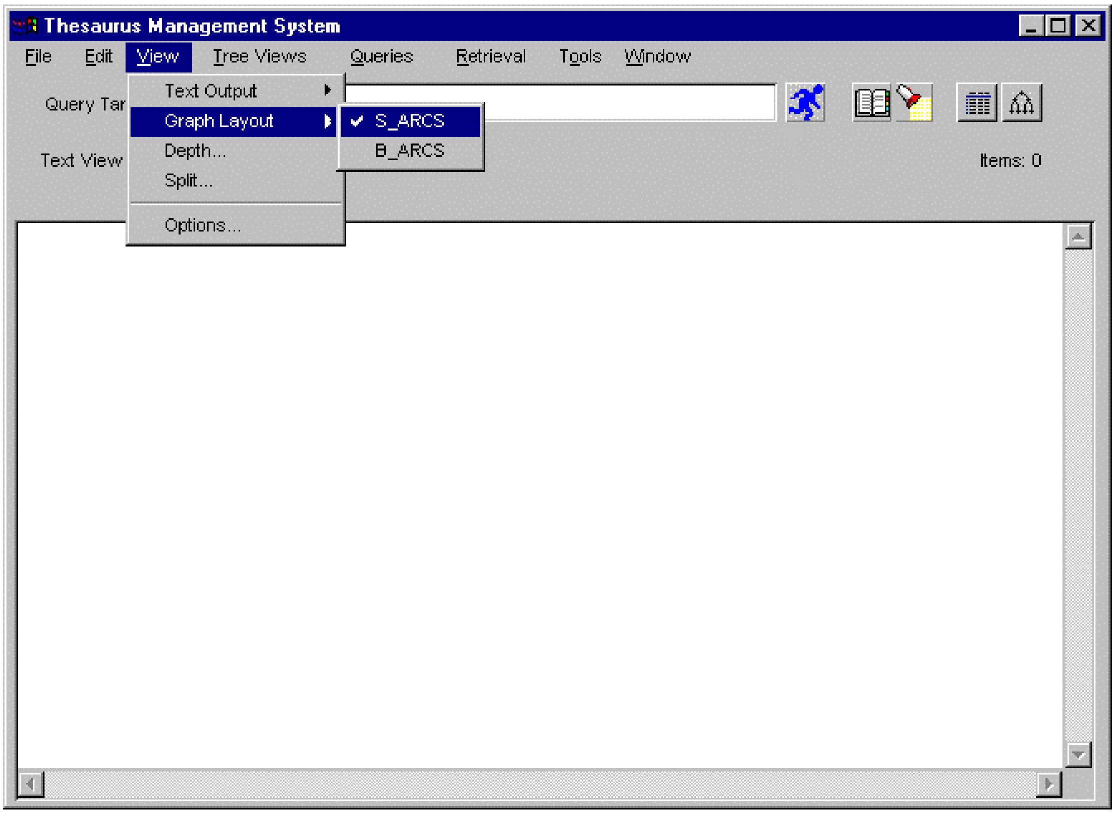


Figure 16 "Graph Layout" submenu

7.3.3 Depth

See section 4.1.

7.3.4 Split

See section 4.2.

7.3.5 Options

This option is a new possibility that has been added in the SIS-GAIN regarding the possibility of customization of the System User Interface. It is activated via View menu. It is a notebook-like window with five different pages-cards. These are the following:

- Colors
- Fonts
- Categories Options
- General Options

Their functionality is described below.

7.3.5.1 Colors

The colors of the User Interface and of Object Card can be changed through this card (see Figure 17). The areas we can change the color are:

- Working Area (Query Results or Text Input Areas)
- Menu Area (menus – menu items)
- Frame Area (the rest areas of SIS and Object card)

Use: Click on the corresponding button for the area its color you want to change. A color chooser is opened and after selecting the desired color you quit by pressing the OK button.

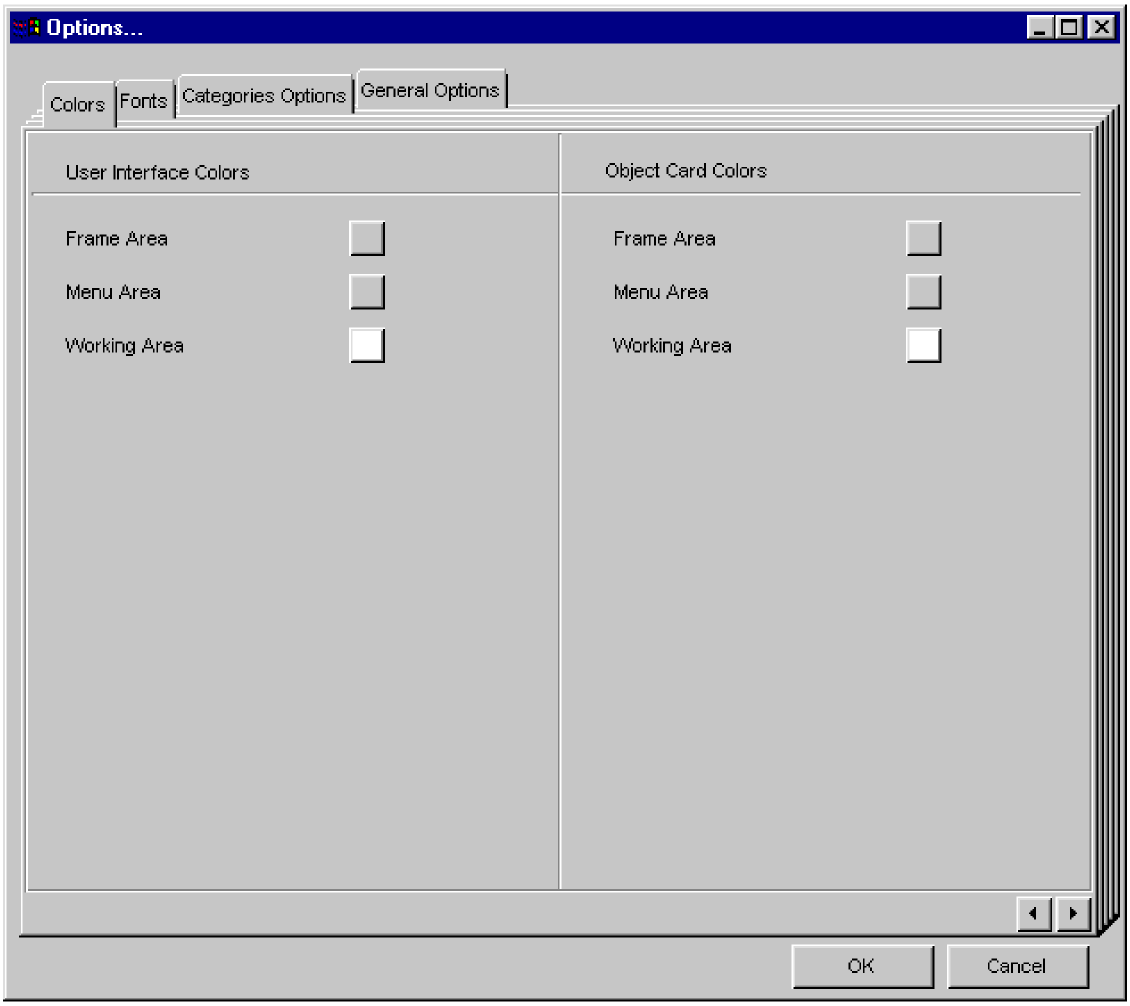


Figure 17 Options Card : Colors Card

7.3.5.2 Fonts

The fonts appearing on the different parts of the User Interface and of Object Card can be changed through this card (see **Figure 18**). The areas we can change the font are:

A) For SIS

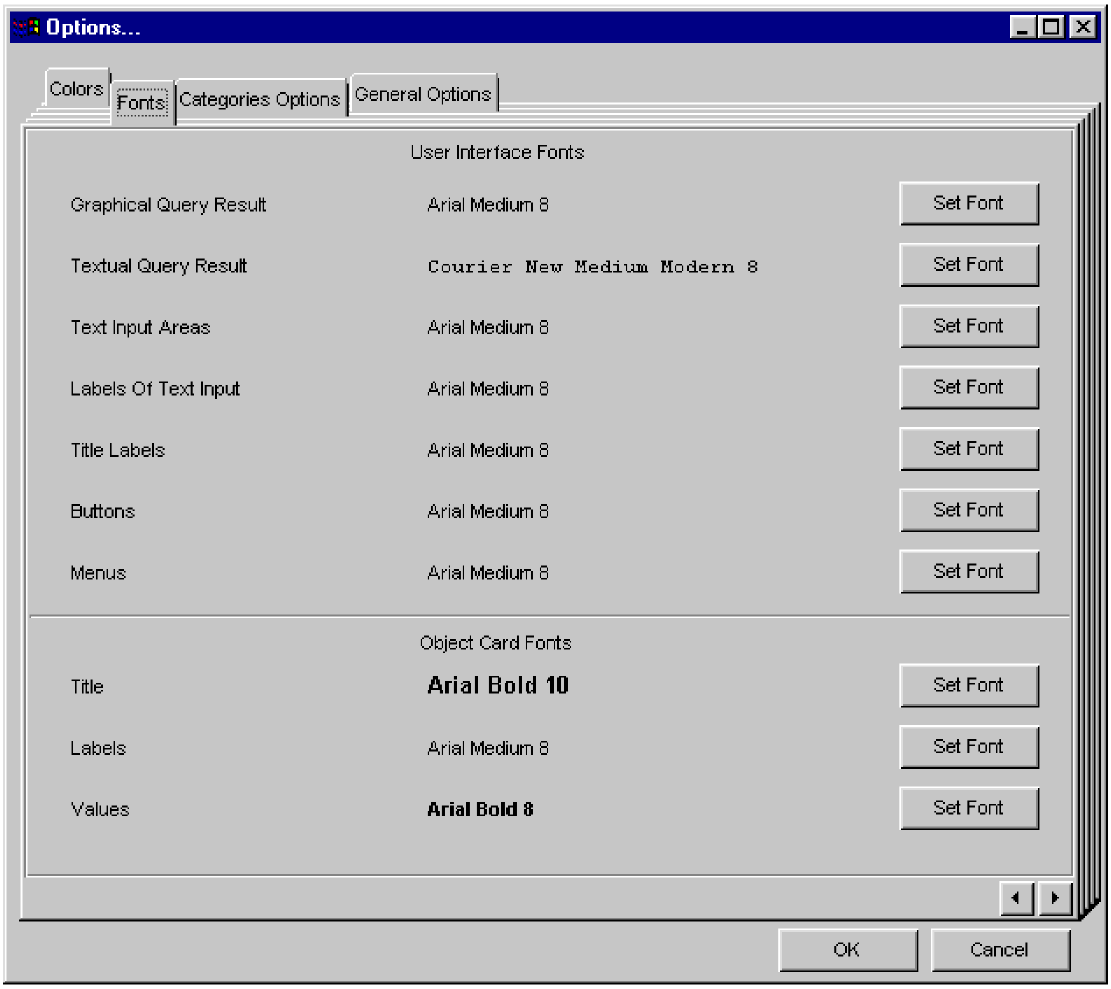
- Graphical Query Result (Tree Views Results)
- Textual Query Result (Queries Results)

- Text Input Area (area in which we can type text)
- Labels of Text Input (The labels for the text input areas e.g. Query Target)
- Title Labels (the font of titles: e.g. Items)
- Buttons (text appearing on buttons e.g. Find)
- Menus (text on menus)

B) For Object Card

- Title (the title of the Object card)
- Labels (the names of categories)
- Values (the values of categories)

Use: Click on the corresponding button for the area its font you want to change. A font chooser is opened and after selecting the desired font family, face and size you quit by pressing the OK button.



User Interface Fonts

Graphical Query Result	Arial Medium 8
Textual Query Result	Courier New Medium Modern 8
Text Input Areas	Arial Medium 8
Labels Of Text Input	Arial Medium 8
Title Labels	Arial Medium 8
Buttons	Arial Medium 8
Menus	Arial Medium 8

Object Card Fonts

Title	**Arial Bold 10**
Labels	Arial Medium 8
Values	**Arial Bold 8**

Figure 18 Options Card : Fonts Card

7.3.5.3 Categories Options

Through this card the user can define the color, the nodes and links, will appear in the various graphs of the User Interface. The user can also give priority in order to define the order will appear at Star View and Object card (see Figure 19).

Node coloring

The user can define that all the instances of a class will be colored in a graph with the same color. This is done as following described:

We click on the *Class Name* button. Following we type the name of the class beyond the Specify Class. We chose the color and priority via the Color and Priority menus correspondingly. Finally we press the *Add/Modify* button and our choice is inserted in the list. (Current version supports four different colors).

If we want to modify a class color or priority we click on the class entry, we change the color or priority and we press the *Add/Modify* button.

If we want to delete a class we click on it and press the *Remove* button.

Link coloring – Defining ordering priority

The user can define different colors for attributes of a class. (S)he can also define the order that they will appear on a graph or Object card.(We can not define an order for an object card different than that of a graph).

E.g. we have a class A with attributes a1, a2, a3, a4 and we want to give different colors to them, as well as to appear with the order a2, a1, a3, a4 on a graph and object card.

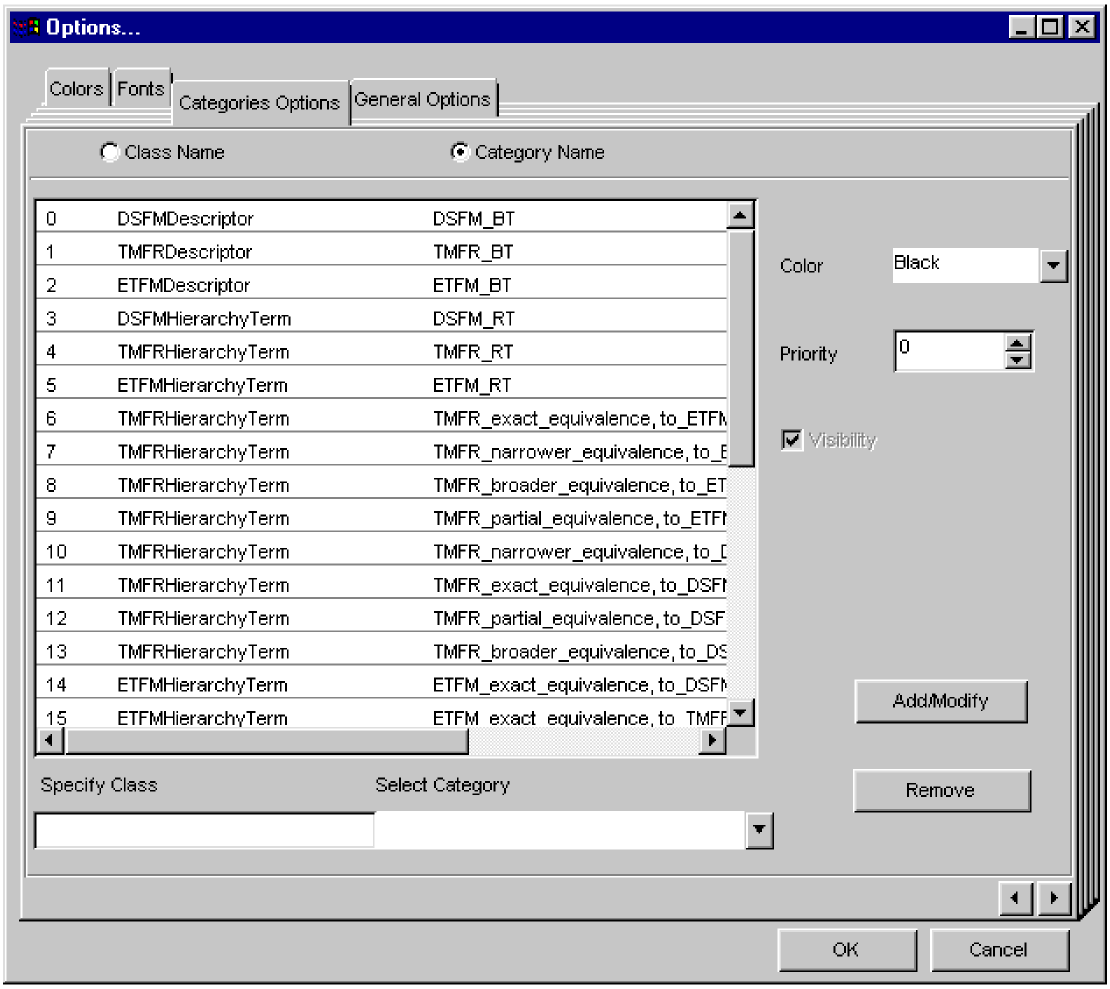
First of all we click on the *Category Name* button. In the *Specify Class* field we type the class name (A). From the Select Category menu next to *Specify Class* field we chose an attribute for the specified class. We chose a1, we chose the color we want, we make the priority 1 using the up-down arrows and finally e press the *Add/Modify* button.

We make the same for the a2 attribute with priority 0 (since we want it to appear first) and priorities 2 and 3 for a3, a4 correspondingly.

Finally we press OK button.

If we want to modify a color or priority we pick the wanted attribute by clicking on it in the list and e change the color or priority and at the end press *Add/Modify* button.

If we want to delete an entry we click on it and press the *Remove* button.



○ Class Name ● Category Name

0	DSFMDescriptor	DSFM_BT
1	TMFRDescriptor	TMFR_BT
2	ETFMDescriptor	ETFM_BT
3	DSFMHierarchyTerm	DSFM_RT
4	TMFRHierarchyTerm	TMFR_RT
5	ETFMHierarchyTerm	ETFM_RT
6	TMFRHierarchyTerm	TMFR_exact_equivalence, to_ETFN
7	TMFRHierarchyTerm	TMFR_narrower_equivalence, to_E
8	TMFRHierarchyTerm	TMFR_broader_equivalence, to_ET
9	TMFRHierarchyTerm	TMFR_partial_equivalence, to_ETFI
10	TMFRHierarchyTerm	TMFR_narrower_equivalence, to_D
11	TMFRHierarchyTerm	TMFR_exact_equivalence, to_DSFI
12	TMFRHierarchyTerm	TMFR_partial_equivalence, to_DSF
13	TMFRHierarchyTerm	TMFR_broader_equivalence, to_DS
14	ETFMHierarchyTerm	ETFM_exact_equivalence, to_DSFN
15	ETFMHierarchyTerm	ETFM_exact_equivalence, to_TMFF

Color: Black

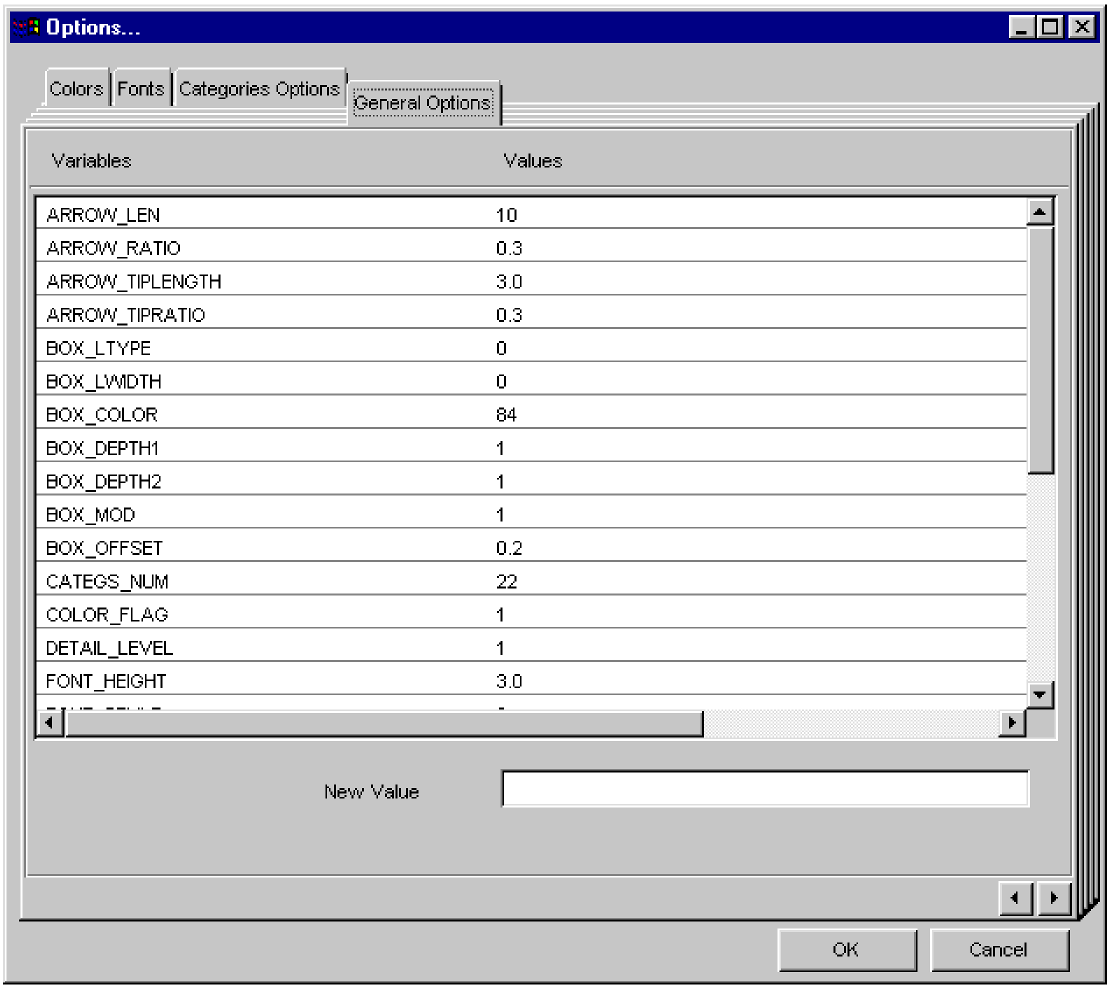
Priority: 0

☑ Visibility

Figure 19 Options Card : Categories Options Card

7.3.5.4 General Options

In this card, all the system environment variables that can be defined from the user have been put together (see Figure 20). These variables regard characteristics that determine a graph appearance, the lines thickness, shadows, e.t.c.).



Variables	Values
ARROW_LEN	10
ARROW_RATIO	0.3
ARROW_TIPLENGTH	3.0
ARROW_TIPRATIO	0.3
BOX_LTYPE	0
BOX_LWIDTH	0
BOX_COLOR	84
BOX_DEPTH1	1
BOX_DEPTH2	1
BOX_MOD	1
BOX_OFFSET	0.2
CATEGS_NUM	22
COLOR_FLAG	1
DETAIL_LEVEL	1
FONT_HEIGHT	3.0

Figure 20 Options Card : General Options Card

7.4 Tree Views

The Tree Views menu option supports graphical queries. The options depend entirely on the model and can be configured by the user as described in *SIS - Query Interpreter: An Interactive Program to use API Functions.* All queries in this menu require a query target.

The two more recently selected queries of this menu are kept by a caching mechanism for fast toggle. The cache is invalidated only by executing a query through the Exec button. This is useful when the SIS base is updated and we wish to inform the SIS User Interface for the update.

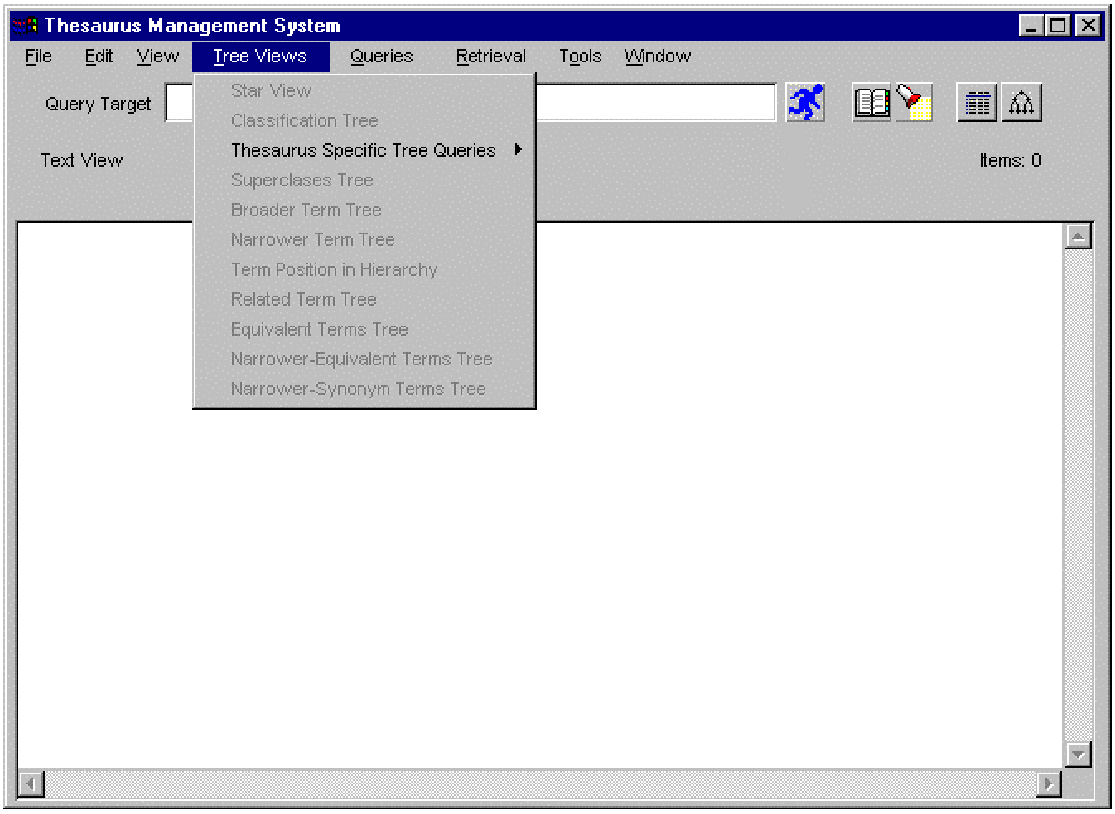


Figure 21 "The Tree Views" menu

7.4.1 Star View

By selecting StarView from the menu, a graphical query is executed which displays the query target as a central node. The superclasses and subclasses of the central object are shown top-right and bottom-right respectively. The classes of which the central node is an instance of, are shown top-left, while if it has instances a box with the label ``INSTANCES" appears bottom-left. By clicking this box with the left mouse button a card labeled ``Instances Card" appears, in which the instances of the central node are listed. The objects listed in the ``Instances Card" are selectable with the left mouse button. At the bottom-left corner of the ``Instances Card" there exist a button labeled ``Find", which offers the same facility described in section 4.3, and its scope is limited within the objects referenced in the ``Instances Card". The next button labeled ``Sort" sorts the contents of this card in alphanumeric order. The bottom-right button labeled ``Close" closes the card. The attribute of the central object are shown on the right of it, while on it's left exist the attributes by which the central node is referenced. The format of the attribute representation has the following semantics: The rectangles denote objects, classes of objects, etc., the diamonds refer to the categories of the attributes, i.e. the classes the links belong to, the ovals to the labels of the attributes, which may not exist, if they are system generated and not specified by the user. The result of a StarView query can be seen in Figure 22. This graphical query always needs a query target found in the Query Target window.

The StarView graph is equivalent to the ObjectCard, in the sense that it presents all the immediate information about an object and it does not show all the applicable fields for an object, but only those that have a value.

The title "StarView" is displayed in the Query type of the Query Info Area while the "Items" label shows a "*" which is displayed only in the case of a StarView.

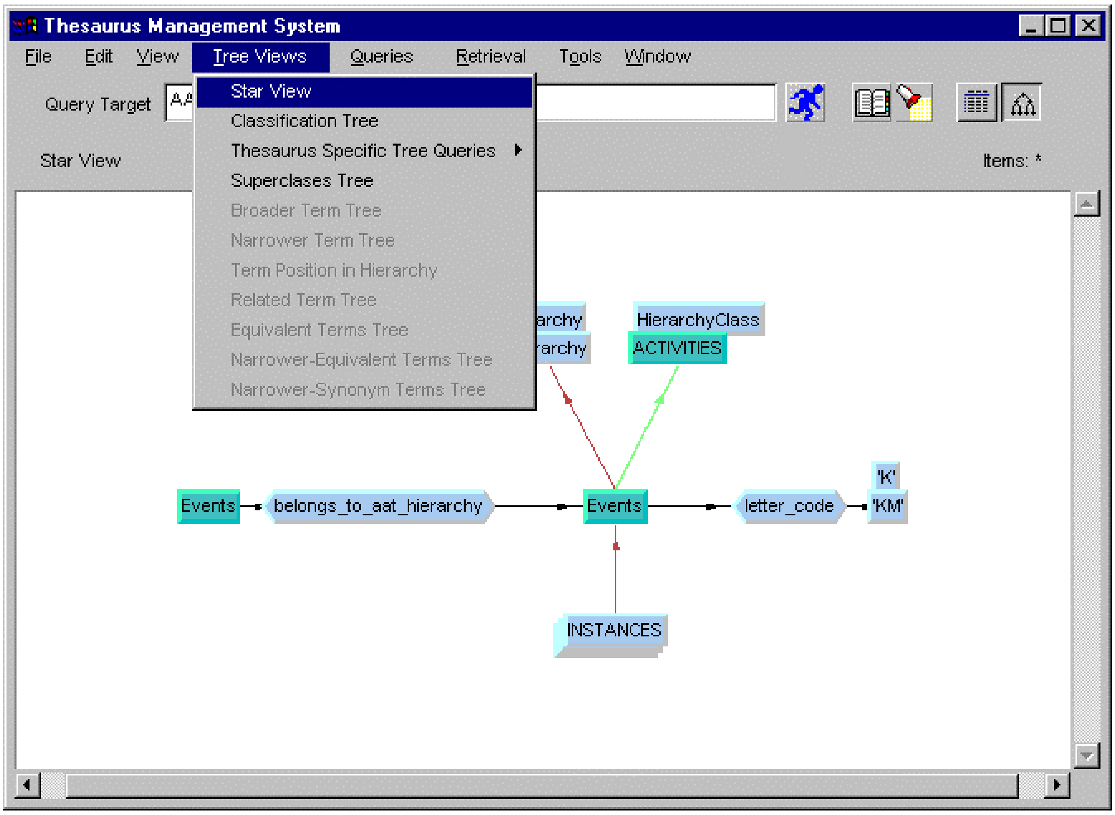


Figure 22 Star View

In case of a link-target a start view graph contains also the from and to-values of this link (see Figure 23 : "Period" and "Place" are the from and to-values of link "region")

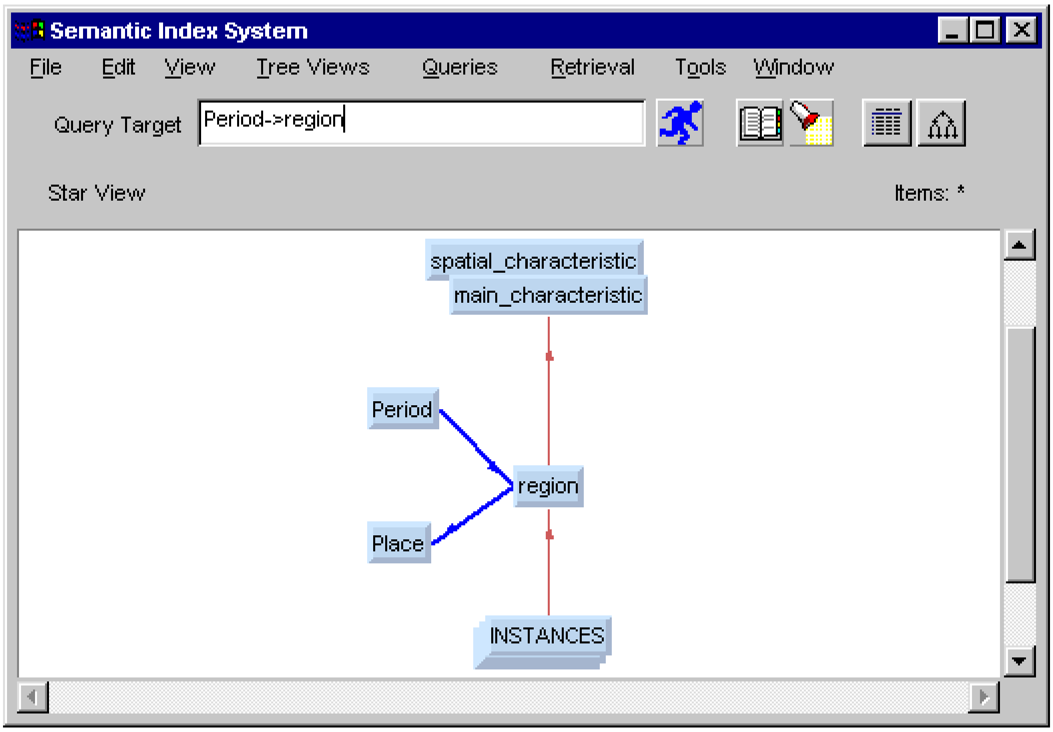
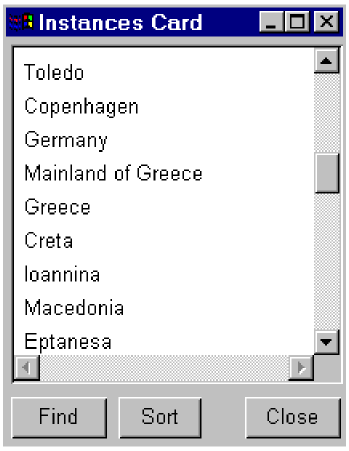


Figure 23 Star View of a link

A star view graph may contain a large number of nodes linked with the target node with the same kind of link that cannot be displayed inside the graphical window. In this case, this set of nodes is represented in the graph with a single node labeled *MANY <category>*. If this node is clicked with the left mouse button a Many List Card (see Figure 24) is opened. The objects listed in the ``Many List Card'' are selectable with the left mouse button. At the bottom-left corner of the ``Many List Card'' there exist a button labeled ``Find'', which offers the same facility described in section 4.3, and its scope is limited within the objects referenced in the ``Many List Card''. The next button labeled ``Sort'' sorts the contents of this card in alphanumeric order. The bottom-right button labeled ``Close'' closes the card.

If the number of nodes linked with the target with a specific kind of link exceeds a thousand, a *cut off* happens, which means that in this case the Many List Card contains only the one thousand first nodes of this kind and the user is warned for this event. In the current version, this limit is checked for classes, instances, IsA super classes and sub classes of the target while the rest of the link categories are regarded as one group. In a future release, each category will be checked separately. The same *cut off* happens also in the contents of every Object Card.



Toledo
Copenhagen
Germany
Mainland of Greece
Greece
Creta
Ioannina
Macedonia
Eptanesa

Figure 24 "Instances/Many List" Card

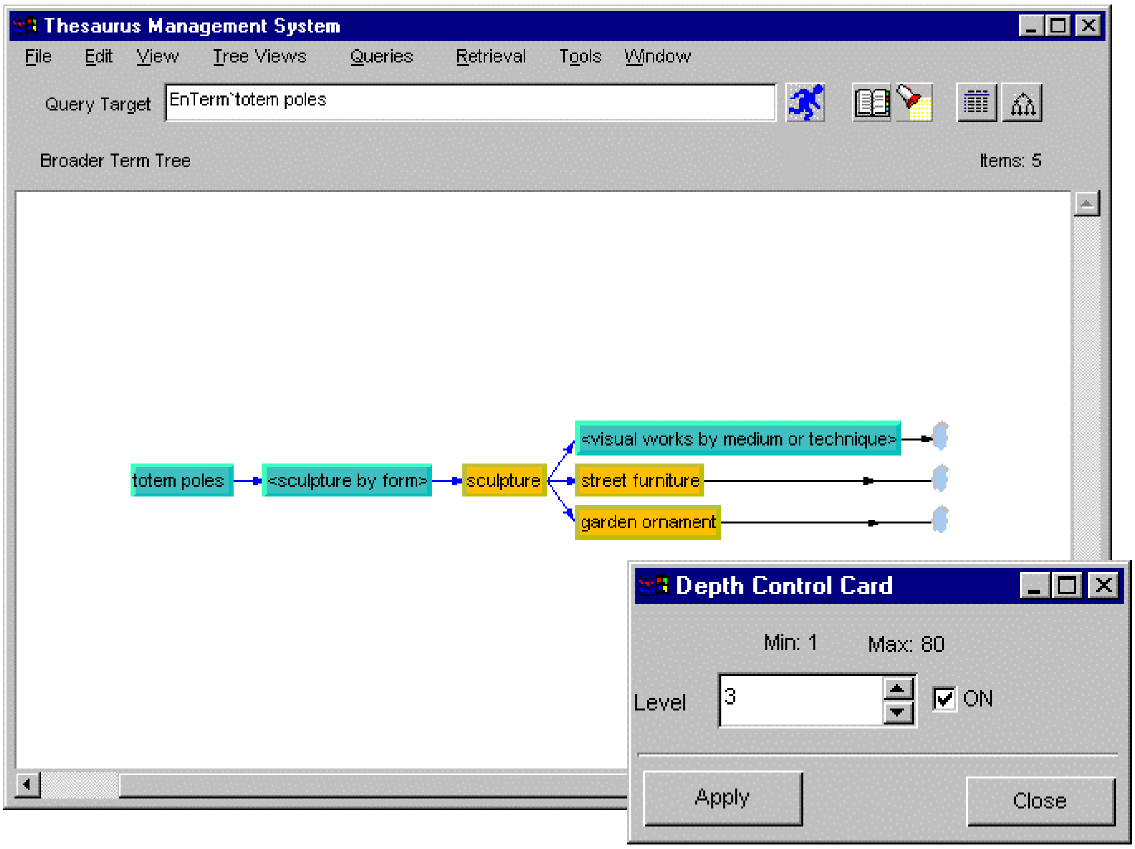
7.4.2 Classification Tree

Display all the subclasses of the given class at schema level.

The remaining choices of the Tree Views menu are recursive queries, displayed as graphs. Some of them require a specified kind of target. A checking is performed when the menu is mapped on screen in order to verify that the given query target is of the kind that the queries require. All queries that require a different kind of target that the one present in the Query Target area automatically become inactive.

The usage of the Depth Level control makes sense in all the above options of this menu except the first two (StarView and Classification Tree). We explain its meaning:

- **Depth Level Control**. When ON, its current value determines the maximum depth of the graph that is to be displayed. If a graph is cut at some nodes due to the above value, these nodes are presented to be linked with a circle to indicate that other objects follow them (see Figure 25). Middle mouse button click on the parent of a circle sets the Query Target to that node and executes the same query, so that the previously not shown subtree is displayed. When OFF, infinite depth is considered.



Query Target: EnTerm`totem poles

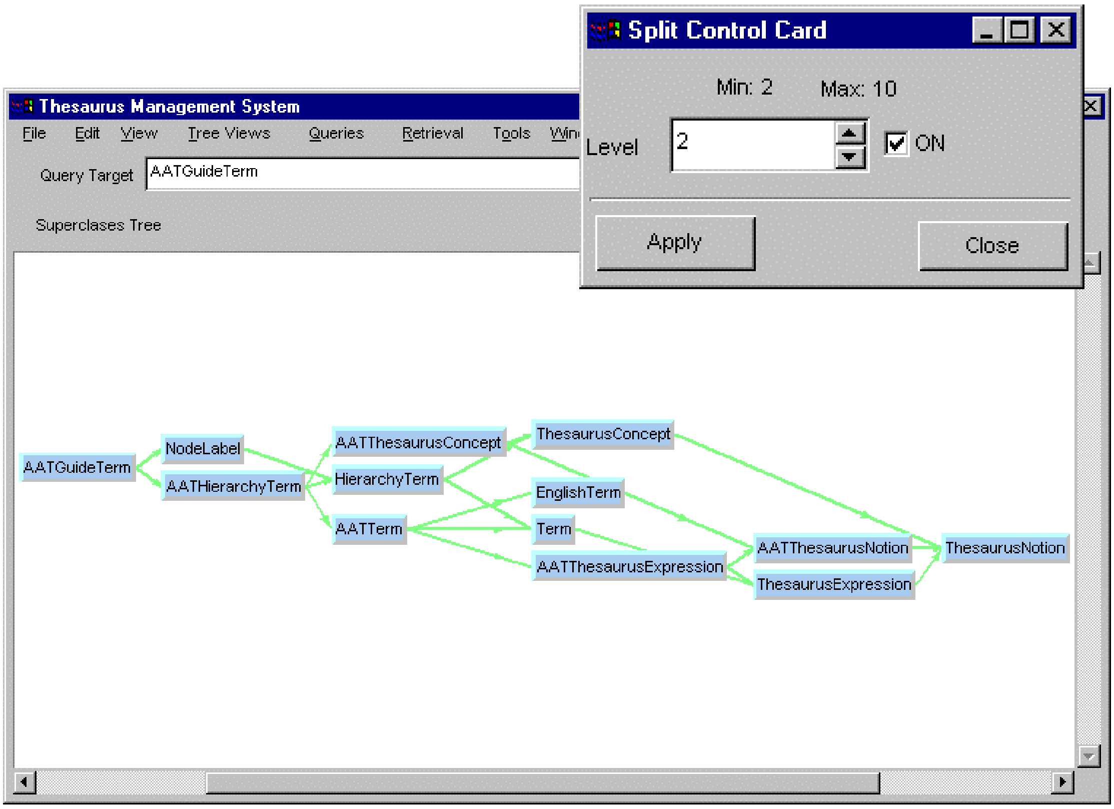
Broader Term Tree — Items: 5

Depth Control Card — Min: 1 Max: 80 — Level: 3 ☑ ON

Figure 25 Example of a cut graph due to depth control

The usage of the Split Level control makes sense in all the above options of this menu except the first two (StarView and Classification Tree). We explain its meaning:

- **Split Level Control**. When ON, its current value determines the minimum level of splitting. This means that if this level equals to n then every node of the graph that is to be displayed is checked if it has n or more links that point to it. If this happens, this node is repeated at the graph so many times as the number of the above links. One repetition (see Figure 26 and Figure 27 for example) is marked with the letter M (multiple) and the rest with a reference counter (increasing number of replications). In this way we avoid the existence of n (or more) links that point to any node of the graph. As a result, we eliminate possible confusion especially in the case of large graphs. For example in ,Figure 26 the split level is 2, i.e., if more than two links point to the same node, then the node is splited and is repeated in the graph. In the case that are links originating from the multiple node, then they are assigned to the node marked with the letter M and not from its repetitions. The Figure 26 is before the splitting and Figure 27 with split level 2.

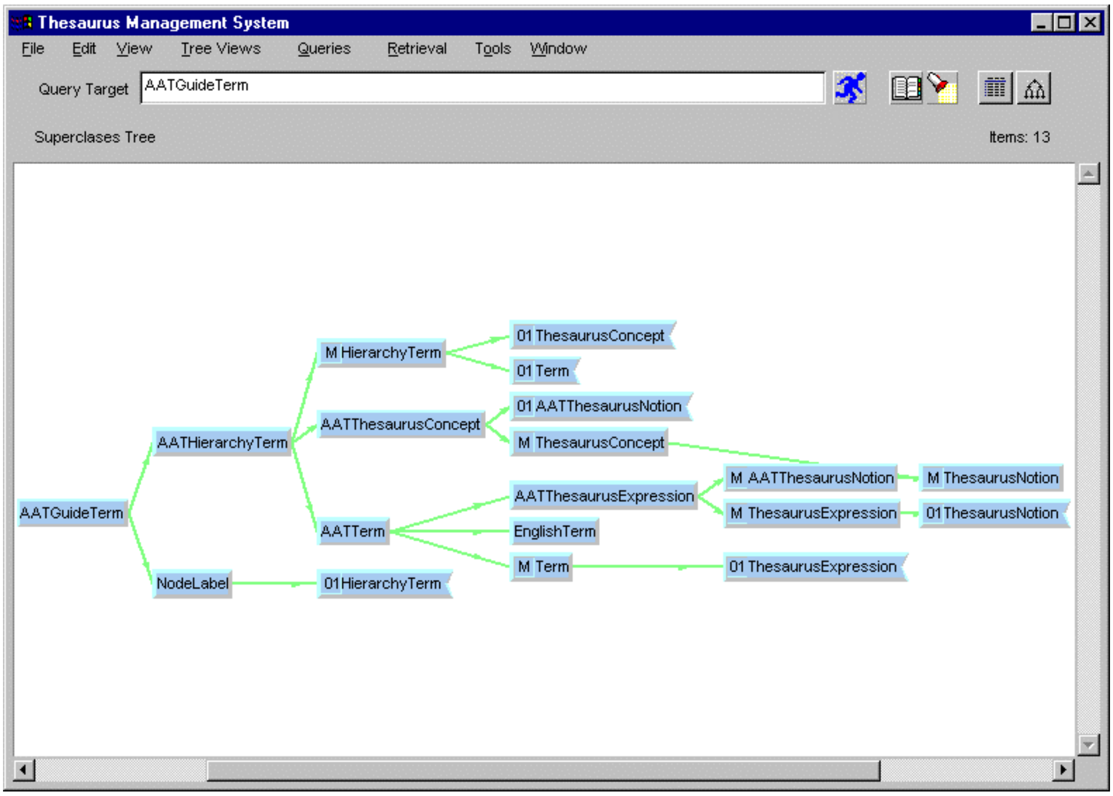


Query Target AATGuideTerm

Min: 2 Max: 10

Level 2 ☑ ON

Figure 26 Example of a graph before split



Query Target AATGuideTerm

Items: 13

Figure 27 Example of a graph due to split control with level 2

7.5 Queries

By pressing the Queries button, a pulldown menu, which depends entirely on the model and can be configured by the user as described *in SIS - Query Interpreter: An Interactive Program to use API Functions*, appears on the screen (see Figure 28).

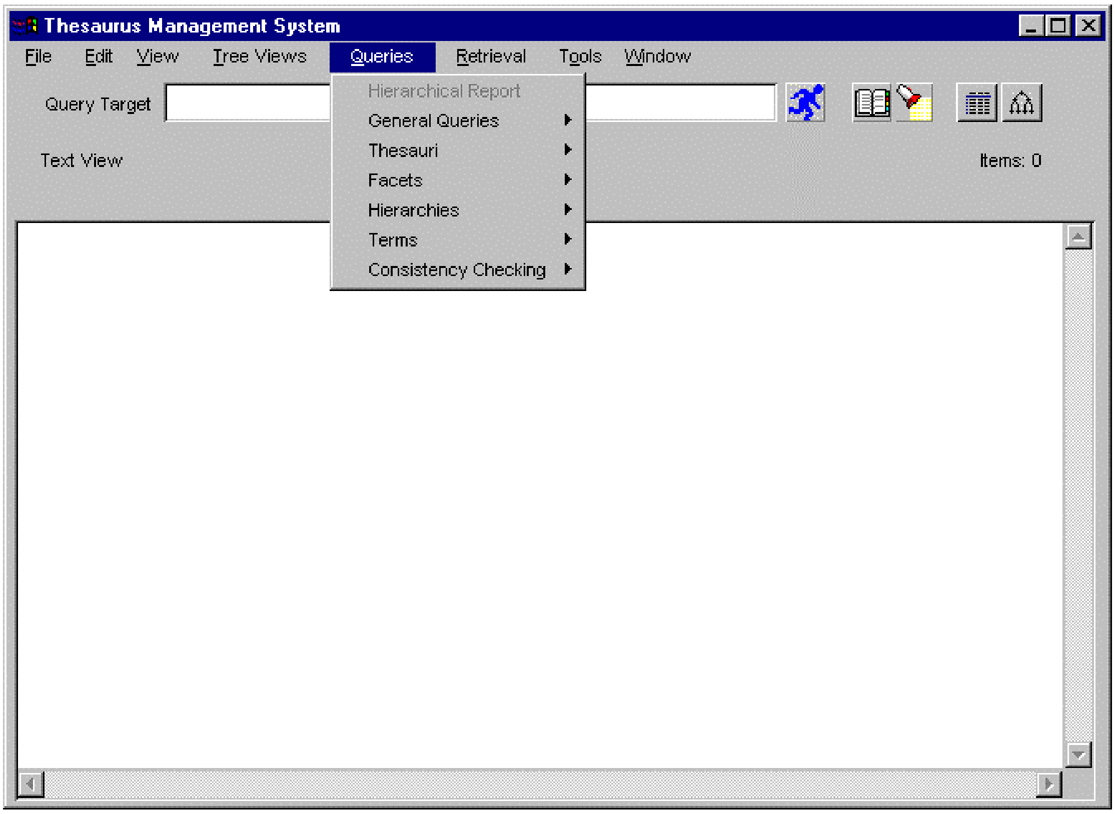


Figure 28 Queries menu for the SIS model.

Whenever you execute a query from this menu, its result is displayed in textual mode, on the text-window. Also an answer set is produced, as result of the query. The cardinality of this answer set is displayed on the right of the label "Items".

The queries may either need or not an object of a certain kind as query target. In the first case, the user must provide the system with one in the query target area. A checking is performed when the menu is mapped on screen in order to verify that the given query target is of the kind that the queries require. All queries that require a different kind of target that the one present in the Query Target area automatically become inactive.

7.5.1 General Queries

This menu includes queries which can be applied in every object of the database. They are concerned with the generalization/specialization and the classification/instantiation relationships. It consists of the following three submenus:

7.5.1.1 Special Kinds

This submenu contains queries relevant to the specialization hierarchy. It consists of the following two queries:

List All Subclasses

Lists all special kinds (subclasses) of a kind (class).

List Immediate Subclasses

Lists the immediate special kinds (subclasses) of a kind (class).

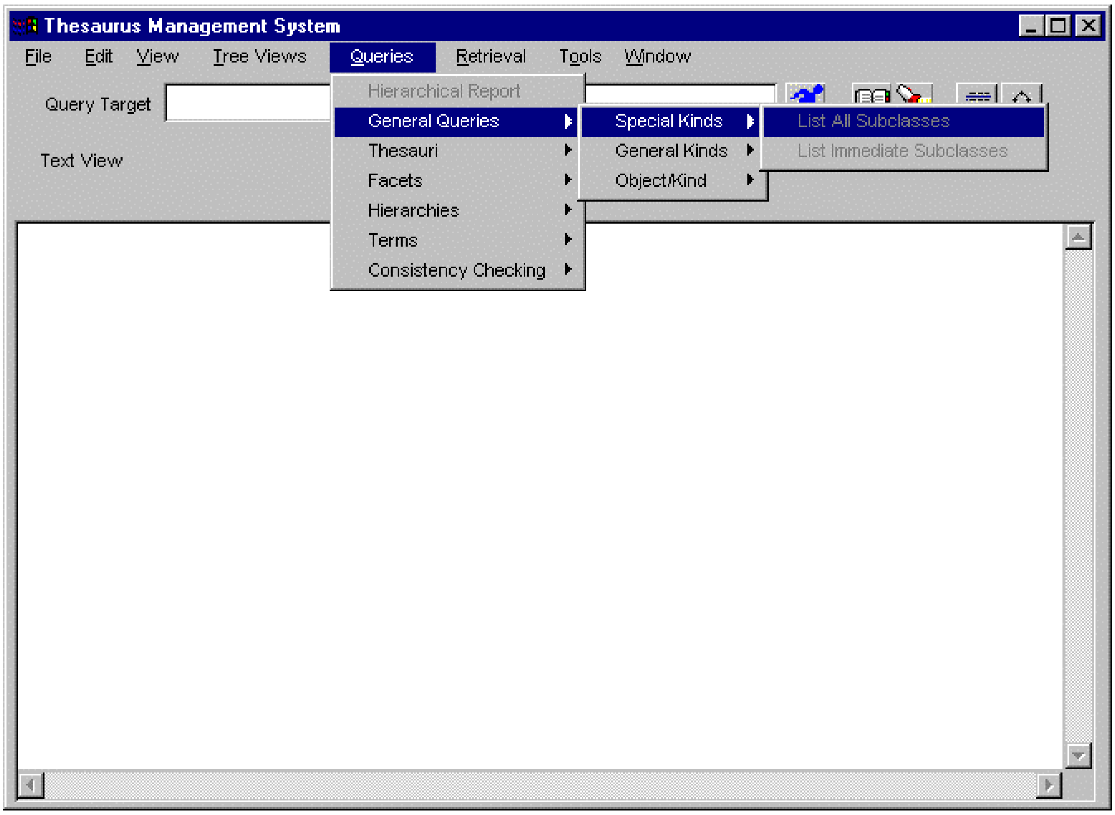


Figure 29 Special kinds queries submenu

7.5.1.2 General Kinds

This submenu contains queries relevant to the generalization hierarchy. It consists of the following two queries:

List All Superclasses

Lists all general kinds (superclasses) of a kind (class).

List Immediate Superclasses

Lists the immediate general kinds (superclasses) of a kind (class).

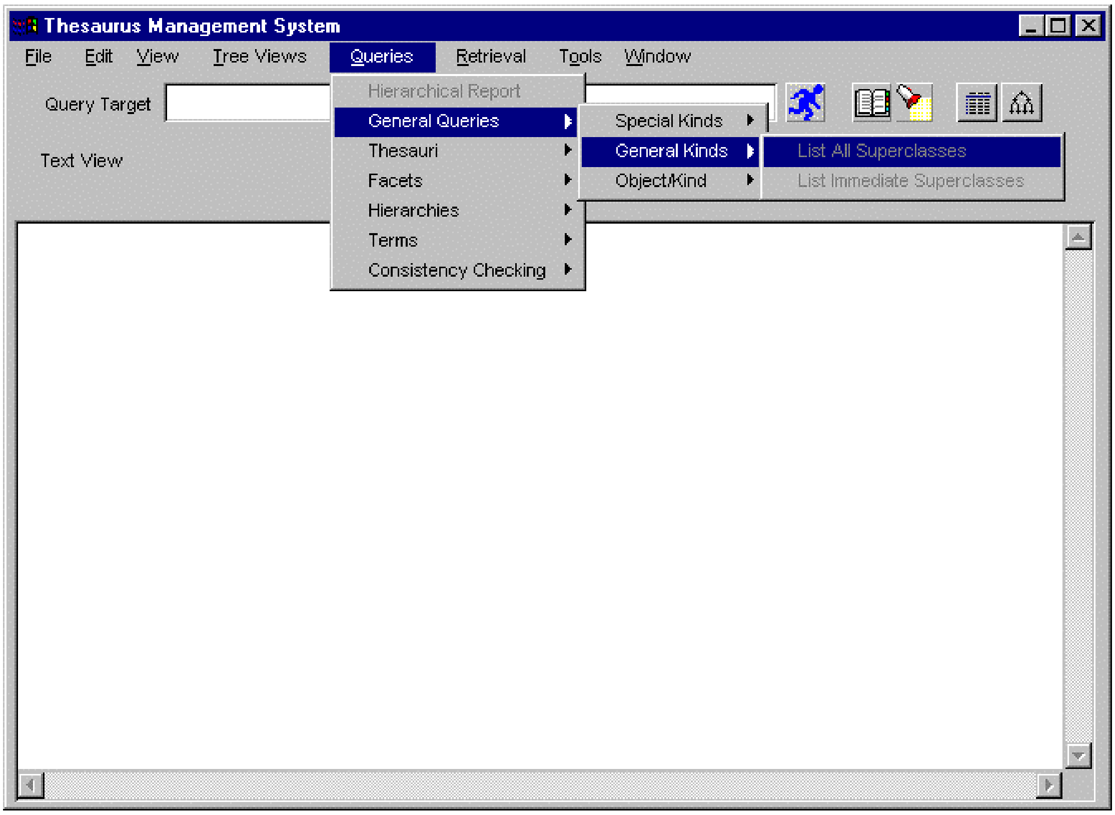


Figure 30 General kinds queries submenu

7.5.1.3 Object/Kind

This submenu contains queries relevant to the classification hierarchy. It consists of the following two queries:

List Objects of Kind

Lists all the instances of a kind (class).

List Kind of Object

Lists all the kinds (classes) of an object

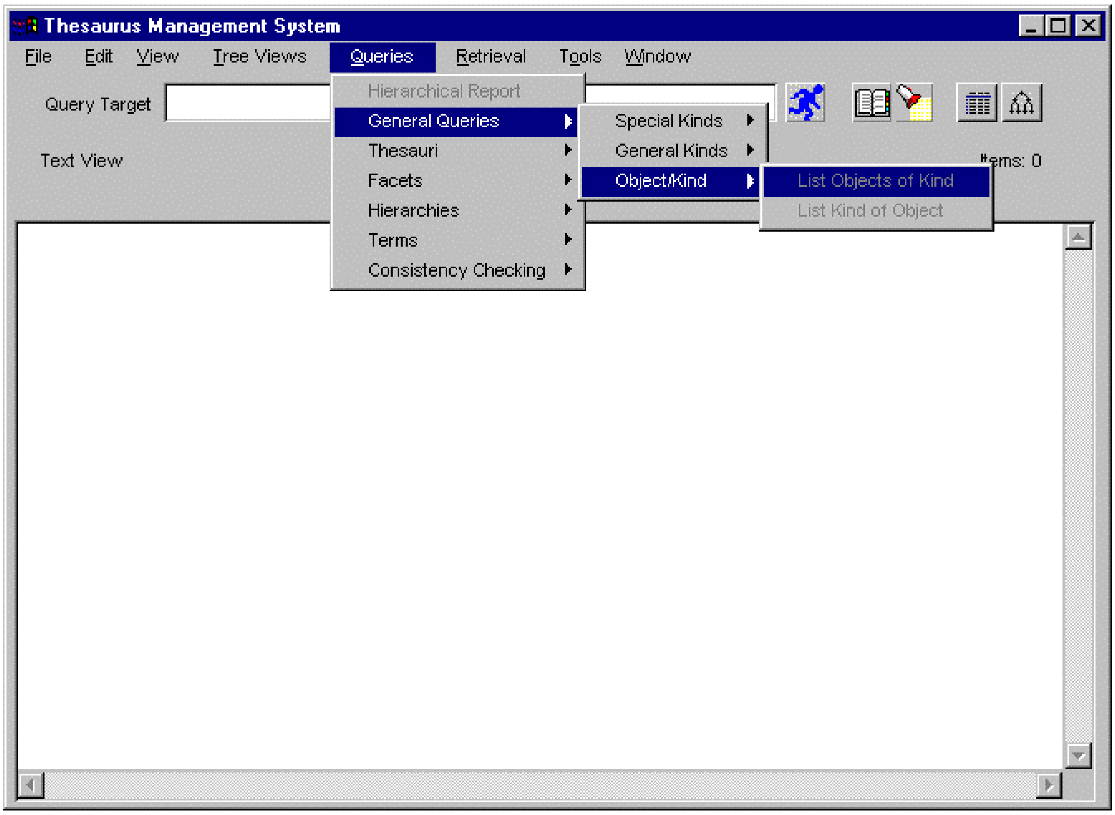


Figure 31 : Objects/kinds queries submenu

7.6 Retrieval

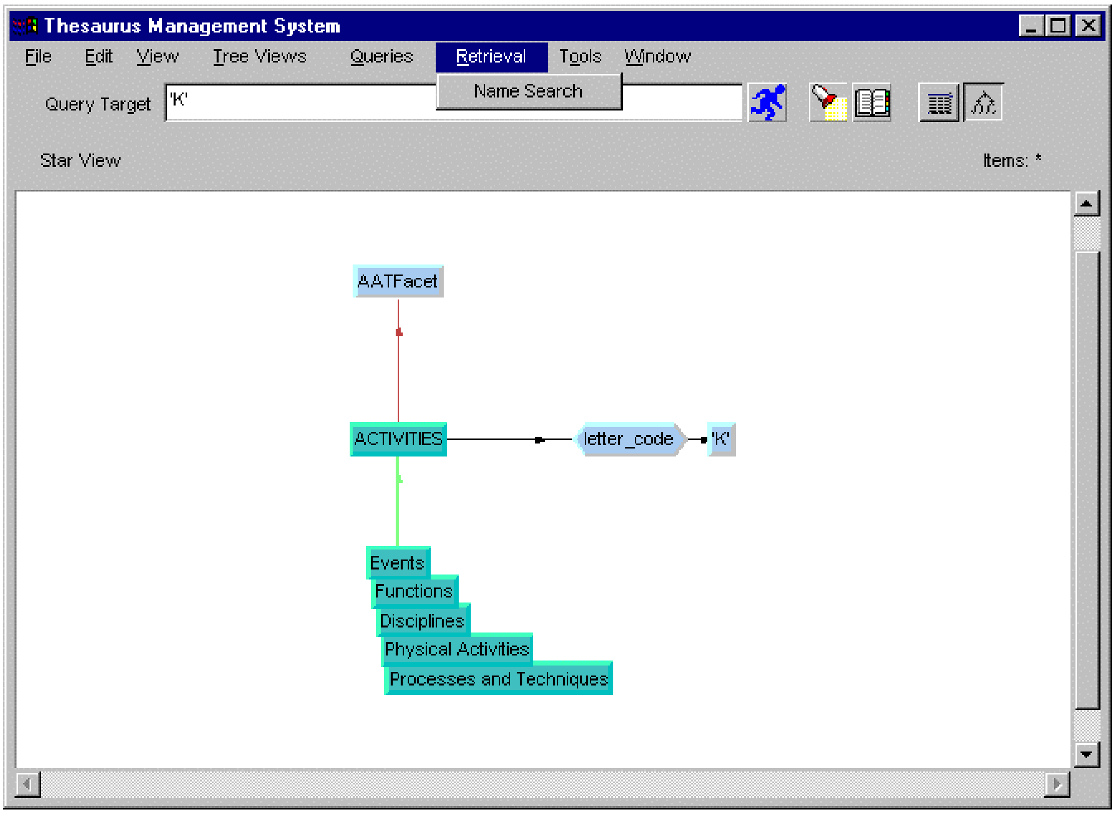


Figure 32 "Retrieval" menu

By pressing the Retrieval button, a new card labeled "Search Card", appears on the screen. (see Figure 32).

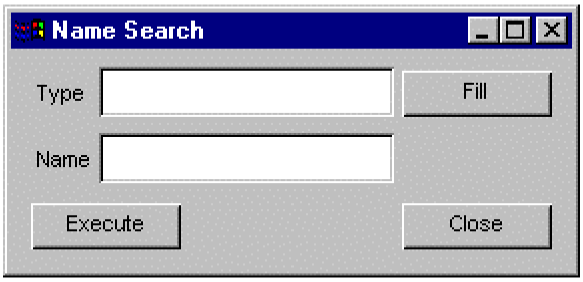


Figure 33 The "Search Card" window

The search card consists of several single line text-editors: each of them is accompanied by a label on the left side and a pushbutton "Fill" on the right side. The number of the text editors and of the other widgets depends on the number of predefined retrieval queries the user has written. There is also a label on top of the card ("Name Search" in figure). All labels are user defined and depend on the description of the predefined queries in the SIS base.

The labels of the text-editors indicate the type of objects the user should enter in each one to perform the query. The queries depend entirely on the model and can be configured by the user as described in SIS - *Query Interpreter: An Interactive Program to use API Functions*. The user can fill one or more object names in each text-editor and combine them with the logical operators '^' (signifying logical AND) and 'V' (signifying logical OR). By pressing one of the fill buttons, the query target specified in the query target area of the main window is copied at the end of the respective text-editor. The user should then fill in the respective logical operator that combines the new object with the previous ones.

On the lower left part of the search card there is one more pushbutton, labeled "Execute". Once the user has filled all the text-editors with appropriate objects, this button can be pressed. By pressing it, the following operation is performed:

The objects that the user has filled in each text-editor are given as target to a predefined query. The logical operations are then performed according to the operators that the user has provided. These steps are repeated for all text-editors and their results are then merged using the logical AND operation. The final results are then presented in the textual window.

If one of the text-editors is left empty, it is ignored during query execution. Before execution of the actual query a checking is performed in order to verify that all objects exist in the database and that they match the type of objects that the respective label indicates. If one of the objects in the text-editors does not exist in the database or it does not belong to the proper type of objects, it is ignored during query execution and the user is appropriately warned. The system automatically maps the text window during the execution of the query, if it is not already mapped. It also updates the label of the executed query with the title "Conditional Search" and the "Items" label with the cardinality of the answer set.

The search card can be closed by pressing the pushbutton labeled "Close" on lower right of the card.

7.7 Tools

Options related to external tool calls are defined by the user and stored in the SIS base. For a description of the external tool bindings refer to "SIS - Binding with External Tools".

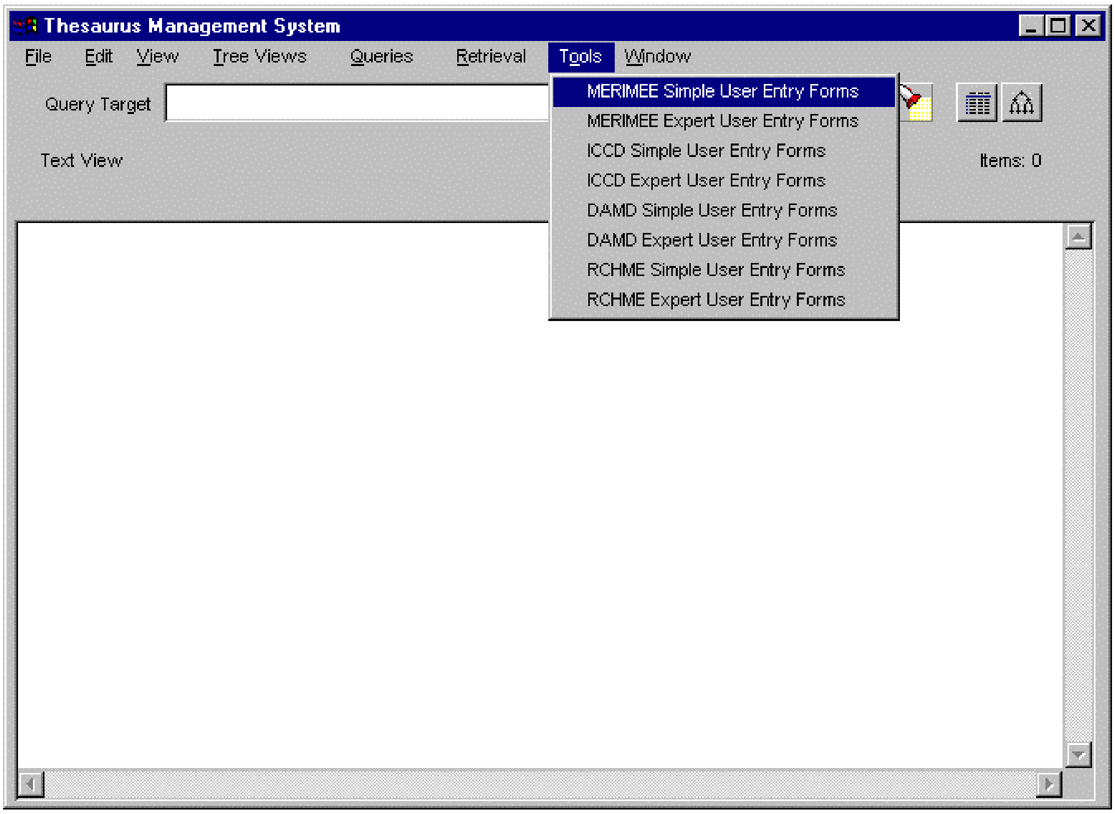

Thesaurus Management System
File
Edit
View
Tree Views
Queries
Retrieval
Tools
Window
Query Target
Text View
Items: 0
MERIMEE Simple User Entry Forms
MERIMEE Expert User Entry Forms
ICCD Simple User Entry Forms
ICCD Expert User Entry Forms
DAMD Simple User Entry Forms
DAMD Expert User Entry Forms
RCHME Simple User Entry Forms
RCHME Expert User Entry Forms

Figure 34 'Tools" menu

For example, selecting one of the options of the “Tools” menu calls Entry Form (EF) which is a tool used for the interactive update of the Semantic Index System (SIS) (see SIS - Entry Form User’s Manual).

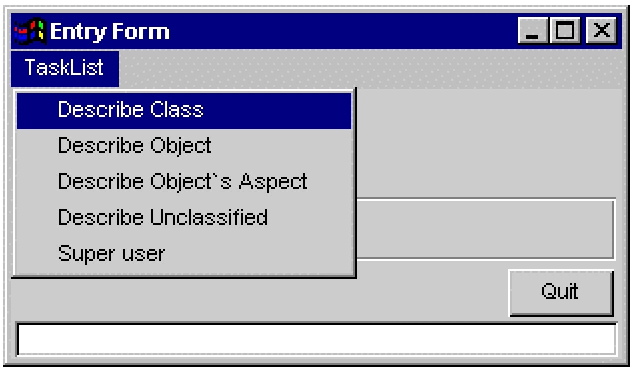


Figure 35: Entry Form (EF)

7.8 Window

By pressing the Window button, a pulldown menu with options that give all the available output representations, appears on the screen (see Figure 35).

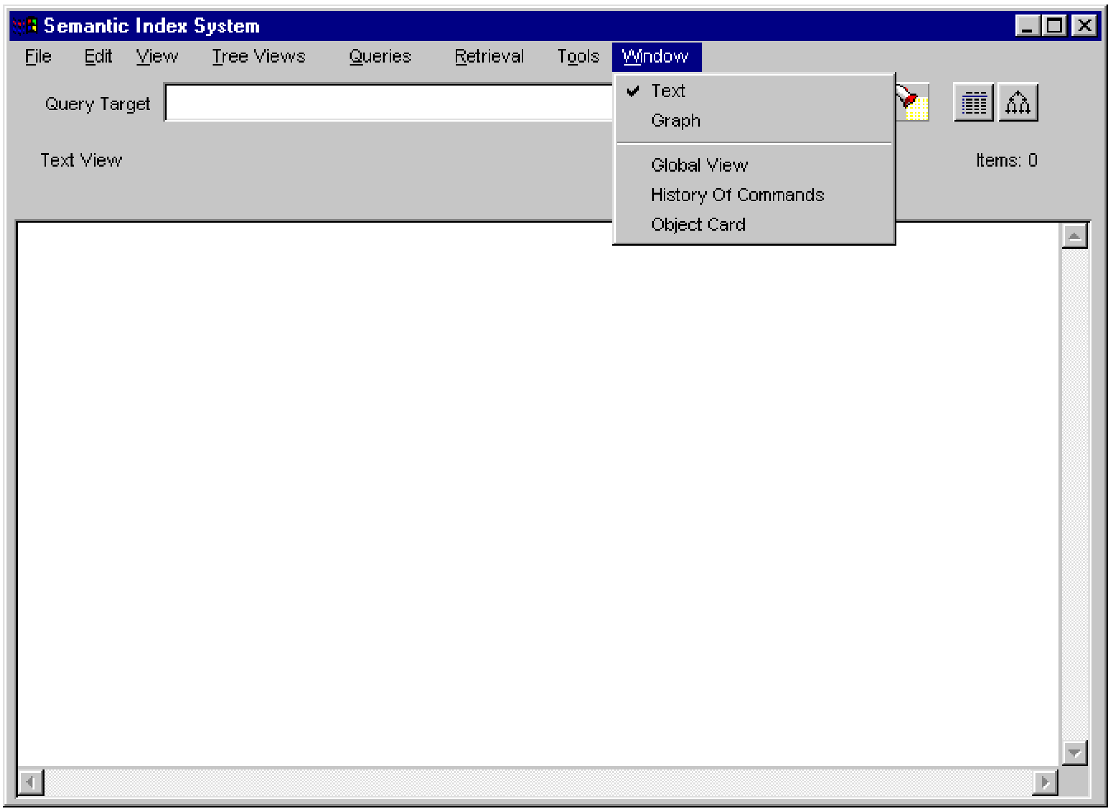


Figure 356 "Window" menu

7.8.1 Text

See section 2.3

7.8.2 Graph

See section 2.3

7.8.3 Global View

This option is provided so that the user can have a global view of the graph presented in the graphical window. This is useful when the graph is too large to fit in the window and only a part of it is actually drawn. By pressing the Global View button a window called "Global View Card" appears on screen (see Figure).

It is a window with a drawing area where the global view of the graph currently drawn in the graphical window is shown. The portion of the graph that is currently present in the graphical window is highlighted, the names of the nodes, however, are omitted. By clicking the left mouse button on a point of this card a new region is highlighted and the graph in the main graphical window is redrawn so that it represents the new highlighted portion of the Global View card. The Global View card is updated every time a new graphical query is executed so as to present the current graph.

A pushbutton "Close" on the lower right of the card allows the user to close it.

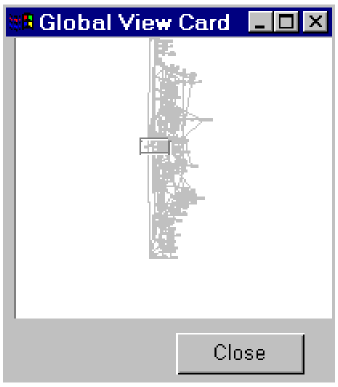


Figure 37 "Global View" window

7.8.4 History Of Commands

See section 6.1 for more details.

7.8.5 Object Card

This option opens the Object Card of the Query Target object.

See section 5.1 for more details.

Appendix A - Changes from previous versions

In the process of redesigning the User Interface, in order to be Windows - like, some objects changed their placement (e.g. buttons moved into menus).

Also additional functionality was added in order to have a complete product. (Enable mechanism for printing the query results (textual or graphical) and enable the split mechanism for graphs).

Changes from version 1.3 to version 2.0

- In this version, Win 32 platforms (Win NT and Win 95) are now supported in client-server version.
- The new card called Options was added in the program in order to have the possibility to change parameters concerning the customization of the User Interface (e.g. colors, fonts, nodes and links color) (See section 7.3.5)

Changes from version 2.0 to version 2.1

- Changes took place for fixing malfunctions of the program.
- Also user friendly functionality was added. The minimized windows go on the taskbar, pressing the X button on the windows close the windows normally and so on.

Changes from version 2.1 to version 2.2

- Redesign of the User Interface took place. So the whole functionality inserted into menus and the most used operations became a toolbar (See section 7)
- Printing mechanism was added (See sections 7.1.3 - 7.1.4)
- Splitting mechanism was enabled (See section 4.2)
- Sibling order was inserted so the links of a given category will appear in the Star View and Object Card in the way the user has sorted them via Entry Forms.
- Using appropriate language configuration files the user can have the program interface and the messages appearing in the desired language.
- Client - server version is only supported on all platforms.
- Help for every object can be taken from the Strings Page of the Options Card. In the previous version the user had to press the right mouse button on the specified object.

Changes from version 2.2 to version 2.3

- Save ans SaveAs options of file are using the Windows default Save and SaveAs cards.
- Object Card and History of Commands are now available from Windows button.
- In Object Card at alternative state FULL, is presented additional information about the references-to that the object inherits.

- In Star View graph and Object Card, link objects are also selectable.
- Star View and any other graphical or textual query and Object Card are applicable to link objects.