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Marvel
Functional Specification

Version	Author	Date	State	Annotations
1.0	Peter Thiemann Stefan Franck	1. Dez 2004	handed in	

1 Objectives

This software shall offer the functionality of a spread sheet while abstracting over the concepts of tables, views, queries, and so on.

The main reason for creating Marvel is a perceived lack of structure in existing spreadsheets. Usually, all data is put into one spreadsheet using different areas in the spreadsheet for different kinds of data, that is, the only way to structure data is by choosing a two-dimensional layout. Unfortunately, 2D layout cannot be visually appealing and user-friendly at the same time when it comes to editing the spreadsheet. In particular, operations like inserting and deleting rows/columns have to be exercised with care so as not to affect data of a different kind that happens to be on the same row/column. A solution to the change problem is to arrange all your data in rectangular blocks along the diagonal of the spreadsheet. But such a layout is hardly readable.

Marvel decouples the structure from the layout by introducing two concepts, work spaces and work items. A work space is just a container in which different work items can be placed to achieve a visually pleasing and ergonomic layout. Among other possibilities, a work item can be a spreadsheet but now the spreadsheet needs only contain one kind of data (and can thus be changed without affecting other kinds of data). The price is that formulas now must be able to refer to entries in other work items via external references. Thus, instead of accessing cell A5 for the current value added tax rate you now have to refer to {taxrate}.

2 Use Cases

/F10/ Create Work Item

Objective: A new Work Item can be used.

Category: primary

Precondition: —

Postcondition Success: A new Work Item with unique name inside it's workspace exists.

Postcondition Failure: —

Actor: User

Description:

a) Right click on the item and choosing "new work item" from context menu.

b) Alternatively: Select a target Workspace and then choose "new work item" from menu bar.

c) Name the work item.

d) Choose type of item.

/F20/ Delete Work Item

Objective: A Work Item is removed.

Category: primary

Precondition: A Work Item must exist.

Postcondition Success: The respective Work Item does not exist anymore.

Postcondition Failure: —

Actor: User

Description:

a) To select WI either click left & choose "delete work item" from menu bar or click right and choose from context menu.

b) Verify recursive deletion.

c) Warn of dangling references (options: break or continue).

d) Destroy the work item.

/F30/ Rename Work Item

Objective: A Work Item can be accessed by the new name.

Category: secondary

Precondition: A Work Item must exist.

Postcondition Success: The Work Item's name is changed.

Postcondition Failure: No change.

Actor: User

Description:

a) To select WI either click left & choose "rename work item" from menu bar or click right and choose from context menu.

b) Enter new name.

Extensions:

Globally replace the old name by the new name, in particular in references

/F40/ Edit Attributes of Work Item

Objective: The Work Item has new Attribute settings.

Category: primary

Precondition: A Work Item must exist.

Postcondition Success: The Work Item's Attributes are changed.

Postcondition Failure: No change.

Actor: User

Description:

a) Right click on work item opens context menu; choose "edit attributes".

b) Alternatively: select item with left click and select "edit attributes" from menu bar.

c) In a new pop down box: Display & Facility to repeatedly select an attribute and modify it.

d) Close the box.

/F50/ Clone Work Item

Objective: A copy of a Work Item can be used.

Category: secondary

Precondition: A Work Item must exist.

Postcondition Success: A new Work Item with the same properties of another and a new name unique in it's workspace exists.

Postcondition Failure: —

Actor: User

Description:

a) Right click on Work Item opens context menu; choose "clone work item".

b) Alternatively: select work item with left click and select "clone work item" from menu bar.

c) [clone appears] drag the cloned work item in position.

d) Modify name of work item.

/F60/ Work Item Manager

Objective: Work Items can be managed in a convenient way.

Category: primary

Precondition: —

Postcondition Success: —

Postcondition Failure: —

Actor: User

Description:

The Work Items can be managed with typical window manager functions, say move, resize, raise, lower, etc inside a distinct Work Space

/F70/ Save Work Item to File

Objective: A Work Item can be retrieved from the file system.

Category: primary

Precondition: A Work Item must exist.

Postcondition Success: A file containing the work item's information exists in the file system.

Postcondition Failure: —

Actor: User

Description:

a) Select work item (left click & menu bar; or right click & context menu)

b) Enter a file name (browsing widget)

c) References need to be checked. No inside references should point outside of the item. If illegal reference: warning message with options "continue" or "cancel".

d) Convert to XML and write to file.

/F80/ Load Work Item from File

Objective: An earlier saved Work Item is ready to use in Marvel.

Category: primary

Precondition: —

Postcondition Success: A new Work Item containing the information of a file is accessible.

Postcondition Failure: —

Actor: User

Description:

a) Select a work item (including the toplevel work space) into which to load the work item
b) Enter name of an existing file (browsing widget)
c) Read file and convert from XML to internal representation.

/F90/ Enter Data

Objective: The cell of a spreadsheet has a new value.

Category: primary

Precondition: A cell has to be selected.

Postcondition Success: The cell is set to the new value.

Postcondition Failure: —

Actor: User

Description:

a) Enter new cell value
b) Confirm with enter

/F100/ Enter Formula

Objective: The value of a cell is calculated using a formula.

Category: primary

Precondition: A Table must exist.

Postcondition Success: The content of one cell is a formula.

Postcondition Failure: —

Actor: User

Description:

a) Select a cell
b) Enter a formula

Alternatives:

Compose formula visually via selectors and forms

/F110/ Calculate

Objective: The displayed information in the Work Items is up-to-date.

Category: primary

Precondition: A Work Item must exist.

Postcondition Success: Every Cell is set to its current value.

Postcondition Failure: —

Actor: User

Description:

a) compute dependencies from references.

b) calculate topological order.

c) Warning message, if the dependency graph contains cycles (display; wait for click; and the cut the cycles arbitrarily).

d) Redisplay.

/F120/ Print Work Item

Objective: A Work Item is printed on paper.

Category: secondary

Precondition: A Work Item must exist, Printer must be ready.

Postcondition Success: The printer receives a print job.

Postcondition Failure: —

Actor: User

Description:

a) Select work item.

b) Select print options.

c) Print.

/F130/ Display Work Space Tree

Objective: Convenient access to all Work Spaces of a Document.

Category: secondary

Precondition: —

Postcondition Success: A Widget displaying the Work Space Tree exists.

Postcondition Failure: —

Actor: User

Description:

A Tree similar to a directory tree is displayed which offers similar functionality, like renaming, creating, moving, copying,... of Work Items and Work Spaces

3 Product Data

/D10/ Work Space
Has standard attributes (name, author, creation date,...) and arbitrary many Work Items.

/D20/ Spread Sheet
Has standard attributes (name, author, creation date,...) and an arbitrary large 2-dimensional matrix of cells.

4 Non-Functional Requirements

Marvel shall be easy to use for unexperienced clientel. Usability is of utmost importance.
The external format shall be XML.
The software shall be easy to extend and maintain.

5 Glossary

Cell A cell is a piece of Data embedded in a table.

Formula An input-value of a cell. The cells content is calculated depending on some of the content of this or other Work Items. The calculation is specified by the formula.

Marvel The name of our spread sheet.

Query A selection following specific rules of some content of a table.

Spread Sheet A Spread Sheet allows to enter, store, use and display tabular interactive Input of numeric and alphanumeric data.

Table 2-dimensional data storage.

View Porjection of a table to a subset of its content.

Work Item Anything which can be managed in Marvel is a Work Item. This inlcudes tables, queries, views, and so on.

Work Space The area where the Work Items are manged.