A performance comparison
of search trees

User Guide

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HISTORY OF CHANGES

Version	Date	Author	Description
0.0.1	1.01.2012	Przemysław Rosiński	Created document
0.2	1.01.2012	Przemysław Rosiński	Created Preface
0.4	2.01.2012	Przemysław Rosiński, Piotr Janaszek	Created Interface Overview
0.5	2.01.2012	Piotr Janaszek	Created Launch
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1.0	8.01.2012	Przemysław Rosiński	Fixed mistakes and changed document formatting

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PREFACE

Developed application shows capabilities of search tree libraries. Libraries are of C# generic type standardized to DLL format.

Program is be able to retrieve necessary data about tree nodes manually by user input via GUI (Graphical User Interface) and/or automatically from external CSV file.

The application graphically presents structure of the tree to the user. Result of searching algorithm execution should are also visualized by marking the path from root to the particular node.

Program gives possibility to compare the performance of search trees using external tool. Application exports external file compliant with CSV format.

LAUNCH

Before launching the application, make sure that in the same directory there are:

- application executable file,

- *Plugins* folder with DLL libraries containing trees projects,

- *Lib* folder with *ForRest.Provider* DLL library (necessary for application startup) and *Microsoft.GLEE*, *Microsoft.GLEE.Drawing*, *Microsoft.GLEE.GraphViewerGDI* DLL libraries (needed for displaying trees in GLEE graph form).

INTERFACE OVERVIEW

In this section the reader can get known the application interface layout. This will help with using the application and understand description of steps in next sections.

The main window of the running program consists of three parts.

- On the top, there is menu strip with four items, which provide main functionalities of the program.

- Below, there is tool strip consisting of seven buttons with icons on them. These buttons correspond to items under menu, but they provide faster access and intuitiveness.

- The biggest part is prescribed for child windows corresponding to modes of the program. Depending on the mode, additional controls are available for performing actions, collecting data from user and presenting results.

MAIN WINDOW
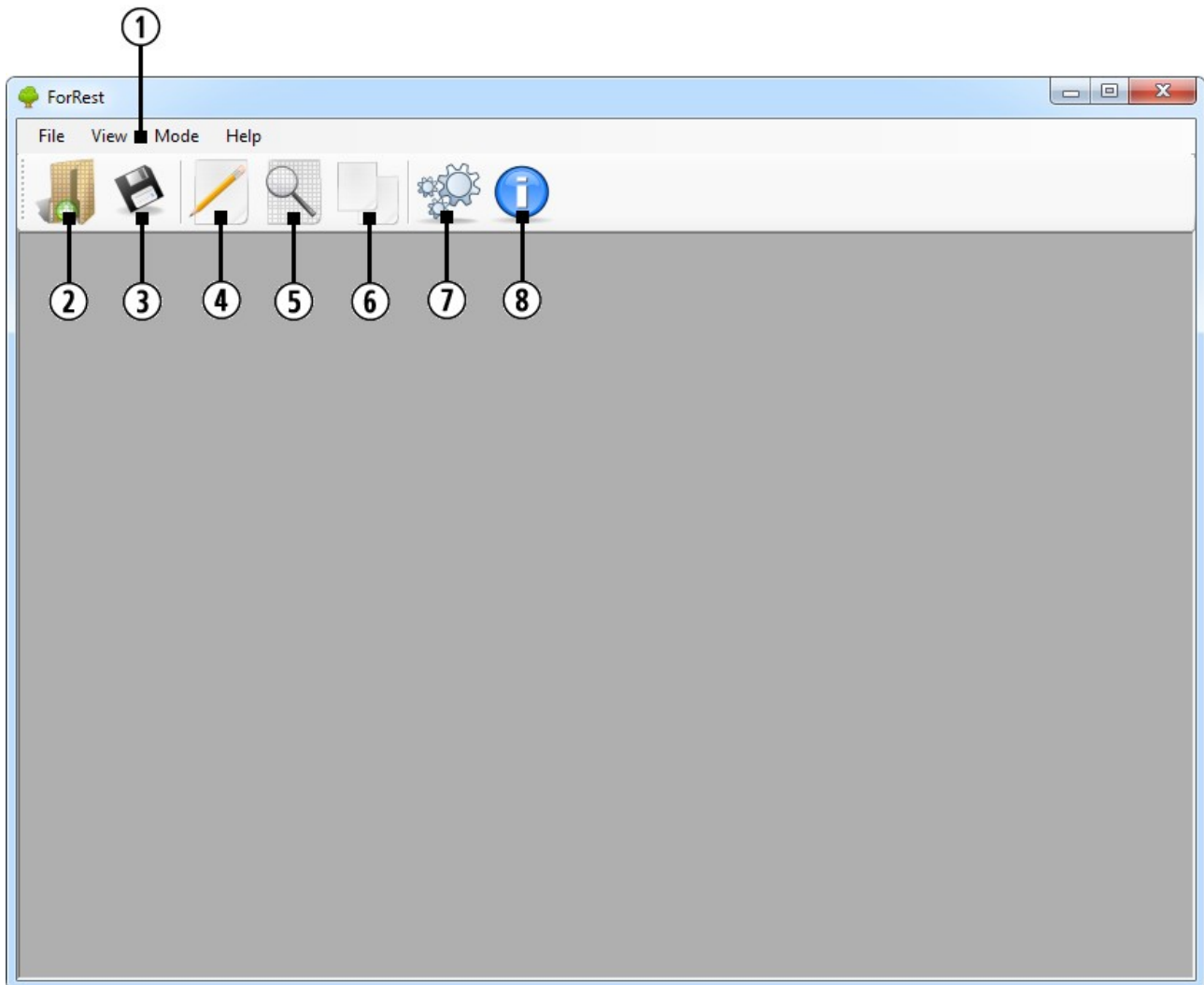
1 – *Menu* strip. Contains of four items: *File*, *View*, *Mode* and *Help*.

2 – *Open file* button.

3 – *Export to file* button.

4 – *Create* button.

5 – *Search* button.

6 – *Batch process* button.

7 – *Loaded modules* button.

8 – *About* button.

CREATE MODE
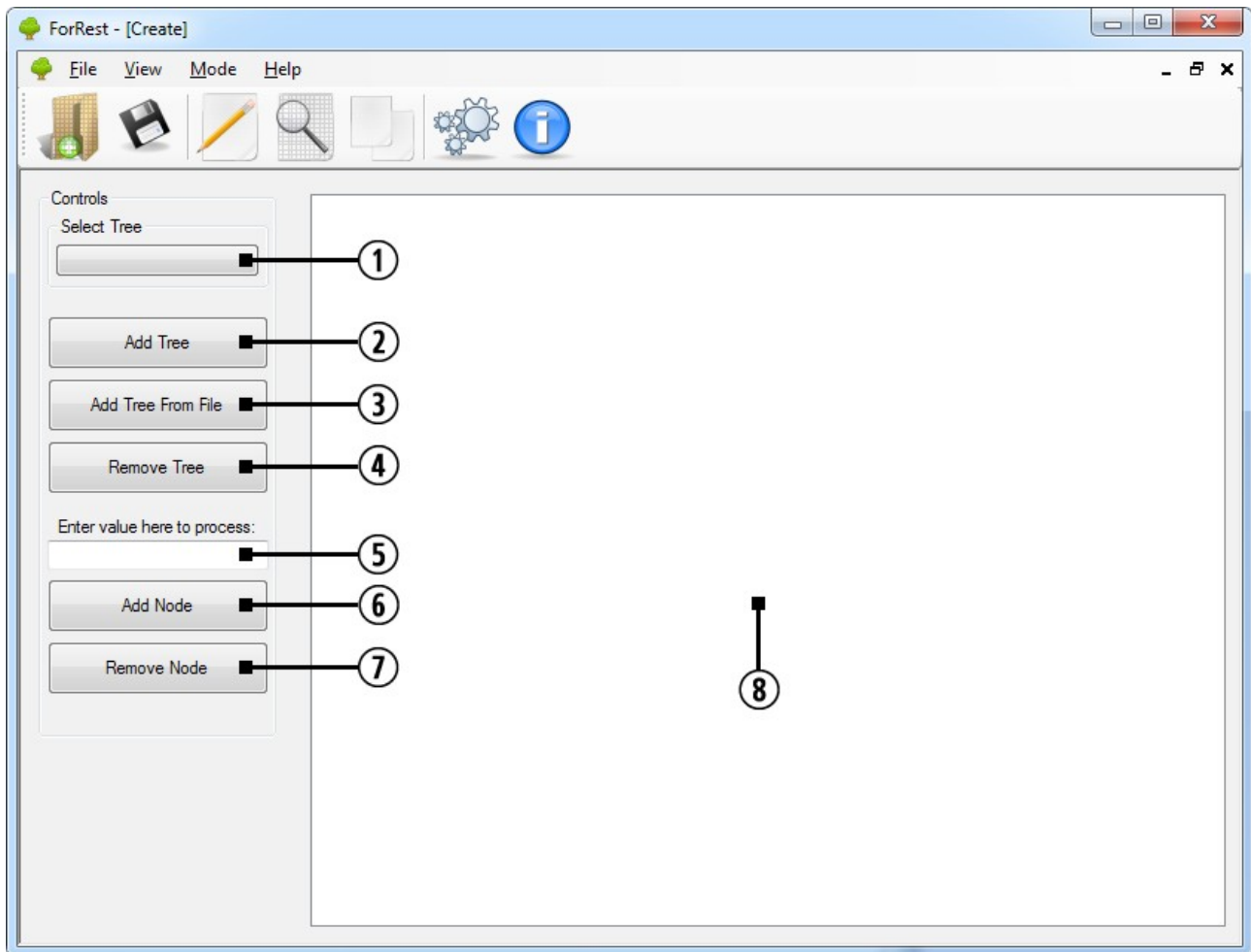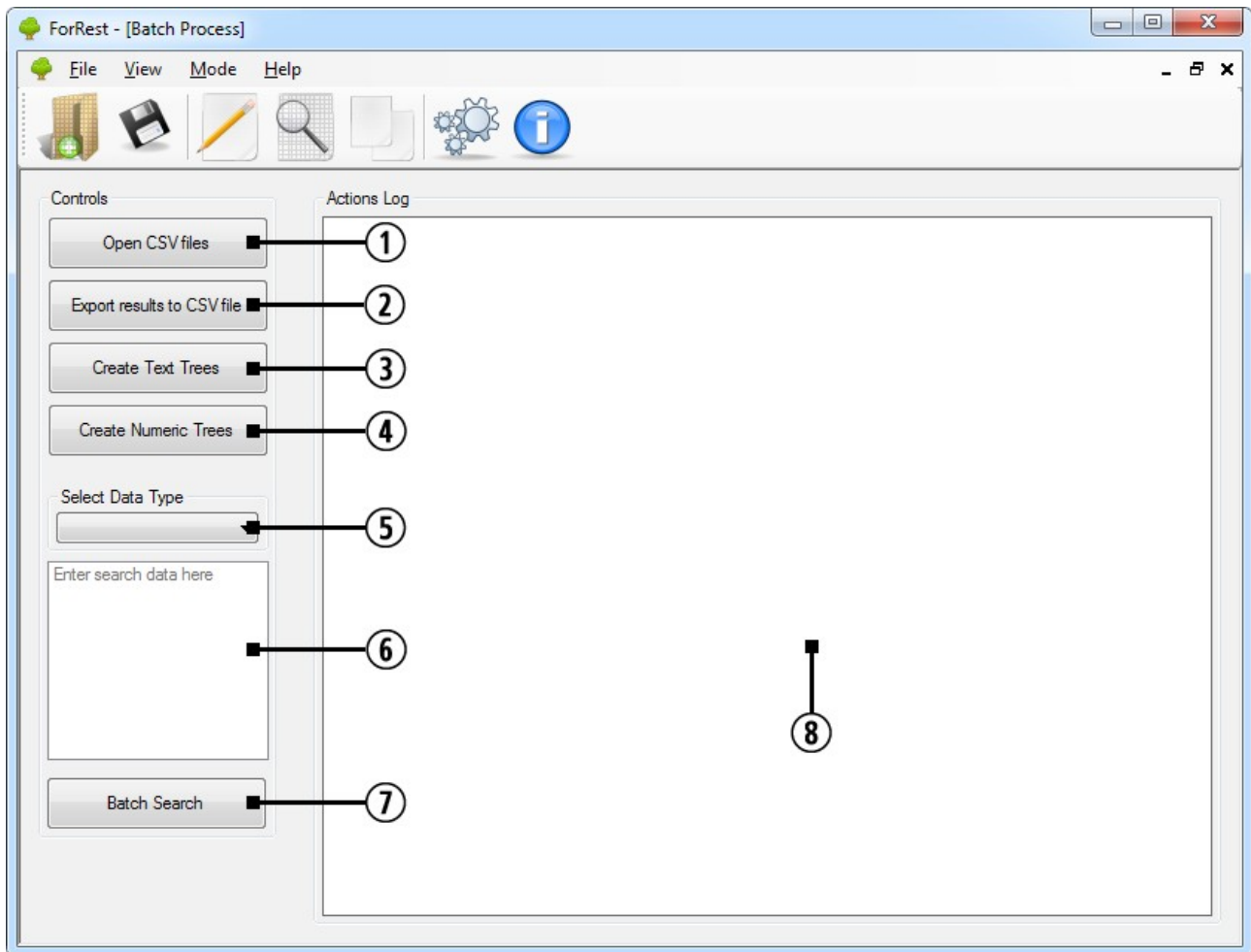

1 – *Select tree* combo-box.

2 – *Add tree* button.

3 – *Add tree from file* button.

4 – *Remove tree* button.

5 – *Value* text-box.

6 – *Add node* button.

7 – *Remove node* button.

8 – *Graph* panel.

SEARCH MODE
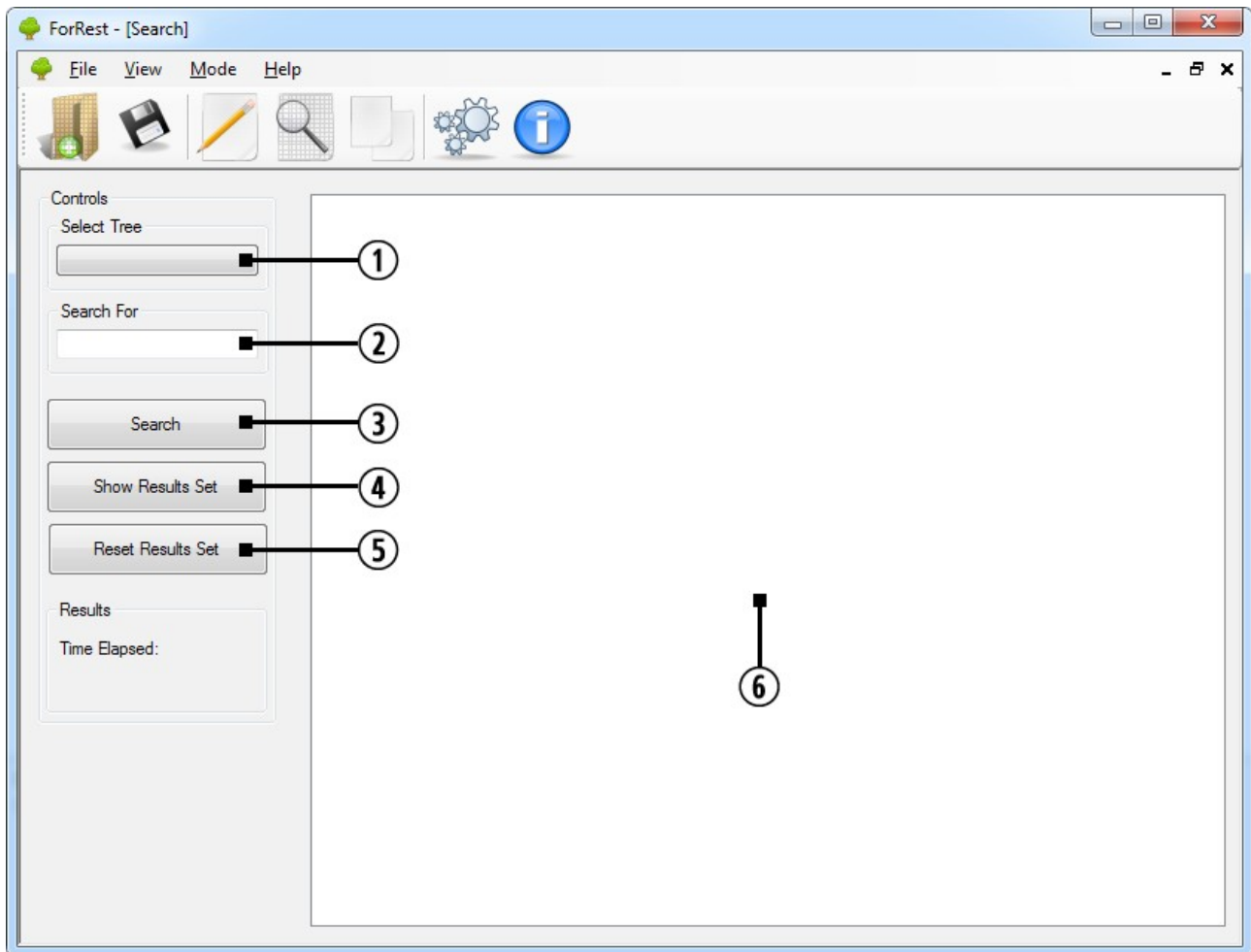
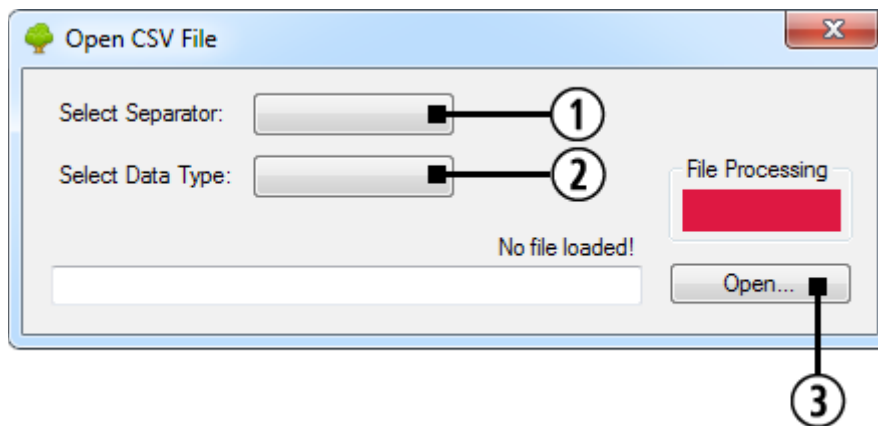1 – *Select tree* combo-box.

2 – *Value* text-box.

3 – *Search* button.

4 – *Show results* button.

5 – *Reset results* button.

6 – *Graph* panel.

BATCH PROCESS MODE

1 – *Open files* button.

2 – *Export results* button.

3 – *Create text trees* button.

4 – *Create numeric trees* button.

5 – *Data type* combo-box.

6 – *Values* text-box.

7 – *Batch search* button.

8 – *Action log* panel.

OPEN FILE DIALOG

1 – *Separator* combo-box.

2 – *Data type* combo-box.

3 – *Open* button.

ADD TREE DIALOG
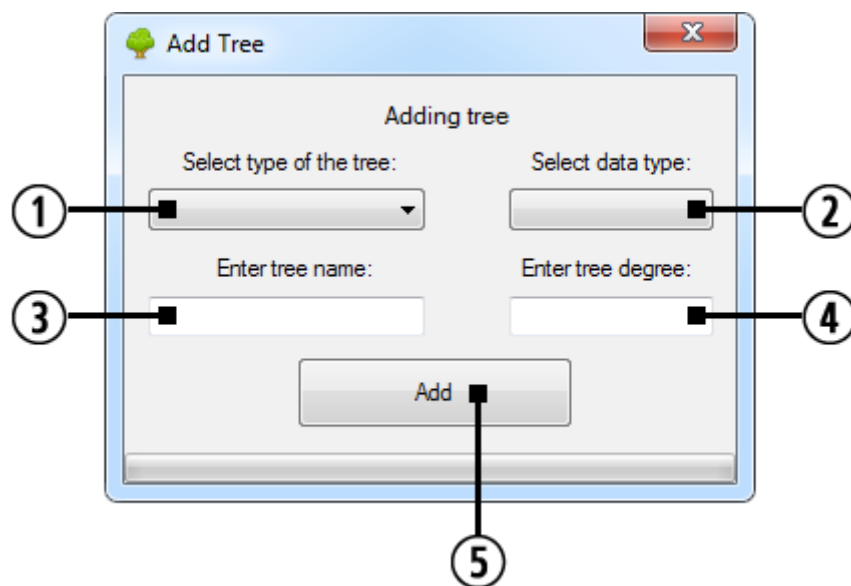
1 – *Tree type* combo-box.

2 – *Data type* combo-box (optional).

3 – *Tree name* text-box.

4 – *Degree* text-box (optional, depending on selected tree type).

5 – *Add* button.

USAGE

LOAD INPUT FILE

To load data from external file user should:

- click *Open file* button in tool strip or
- select *Menu > File > Open File*.

Open File dialog will appear in which user should:

- select separator used in CSV file (comma, colon or semicolon) and
- select data type (text or numeric).

Previously disabled *Open* button will be enabled. After clicking it standard Windows open file dialog will be displayed for choosing the file from disk.

If file is processed correctly, data is loaded and ready to use.

ADD TREE FROM FILE

To add tree from external file application must be in *Create* mode. User should:

- click *Create* button in tool strip or
- select *Menu > Mode > Create*.

Child window will appear inside main window in which user should click *Add tree from file* button. *Add Tree* dialog without *Data type* combo-box will appear in which user should:

- select tree type and
- type tree name and
- enter degree of the tree (optional, depending on selected tree type).

Previously disabled *Add* button will be enabled. After clicking it tree with nodes specified in input file is created and added to *Select tree* combo-box in *Create* child window.

NOTE: Possibility of performing not allowed action. User cannot add tree from file, when no file is previously loaded.

ADD TREE MANUALLY

To add tree manually application must be in *Create* mode. User should:

- click *Create* button in tool strip or
- select *Menu > Mode > Create*.

Child window will appear inside main window in which user should select tree from *Add tree* button. *Add Tree* dialog with *Data type* combo-box will appear in which user should:

- select tree type and
- select data type and
- type tree name and
- enter degree of the tree (optional, depending on selected tree type).

Previously disabled *Add* button will be enabled. After clicking it tree is created and added to *Select tree* combo-box in *Create* child window.

REMOVE TREE

To remove tree application must be in *Create* mode. User should:

- click *Create* button in tool strip or
- select *Menu > Mode > Create*.

Child window will appear inside main window in which user should select one of previously created trees using *Select tree* combo-box.

Previously disabled *Remove tree* button will be enabled. After clicking it tree is removed from *Select tree* combo-box and cannot be restored.

ADD NODE

To add node to the tree application must be in *Create* mode. User should:

- click *Create* button in tool strip or
- select *Menu > Mode > Create*.

Child window will appear inside main window in which user should select one of previously created trees using *Select tree* combo-box.

Previously disabled *Add node* button will be enabled. Data to be added should be entered into *Value* text-box. After clicking *Add node* button node is added to the tree.

NOTE: Possibility of performing not allowed action. User cannot add node to tree with numeric data type, when content in *Value* text-box cannot be parsed to a number.

REMOVE NODE

To remove node from the tree application must be in *Create* mode. User should:

- click *Create* button in tool strip or
- select *Menu > Mode > Create*.

Child window will appear inside main window in which user should select one of previously created trees using *Select tree* combo-box.

Previously disabled *Remove node* button will be enabled. Data to be removed should be entered into *Value* text-box. After clicking *Remove node* button node is removed from the tree.

NOTE: Possibility of performing not allowed action. User cannot remove node from tree with numeric data type, when content in *Value* text-box cannot be parsed to a number.

SEARCH ELEMENT

To search element in the tree application must be in *Search* mode. User should:

- click *Search* button in tool strip or
- select *Menu > Mode > Search*.

Child window will appear inside main window in which user should select one of previously created trees using *Select tree* combo-box.

Previously disabled *Search* button will be enabled. Data to be searched should be entered into *Value* text-box. After clicking *Search* button node is searched in the tree and searching performance information is displayed in the left panel on the bottom and added to result set.

NOTE: Possibility of performing not allowed action. User cannot search element in tree with numeric data type, when content in *Value* text-box cannot be parsed to a number.

RESULT SET

To manage result of searching element in trees application must be in *Search* mode. User should:

- click *Search* button in tool strip or
- select *Menu > Mode > Search*.

Child window will appear inside main window.

After clicking *Show results* button window with result set is displayed.

After clicking *Reset results* button result set is cleared.

To save result of searching to external file user should:

- click *Export to file* button in tool strip or
- select *Menu > File > Export to File*.

Standard Windows save open file dialog will be displayed for choosing the location for the file to be saved on disk.

NOTE: Possibility of performing not allowed action. User cannot save result set to external file, when result set is empty.

BATCH PROCESS

Batch process in independent from actions performed in *Create* and *Search* modes, i.e. no trees created in *Create* mode and no results of searching done in *Search* mode will be considered or processed during batch process.

To process searching in batch the tree application must be in *Batch Process* mode. User should:

- click *Batch Process* button in tool strip or
- select *Menu > Mode > Batch Process*.

Child window will appear inside main window.

To load files with data user should click *Open files* button. *Open File* dialog will appear in which user should:

- select separator used in CSV files (comma, colon or semicolon) and
- select data type (text or numeric).

Previously disabled *Open* button will be enabled. After clicking it standard Windows open file dialog with multi-selecting enabled will be displayed for choosing files from disk.

Loading files can be done repeatedly in series.

If text data was loaded, *Create text trees* button will be enabled and *Text* value is added to *Data type* combo-box.

If numeric data was loaded, *Create numeric trees* button will be enabled *Numeric* value is added to *Data type* combo-box.

To create trees user should click one or both of enabled above-mentioned buttons.

To enter element to be searched user should select data type from *Data type* combo-box and populate *Values* text-box with desired elements.

After clicking *Batch search* button all the trees of selected data type will be searched for all the elements in *Values* text-box and searching performance information is added to result set.

NOTE: Possibility of performing not allowed action. User cannot search element in trees with numeric data type, when content in *Values* text-box cannot be parsed to a number.

After performing batch searching previously disabled *Export results* button will be enabled. After clicking it standard Windows save open file dialog will be displayed for choosing the location for the file to be saved on disk.

During creating and executing batch process all the information is displayed to the user in *Action log* panel as a text.

DISPLAY TREE

During managing trees in *Create* and *Search* modes, tree is visualized in *Graph* panel.

There are three implemented methods of displaying tree:

- tree-view using Windows Form built-in functionality,
- graph created by the developers of this application,
- graph created using Microsoft GLEE tool.

Default visualization is tree-view. To change it user should select:

- *Menu > View > Tree View / Graph / GLEE Graph*.

In case of Search mode enabled, after searching existing element in the tree path from the root to searched element is marked with thicker green line.

NOTE: When *Microsoft.GLEE*, *Microsoft.GLEE.Drawing*, *Microsoft.GLEE.GraphViewerGDI* DLL libraries cannot be found in *Lib* folder, GLEE graph cannot be created. Items in *Menu > View* are limited to *Tree View* and *Graph*.

NOT ALLOWED ACTIONS

During using the application, the user can attempt to perform not allowed actions. In such cases, program blocks execution of the action and informs the user why it is not allowed by tool-tip pop-up or error message.

TROUBLESHOOTING

ON USER'S OWN

Try to do the following when application does not work as you would expect.

Problem	Possible solution
Application does not launch	Make sure that in the same directory as executable file there is a folder *Lib* with *ForRest.Provider* DLL library
GLEE graph does not exist in *Menu > View*	Make sure that in the same directory as executable file there is a folder *Lib* with *Microsoft.GLEE*, *Microsoft.GLEE.Drawing and Microsoft.GLEE.GraphViewerGDI* DLL libraries
My tree does not exist in *Tree type* combo-boxes	Make sure that in the same directory as executable file there is a folder *Plugins* with your DLL library and check if it is loaded by the application by clicking *Loaded modules* button in tool strip or by selecting *Menu > Help > Loaded Modules*
Application does not allow me to perform an action	Make sure that you are not performing not allowed action and you are following user guide and pop-up tool-tips
Application does not process input file	Make sure that input file is compliant with CSV format
Application does not load data from processed input file	Make sure that input file is compliant with CSV format and you selected proper separator and data type

MORE HELP

In case of problems you cannot solve, e-mail us with as much information as it is possible.

Contact:

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- *Piotr Janaszek – janaszekp@student.mini.pw.edu.pl*