Tutorial for G-AIMMS: Witch Apprentice - Spell Assignment - Sublevel

Introduction to G-AIMMS

G-AIMMS is a series of AIMMS based games aimed to extend your modeling skills and AIMMS knowledge. G-AIMMS: Witch Apprentice - Spell Assignment - Sublevel focuses on data communication with Excel and database. New AIMMS users are recommended to read this tutorial in case they have problems finishing the level. You can always review this tutorial while playing G-AIMMS. It is located on the Help page.

Using the Model Explorer

For this level you need to work in the Model Explorer. The Model Explorer has been explained in the tutorial of the first level. Please have a look at this tutorial again if you feel unsure about how to proceed.

Interfacing with Excel

AIMMS is equipped with a set of functions that can help you with reading data from and writing data to Excel sheets. A detailed description of all these functions can be found in the Function Reference documentation. Below you will find short descriptions on some functions you can use to complete this assignment:

- ExcelSetVisibility(ExcelWorkbook, Visibility). This function sets the visibility of an Excel workbook on or off. If the workbook is not yet open, it will be opened. ExcelWorkbook is a string containing the name of the Excel file and Visibility is either 'On' or 'Off'. Calling ExcelSetVisibility with 'Off' is a common way of opening an Excel workbook. Note that the model already contains an identifier ExcelWorkbookName with as value the name of the Excel workbook. It is best practice to only have the actual hardcoded name of the Excel workbook at one location in your model and use a string parameter for the Excel function calls.

- ExcelSetActiveSheet(ExcelWorkbook, Name). With this function you can specify which sheet is the active sheet in a workbook. In case you don't use this function, you will need to specify with each Excel function call that reads or writes data which sheet should be used. Name is the name of the sheet, as shown in the bottom tab in Excel. Typically the name is "Sheet1" of a new workbook.

- ExcelRetrieveTable(ExcelWorkbook, Parameter, Datarange, Rowsrange, Columnrange). With this function you can read data from Excel into a parameter. Parameter is the name of the identifier in AIMMS, Datarange is the data you want to read, Rowsrange contains the row elements (in our case the elements for the set Witches) and Columns contains the column elements (in our case the elements for the set Spells). In this exercise Excel named ranges are used. This way, you can change the Excel sheet later, have the data in a different location, without having to change the AIMMS application, as long as the named ranges are present.

- ExcelCloseWorkbook(ExcelWorkbook, SaveBeforeClose). This function closes the Excel workbook again. Typically after *reading* data you call it with 0 as second argument, indicating that no save as necessary.

Note that all Excel functions return 1 on success and 0 on failure. The predeclared string parameter CurrentErrorMessage will get a description of the error upon failure. When implementing a procedure that reads data from Excel it is a good idea to check the return status and show the error message with the statement DialogMessage(CurrentErrorMessage) upon failure, so that the user can resolve any problems.

Interfacing with a Database

AIMMS has an identifier, the database table, which helps you to read from and write to databases. With a database table identifier you can give a mapping between identifiers in your model and columns in a database table. Typically indices are mapped onto primary columns in a database table and parameters are mapped on data columns. The following attributes of the database table identifier are relevant for this exercise:

- Data source. A data source is the way a database is known on your computer. Besides a

reference to the actual database, it also contains information about how programs should communicate with the database. This level already comes with a file data source SpellAssignmentSublevel.dsn. You can use this data source to interface with the database. Note that the identifier DatabaseSourceName already contains the name of this data source as its value. It is best practice to only use the hardcoded name of the data source at one location in your model and use a string parameter in the data source attribute of database table identifiers.
- Table name. This field contains the name of the database table. Once you have specified the data source, you can use the wizard to select the database table.
- Mapping. This attribute contains the mapping between AIMMS identifiers and database columns. You can use the wizard to select database columns on the left and their corresponding AIMMS identifiers on the right. In this example you should map all of the three columns.
After specifying the database table identifier, you can write data to the database by writing the following statement in a procedure and executing it:
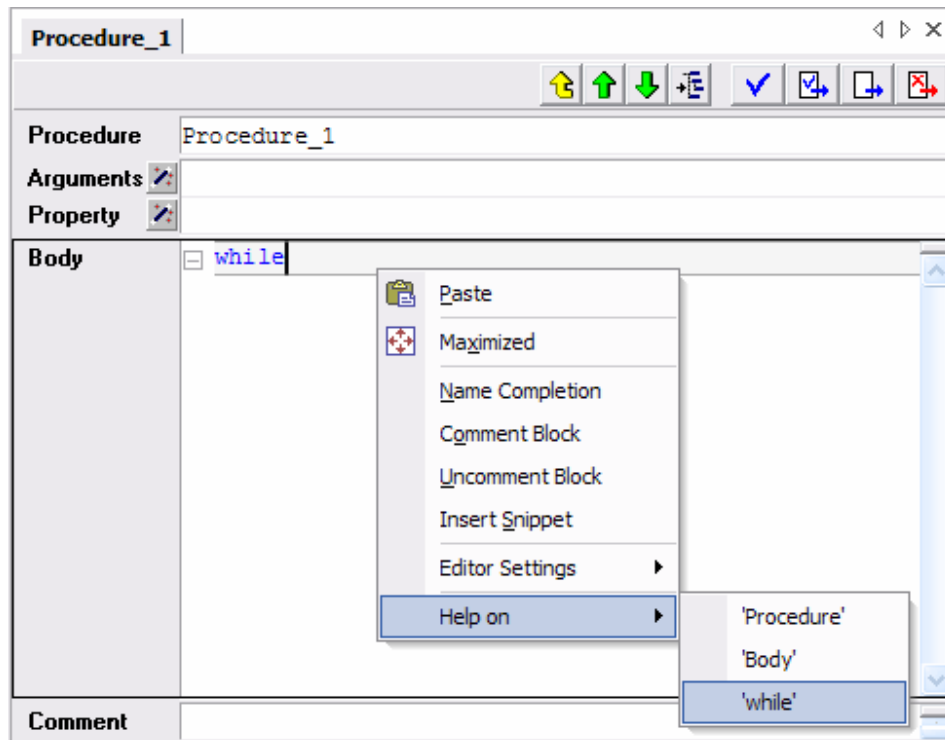Write to table DatabaseTableIdentifier;

Playing this G-AIMMS Level
Below is an overview of the steps you have to take to complete this G-AIMMS level:
- Open the file 'SpellAssignmentSublevel.aimms'. This will start this G-AIMMS level. For this G-AIMMS level you can use your own AIMMS license, a free trial license, or a free student license. You need a password to open this project; the password can be acquired by completing the Spell Assignment main level.
- Take a look at the story and the problem description to get an impression of the problem.
- Open the Model Explorer. In the Player section there are 4 procedures, the procedures ReadPreferencesFromExcel and WriteAssignmentsToDatabase need to be filled in by you.
- After completing these procedures run the procedure DoCompleteRun that reads the data, solves the model, and writes the results to the database. In case you get any errors you should resolve these first.
- You can now press the 'Check Solution' button to check your solution. Should your solution be incorrect, G-AIMMS will tell you why it is incorrect. In this case, please make the necessary corrections. If your solution is correct, congratulations on solving this level!

Where to find help while playing
While playing G-AIMMS, there are a lot of ways to get help. See below for some of the options:
- You can always review this tutorial. It is located on the Help page.
- You can look for extra help in the Help menu, where you can find links to the complete AIMMS documentation and where you can search all of the documentation for a certain topic.
- You can click the icon and select an object on your screen to get help on that object.
- You can type the word you want help on in a procedure, press the right mouse button while your cursor is above it and select 'Help on'.

Final Tips
Below you can find some final tips before you start playing this level:
- Should you accidentally close all of the pages, you can open the start page by clicking the Open first page icon [1] at the top of your screen. You can also use the File menu to do so.

- Remember to often save your project. You can do so by pressing the Save all icon ▥ at the top of your screen or by using the File menu.
- If you feel like you need more knowledge on AIMMS to play this level, you can do the tutorial for beginners first. It is linked in the Help menu in G-AIMMS under 'Additional Documentation'.
- The best way to learn how to use AIMMS, is to just try it, so go ahead and play G-AIMMS!