by experts
for experts

Transformation Manager
Version 5.2

Tutorial 5 - Variables and $document

Transformation Manager

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Table of Contents

Tutorial 5 1

Variables 1

Prerequisites 1

Concepts 1

Information 1

Learning Objectives 1

Learn to use a local variable 1

Create and use a $document transform 1

Learn to use global variables 2

Exercise 1 - Start TM Designer and Open the Repository 3

Exercise 2 - Create a New Project 3

Exercise 3 - Create a Local Variable Transform 4

Exercise 4 - Debug Your LocalVariables Project 6

Exercise 5 - Debugging the LocalVariables Project 9

Exercise 6 - View the Target Data 13

Exercise 7 - Create a New Project 16

Exercise 8 - Create a $document Global Variable Transform 17

Exercise 9 - Create a Transform Using the $document Transform 19

Exercise 10 - Run the Project 20

Exercise 11 - View the Target Data 23

Tutorial 5

Variables

This tutorial introduces variables and the importance of the $document transform when using variables. You will use variables on a regular basis in order to achieve your project goals. The $document transform is important because it executes before your independent and dependent transforms. It lets you set up information to be used in all following transforms, for example, global variables.

We will also make use of debugging to check that our variables are being applied correctly to the target data store.

Prerequisites

Before starting this tutorial we recommend that you have completed the following tasks.

1) Transformation Manager has been installed.
2) An appropriate license has been installed.
3) The tutorial resources including data models, samples and source and target data stores have been downloaded and extracted to your Transformation Manager home directory.
4) You have completed tutorials 1, 2, 3, 4 and 6.

Concepts

This tutorial introduces the use of the $document transform and variables. Variables can be set for a whole project (global variables) or just for a specific transform (local variables). Global and local variables cannot have the same name.

Information

This tutorial will create two projects, one that uses local variables and a second that uses global variables. The first is a simple transform that uses a local variable to add a string to an attribute called name. The second exercise sets up global variables for your project executing them from the $document transform and then adds a local variable and global variable to update the NAME attribute in the target data store. This second project demonstrates how $document transforms can set up information used in all the transforms in a given project.

Learning Objectives

Learn to use a local variable

You will learn how to create and use a local variable which is used only in the transform you are working in.

Create and use a $document transform

You will learn how to create and use a $document transform in order to set up information prior to running other transforms in your project.

Learn to use global variables

You will learn how to create and use global variables in your transformation projects.

Exercise 1 - Start TM Designer and Open the Repository

This exercise will start TM Designer and open the tutorials repository ready to create a new project.

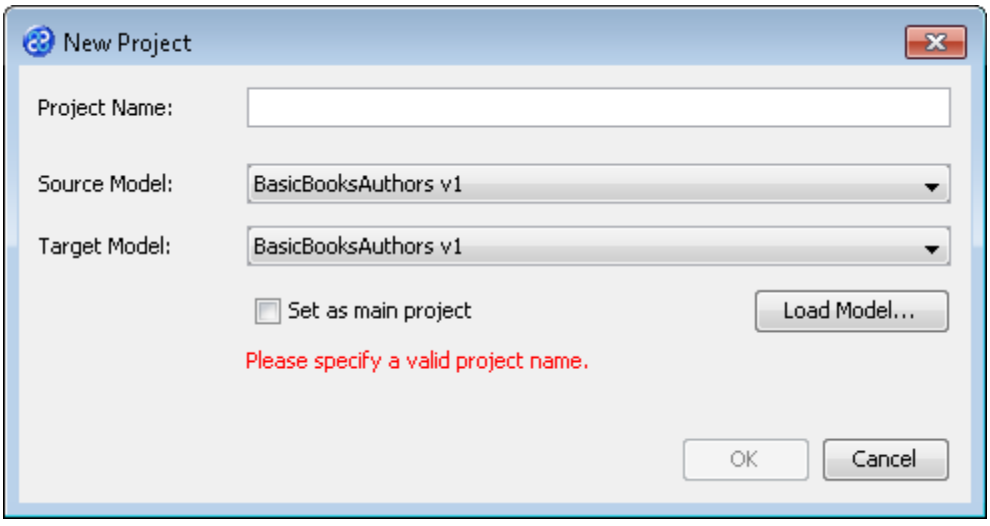
1) Looking at your desktop, find the icon that looks like this,

.
2) Then you have two options.
   a) Using your mouse double-click the icon using the primary mouse button.
   b) Using your mouse press the secondary mouse button, commonly the right-mouse button, while the cursor is over the icon to open the pop-up menu and select Open from the available options.
3) Once TM Designer has opened and displays its interface connect to your repository, **MyExamples**.

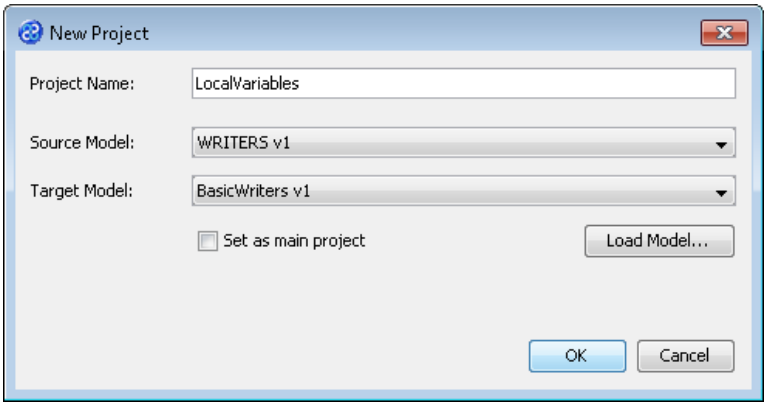
Exercise 2 - Create a New Project

Create a new project using the data model **WRITERS v1** as your **Source Model** and the data model **BasicWriters** as your **Target Model**. Let's create a project using our data models.

1) Using your mouse click on the File option from the menu bar of TM Designer.
2) From the menu, click once on the New Project... option.
3) The **New Project** window will open.



4) In the **Project Name** field we will provide a name for the project. Let's call our project **LocalVariables** by typing the name into the field.
5) Now we must select the target and source models for our project. In the **Source Model** field select **WRITERS v1** from the list. In the **Target Model** field select **BasicWriters v1**.



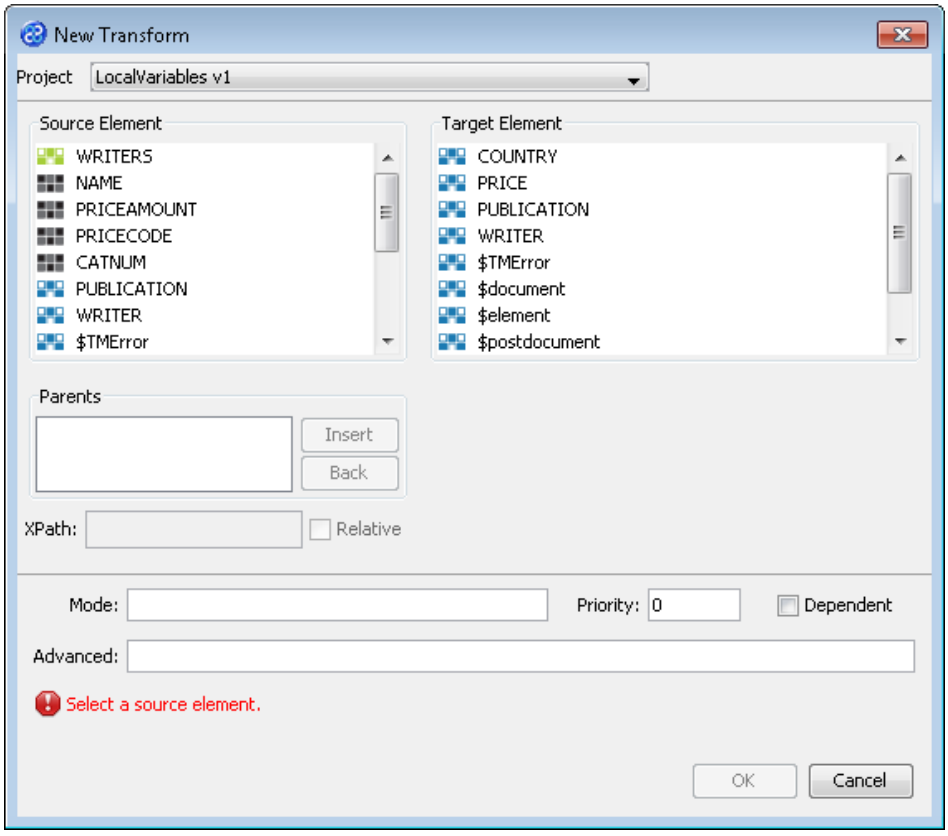
6) Now click once on the OK button. Your project will be created and be displayed in the **Projects** pane.

Exercise 3 - Create a Local Variable Transform

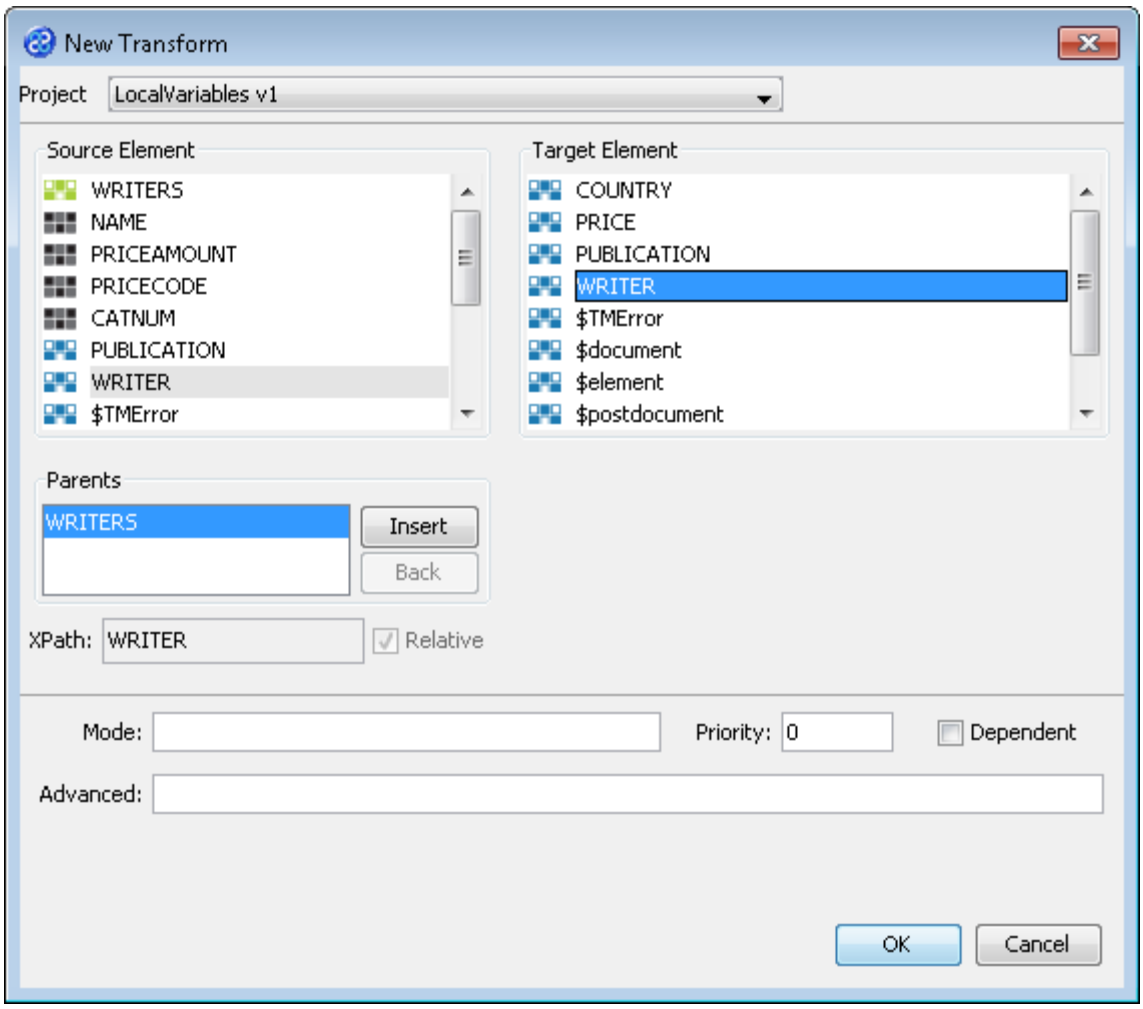
This exercise creates a transform using local variables.

1) Click once on the File menu bar option.
2) Click once on the New Transform... option from the sub-menu.
3) This will open the **New Transform** window. Ensure that you have the correct project selected in the **Project** drop down list, in our case this will be **LocalVariables v1**.

You can create a new transform using Ctrl+N while you have the project selected in the Projects pane.



4) With the **New Transform** window open, we will select the elements for the source and target. In this case the source and target element will be the same, **WRITER**. The **New Transform** window will look like the one below.



5) Click once on the OK button to create your new transform.

6) The Editor pane will open ready for you to write your transform code once the **New Transform** is created.

7) Now we will write our transform. The first section sets up a local variable which we have called `localVar` with a `string` data type. Then the local variable is given a value of `' local'`. Finally, we use our local variable and concatenate it with the `name` attribute.

```
-- Create your local variable
LOCAL
localVar : string;
END_LOCAL;

localVar := ' local';

--map direct attributes
<ID> := <id>;
NAME := name & localVar;
```

8) We have completed our transform.

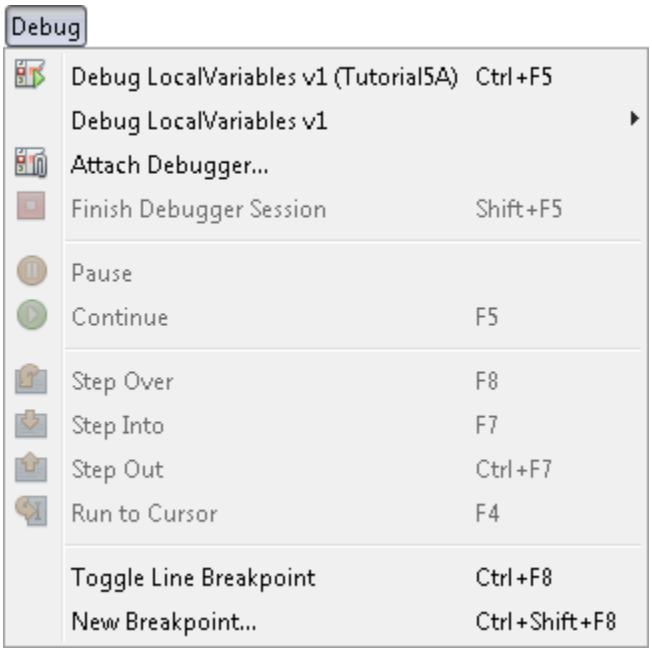
9) Click once on the File menu bar option.

10) Click once on the Save menu bar option to save your transform.

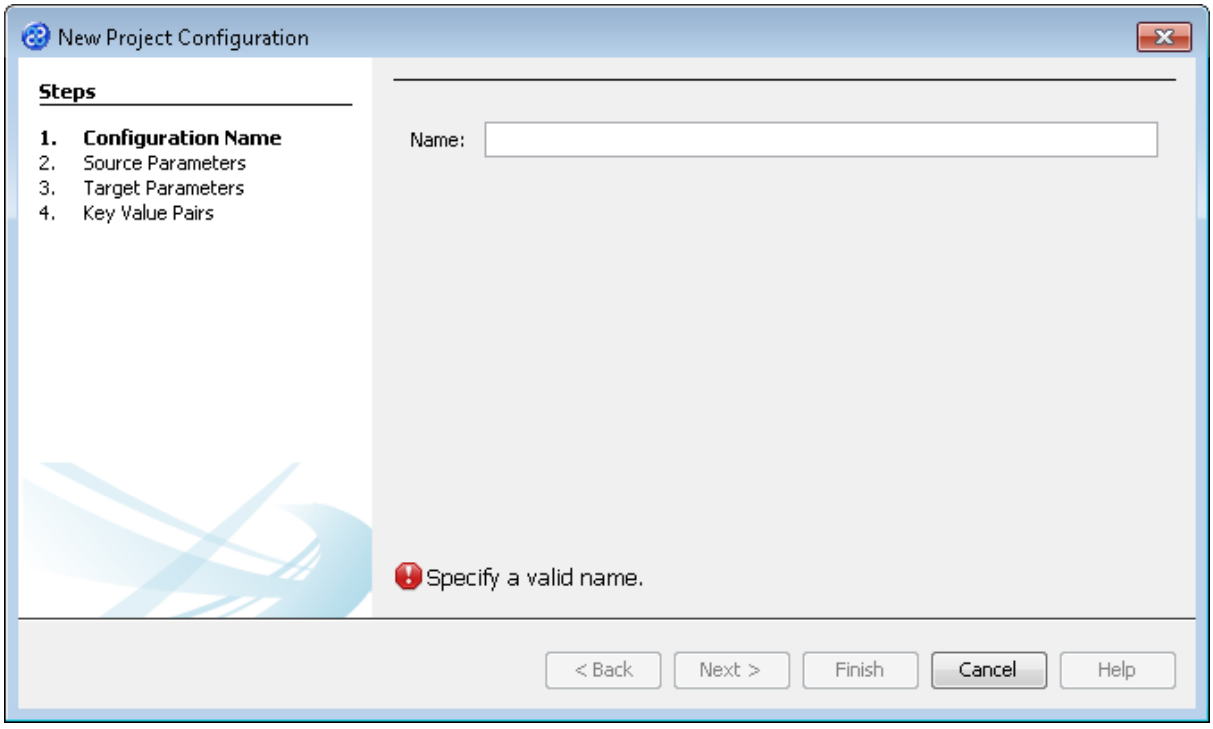
Exercise 4 - Debug Your LocalVariables Project

In this exercise we are going to use the debugger to check our local variable is being properly applied.

1) Click on the Debug menu option. Ensure that the **LocalVariables v1** project is the currently focussed project.



2) Click on the Debug LocalVariables v1 option in the sub-menu. The New Project Configuration window will open because we have, as yet, not provided any information on where the data stores are that we will use for the debug session. Now we will provide this information.



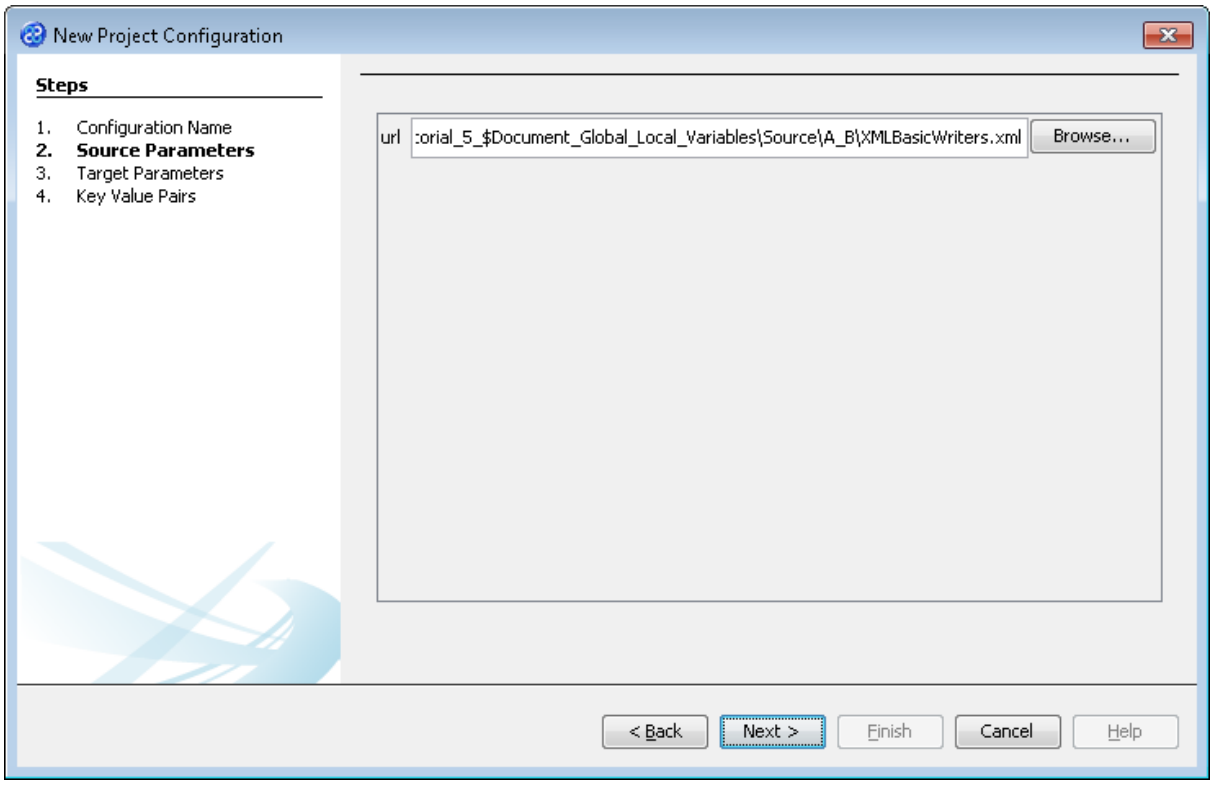
3) Let's give this configuration the name Tutorial1A. Type **Config1** into the **Name** field.

4) Click the Next > button to move to **Step 2. Source Parameters** where we will provide the details for the source data store connection.

5) Go to the **url** field of the **Source Parameters** step. In this field we will specify the location of the source data store. You can type the path and file name manually or you can use the button to select the directory and file. This will be in the following directory.

[TMHOME]\Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Source\A_B\XMLBasicWriters.xml

6) The **Source Parameters** step should look similar to the image below.



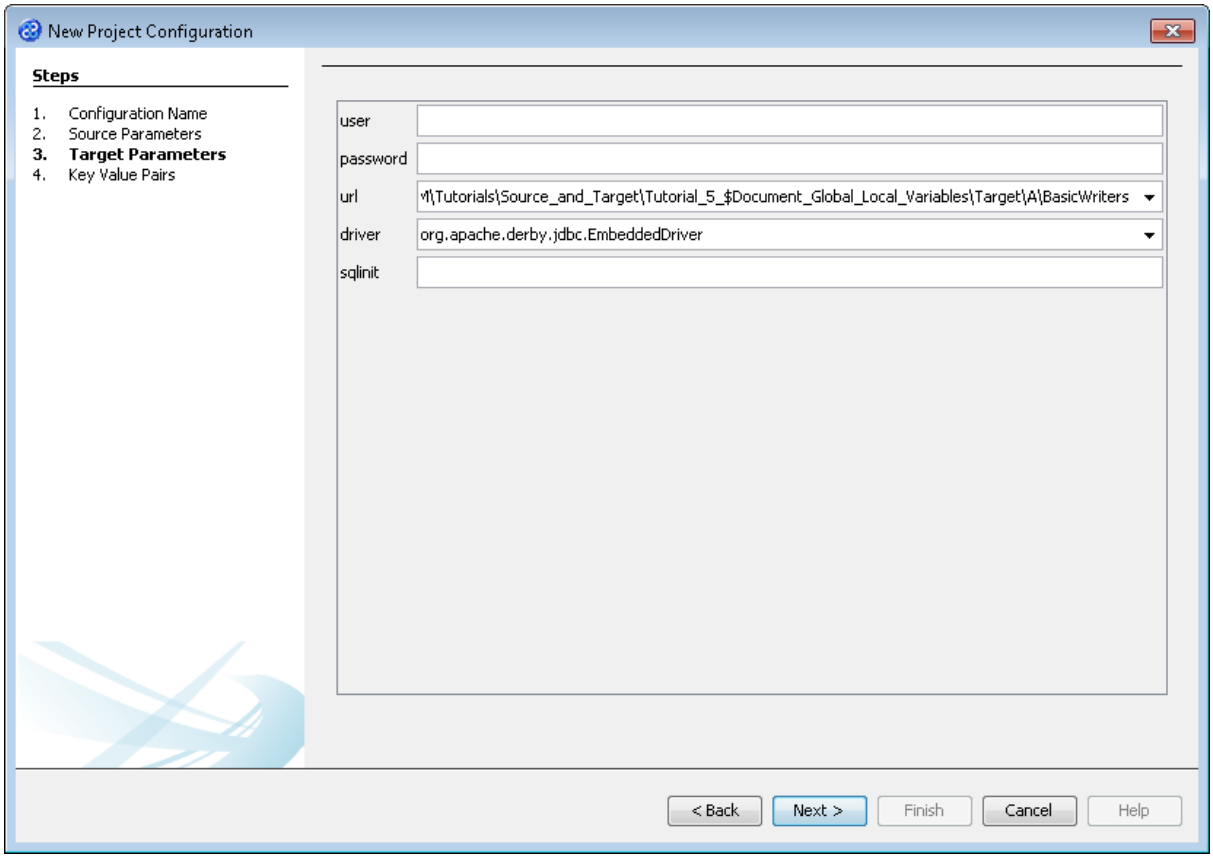
7) Click the Next > button to move to **Step 3. Target Parameters** where we will provide the details for the target data store connection.

8) Go to the **url** field. You will now need to provide the details of where to go to connect to the source data. View the list of options and select the option called **jdbc:derby:<YOUR_NAME>** from the drop down list. Now replace the <YOUR_NAME> part of the list item, including the angle brackets with the directory where the Derby database is stored. This will be in the following location.

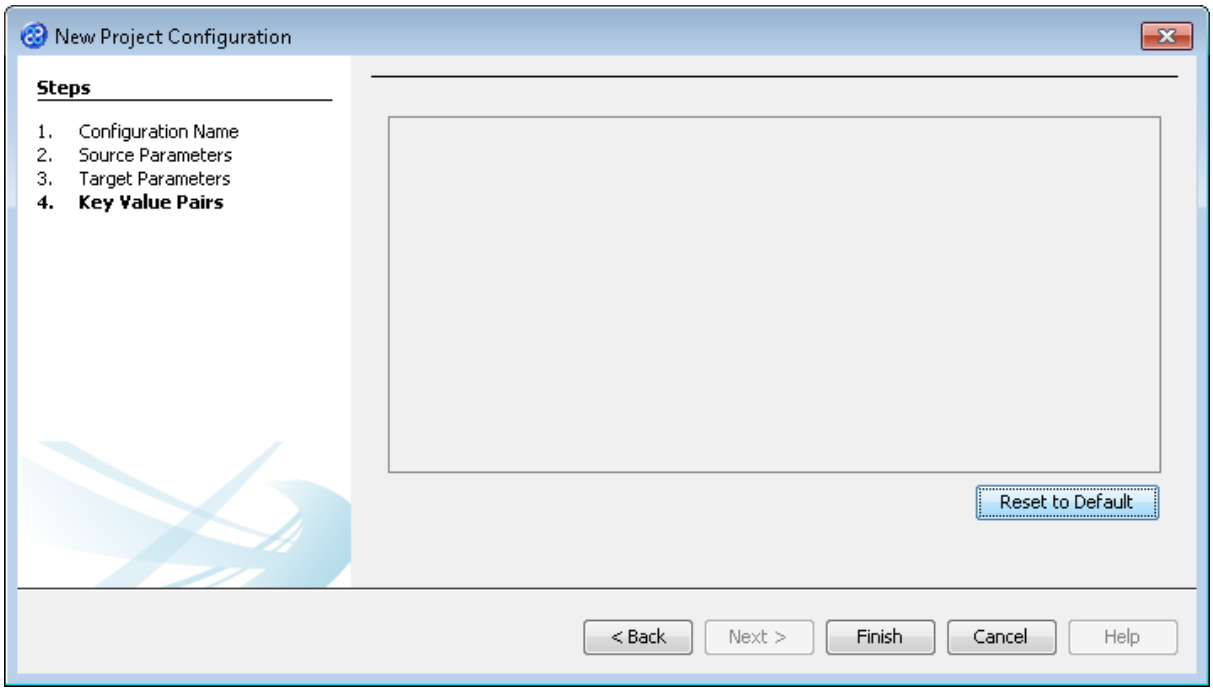
```
[TMHOME]\Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Target\A\BasicWriters
```

9) Go to the driver field and display the list of options available. Select the option called **org.apache.derby.jdbc.EmbeddedDriver**. The Adapter Configuration window will look similar to the image below. **user, password** and **sqlinit** do not require values.

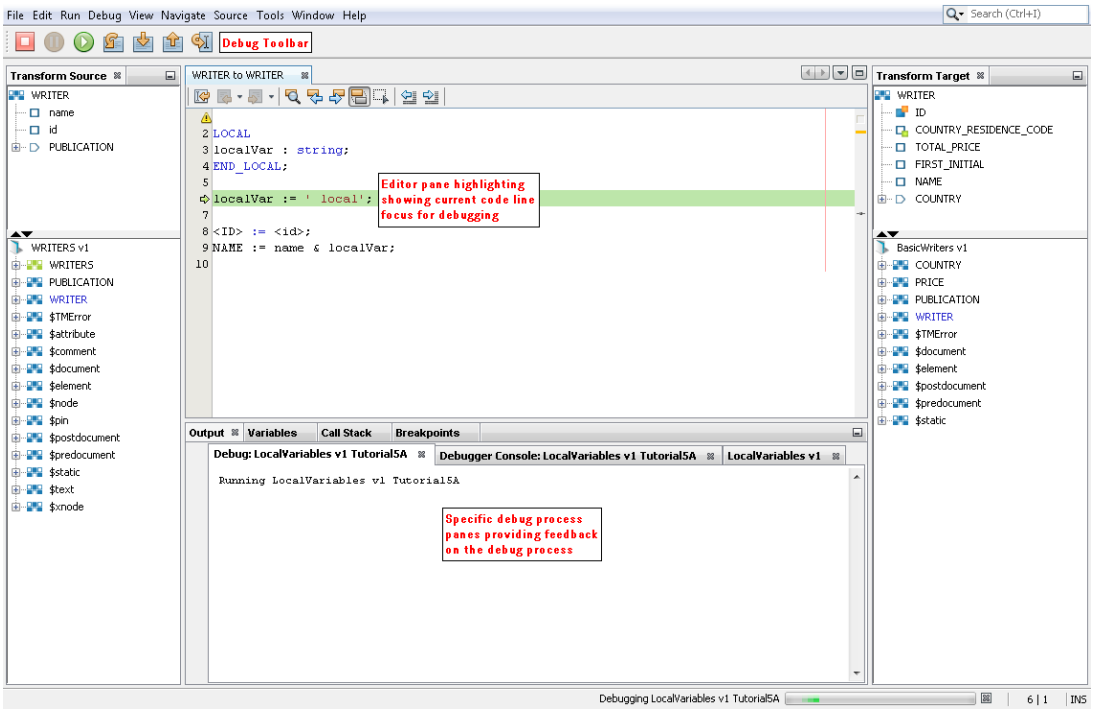
10) The **Target Parameters** step should look similar to the image below.



11) Click the Next > button to move to **Step 4. Key Value Pairs**. We do not need to specify any key value pairs in this exercise.



12) Click the Finish button. This will then cause the project to build making it ready for the debug process. A number of features will be invoked in the interface as shown in the simplified interface image below. These include the debug toolbar and a number of interface panes. In addition to this there will be changes in the Editor pane.

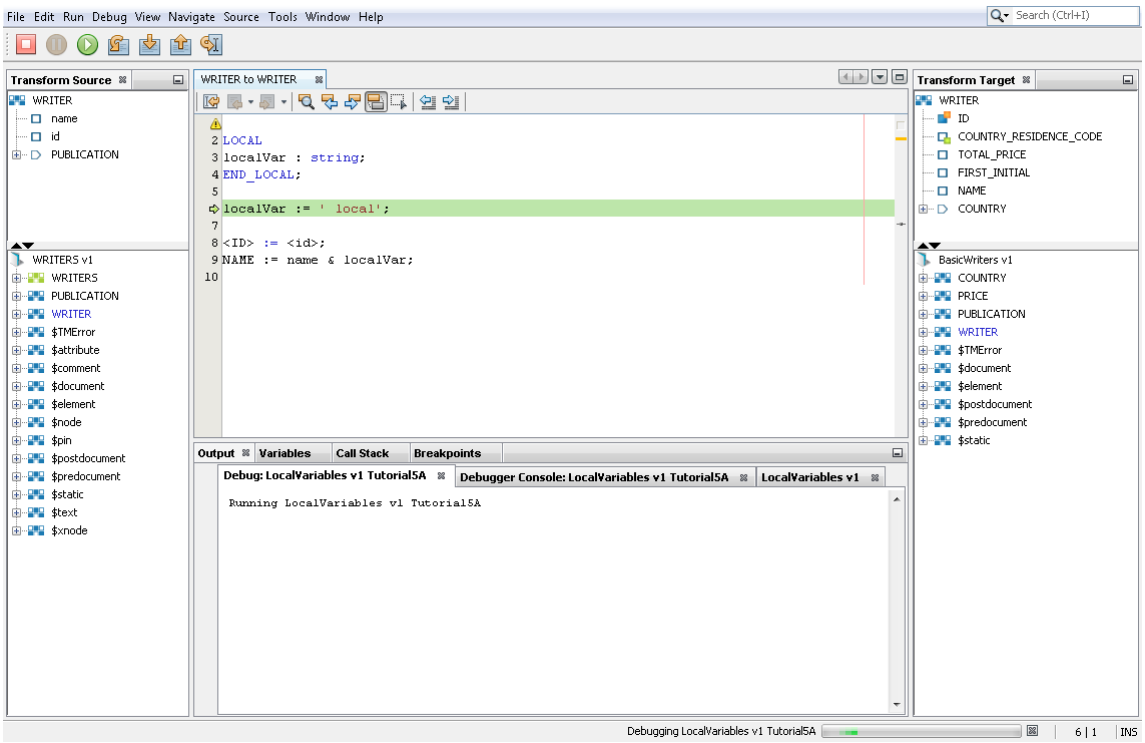


13) Let's now step through the debugging process for this project.

Exercise 5 - Debugging the LocalVariables Project

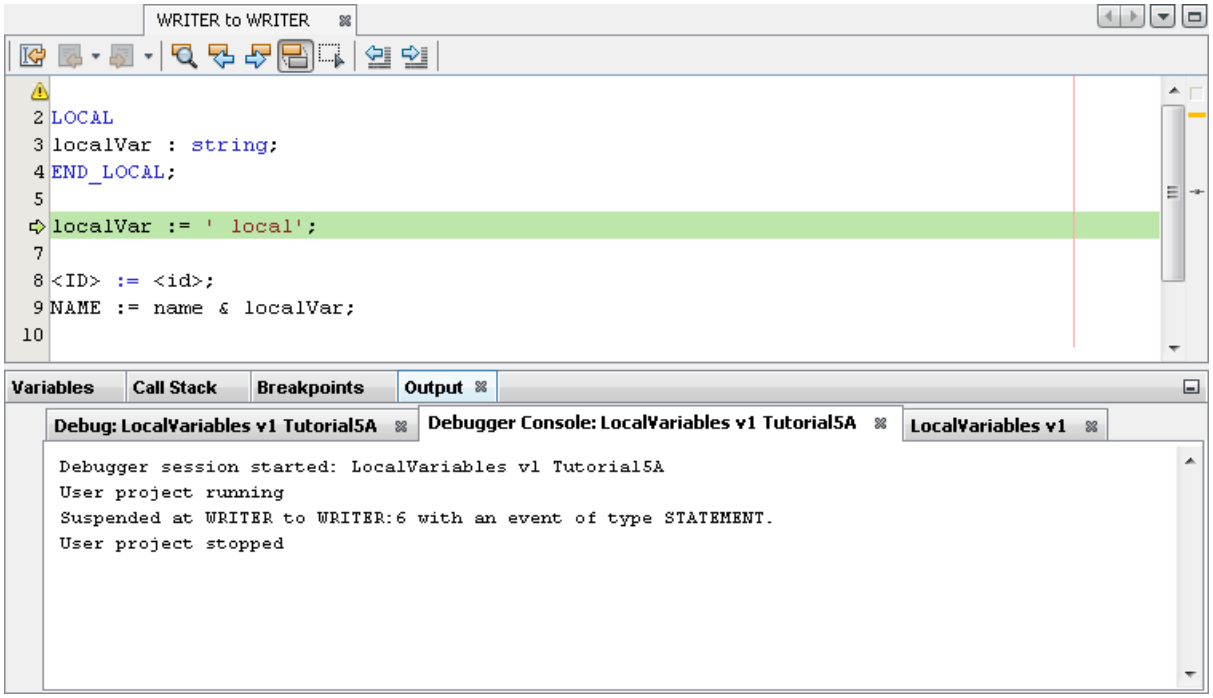
This exercise focuses on the debugging process and how this collection of components work together to help you understand what is happening during the process.

1) Lets look at our starting point. The debug process is suspended at the localVar line which is highlighted in green and has a small arrow facing right in the left hand margin of the Editor pane. The status bar also tells us that we are **Debugging LocalVariables v1 Tutorial5A**.

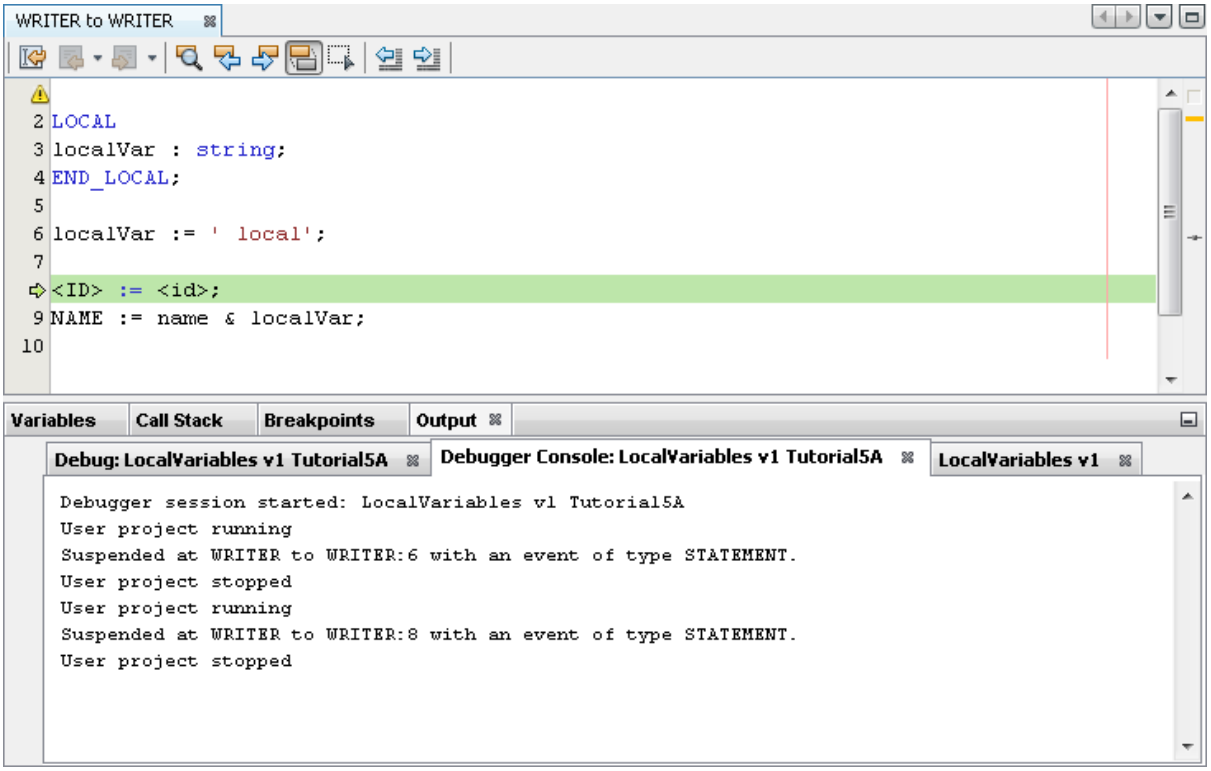


2) The **Output** pane has three sub-panes, the standard output pane, the **Debugger Console** pane and the **Debug** pane. The pane labelled **LocalVariables v1** is the same as the **Output** pane we have seen in previous projects displaying warnings and telling us whether the build has been successful or not. The Debug pane will display the execution log for the project. The Debugger Console reports information about each step of the debug process. This is our key focus for this exercise.

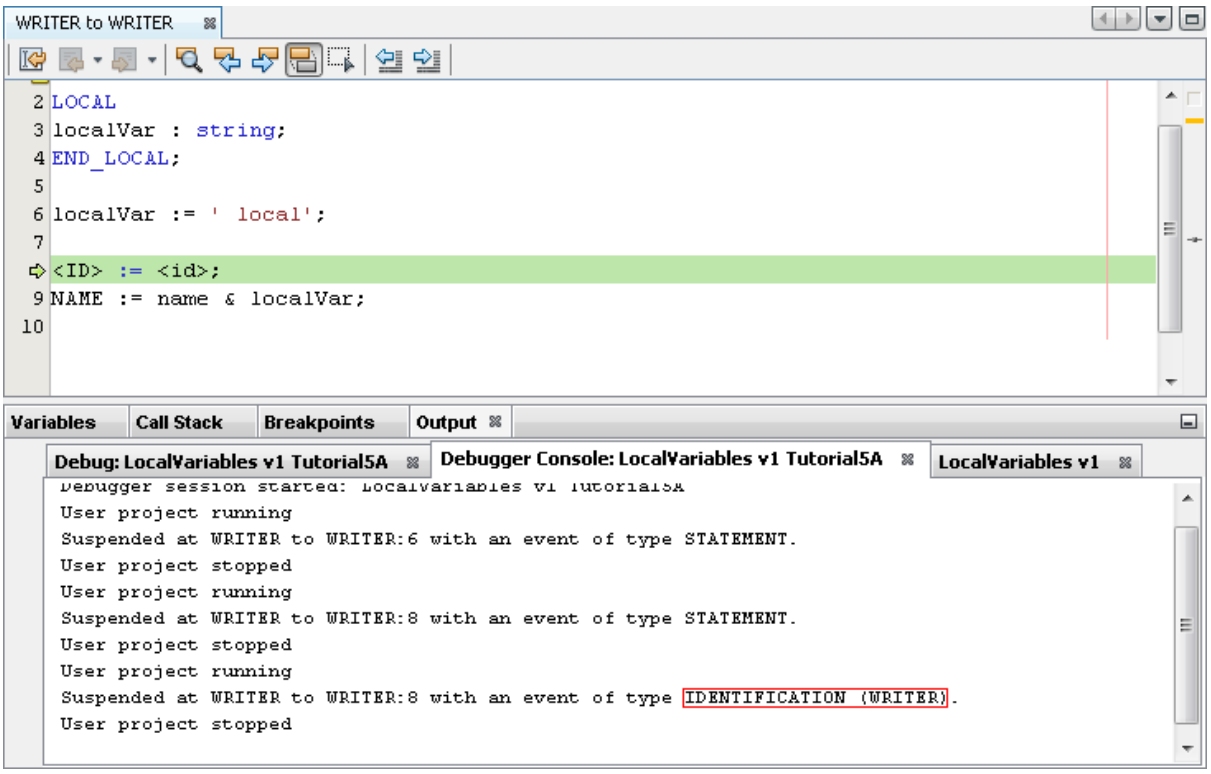
3) The starting point in the debug process is shown below. The highlighted line in the Editor pane is line 6. The Debugger Console tells us we are `Suspended at WRITER to WRITER: 6 with an event type of STATEMENT.` which line in the transform above that we are suspended on, line 6, and the type of event that is about to execute, a statement, which in this case is `localVar := ' local';`.



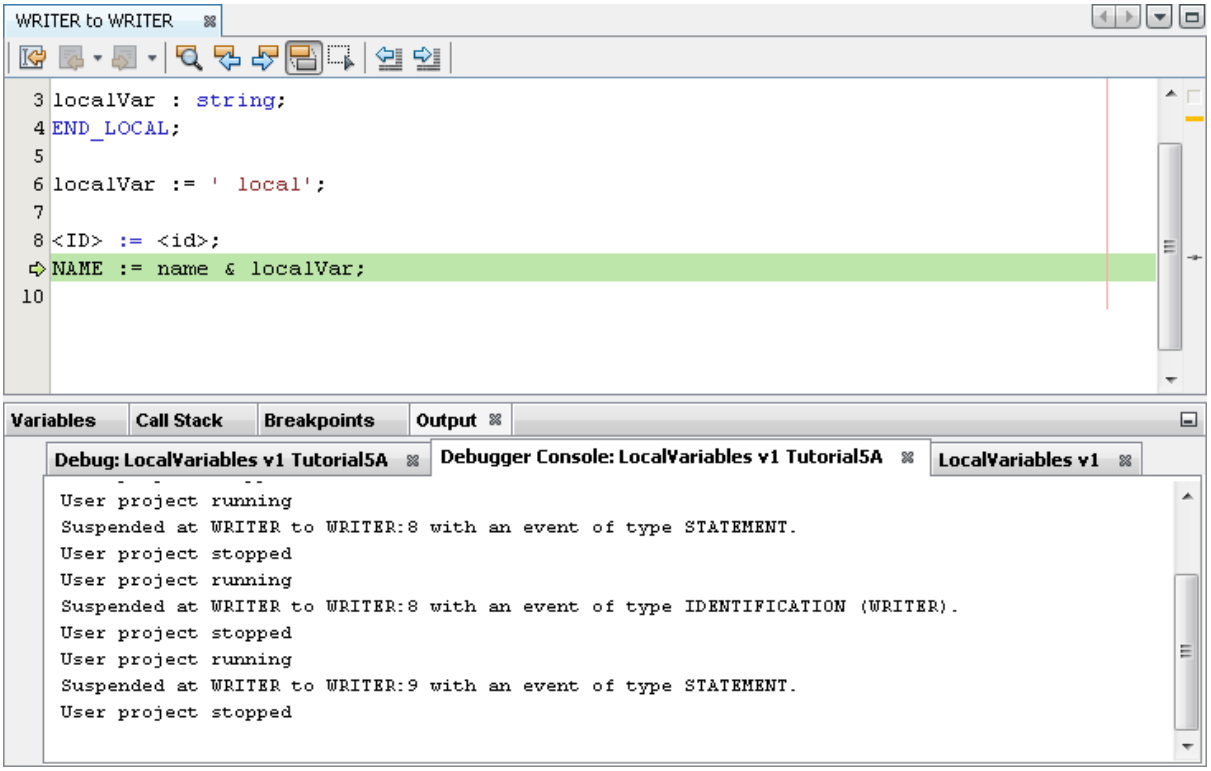
4) Click the Step Over button in the debug toolbar, , to run to the next step in the process. Notice that the debugger steps to line 8, `<ID> := <id>;`. The Debugger Console tells us that the user project started again, was suspended at line 8 and the project has stopped.



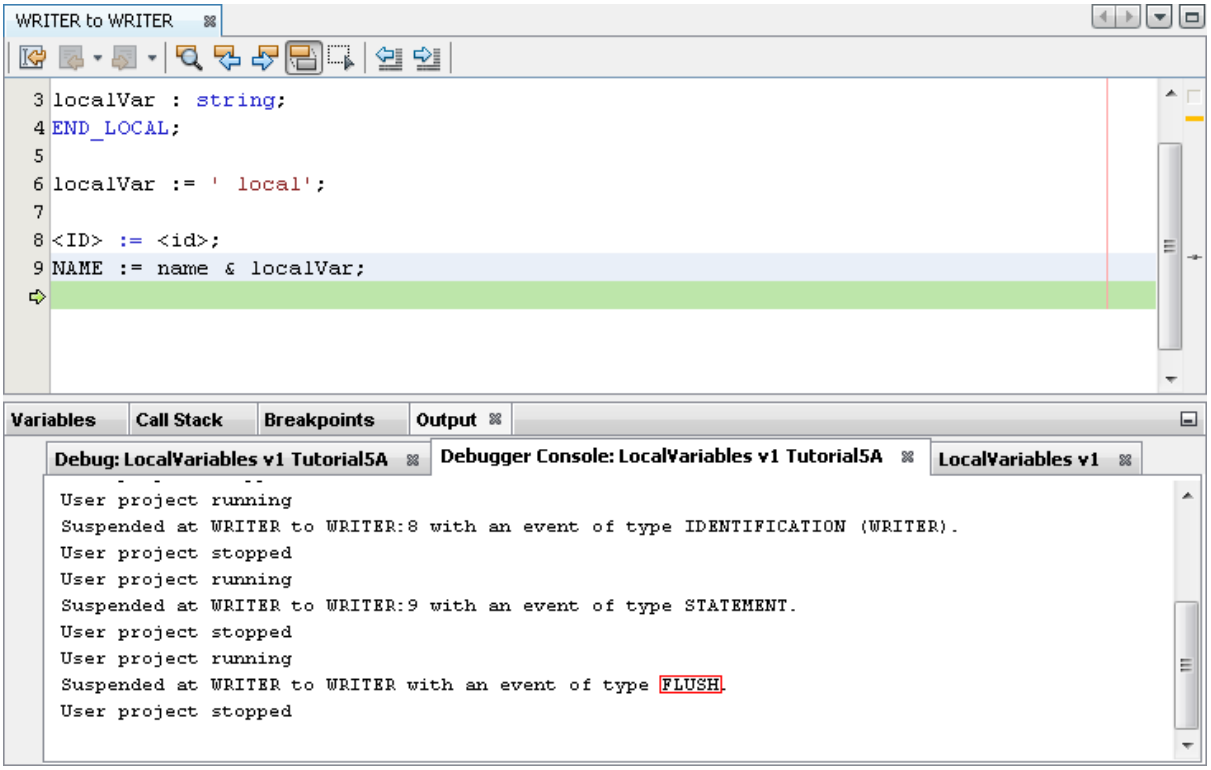
5) Click the Step Over button in the debug toolbar, , to run to the next step in the process. In both the previous actions we have stopped with an event type of STATEMENT but this time the next action is an IDENTIFICATION event which is also on line 8 as shown below.



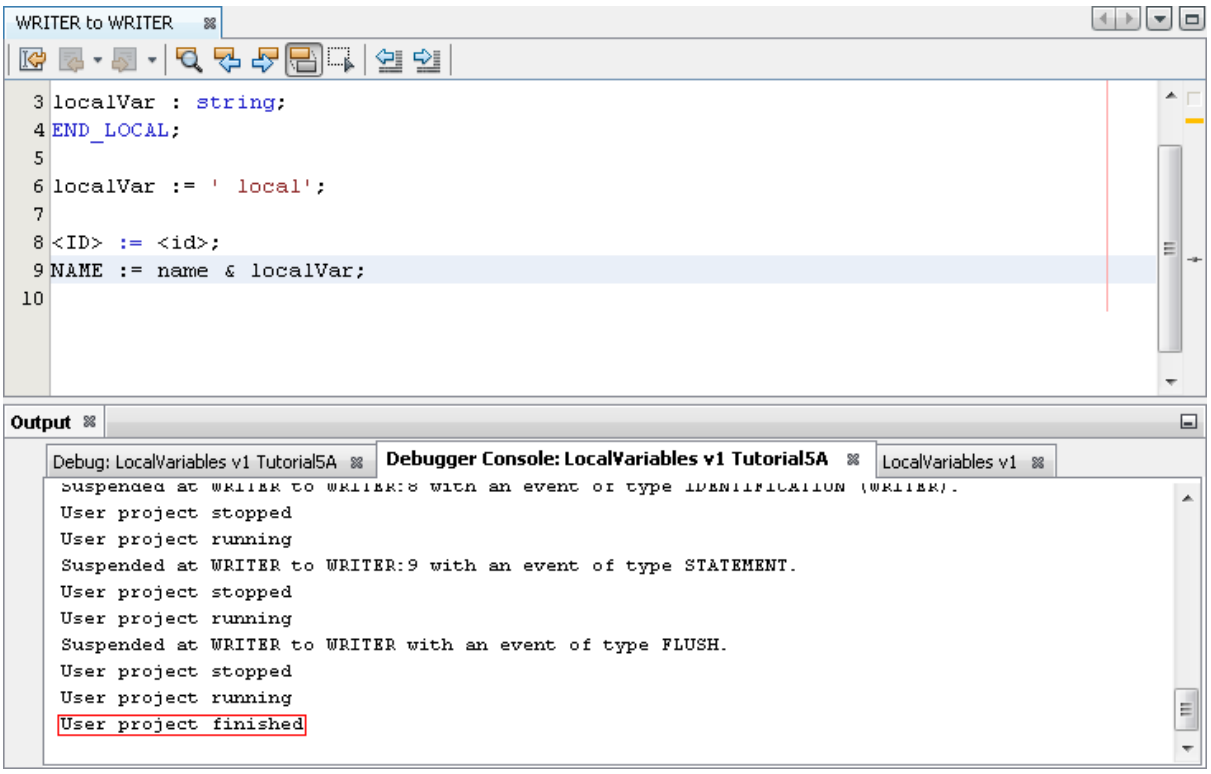
6) Click the Step Over button in the debug toolbar, , to run to the next step in the process. The process now stops at the last line of the transform with an event type of STATEMENT.



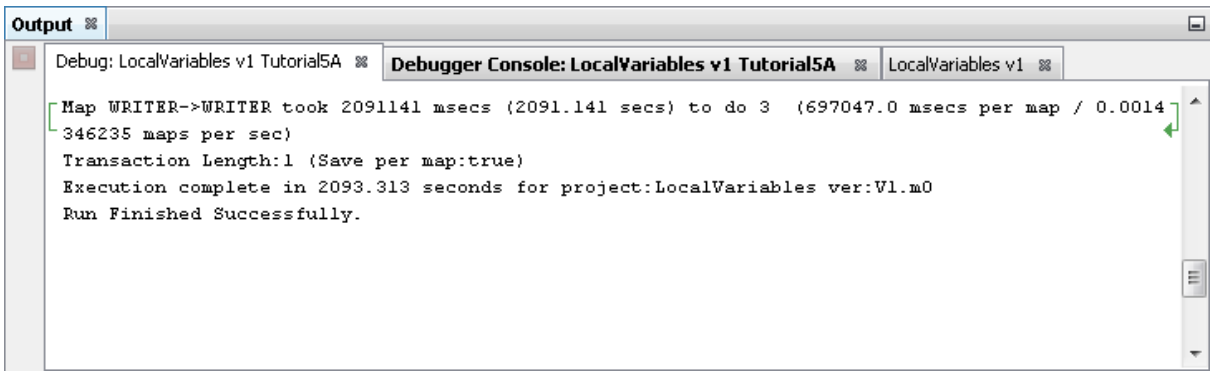
7) Click the Step Over button in the debug toolbar, , to run to the next step in the process. This time the process moves to the next event which is **FLUSH** at which point the debugger lets the transform write the record being processed to its destination. The destination can be to memory or disk depending on the nature of the target data store.



8) Click the Step Over button in the debug toolbar, , to run to the next step in the process. This time the process will return to line 6 to repeat the steps in the transform code for the next record as shown in point 3 above. The process will run through the transform three times in all each time processing a record. When the debug session is complete the Debug Console will display the information below. The line highlighted in red below, `User project finished`, tells you that the debug session is complete.



9) Let's take a look at the Debug pane which shows us the same output as the Output pane in TM Migrator. You can see that the run finished successfully, which should be the case.

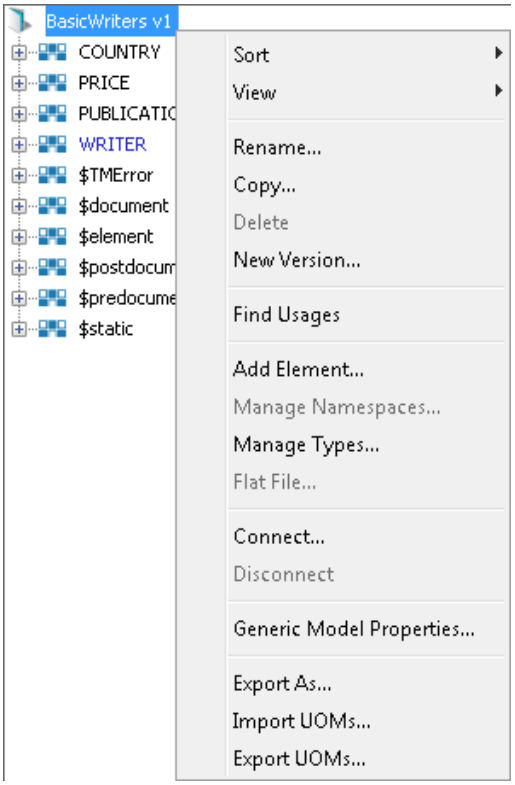


10) Now let's view the data after running the project.

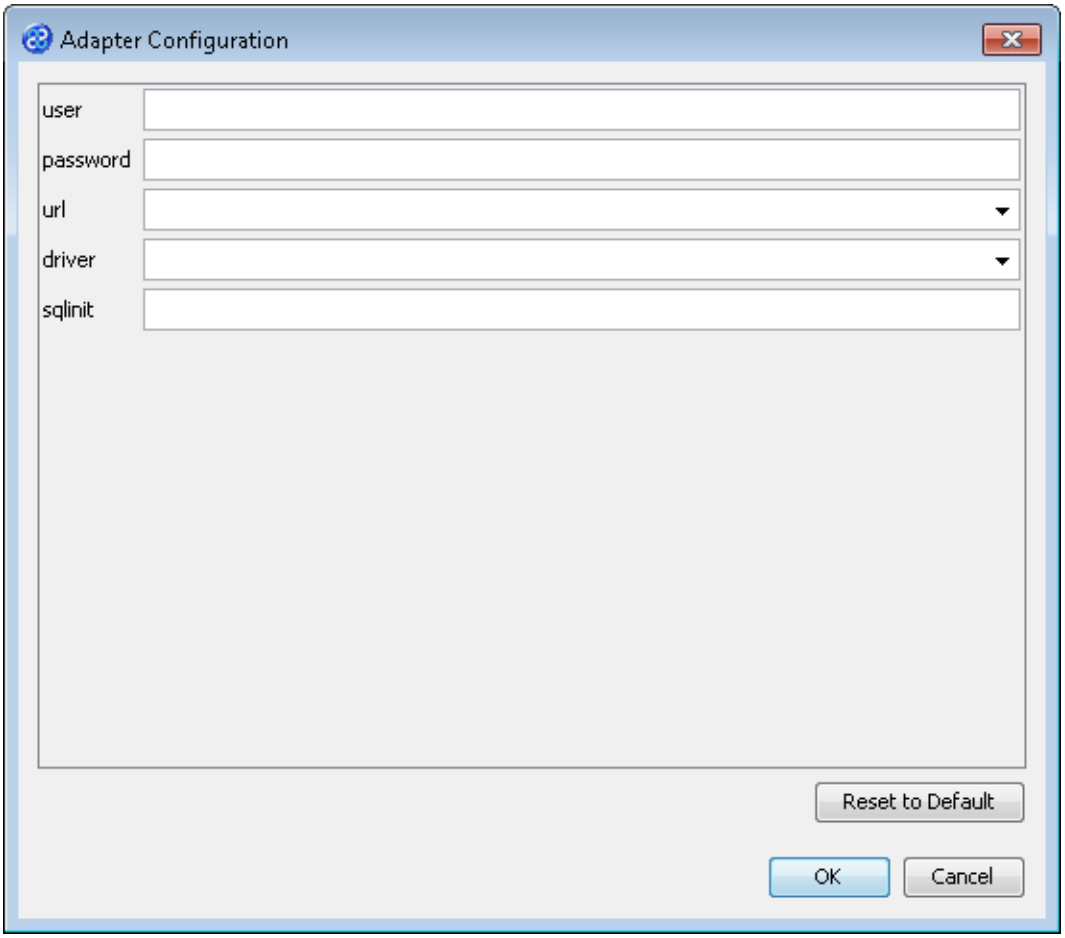
Exercise 6 - View the Target Data

Now let's check our target data store to see if our data has been transformed as expected.

1) With the Editor pane still open, move the cursor over the name of the data model in the Transform Target pane and display the context menu for the data model.



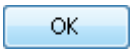
2) Select the Connect... option from the menu. The Adapter Configuration window will open ready for the connection details to be entered for the target data store.



3) Let's provide the relevant connection information as shown below. Go to the **url** field. You will now need to provide the details of where to go to get the source data. View the list of options and select the option called **jdbc:derby:<YOUR_NAME>** from the drop down list. Now replace the <YOUR_NAME> part of the list item, including the angle brackets, with the directory where the Derby database is stored. This will be in the following location.

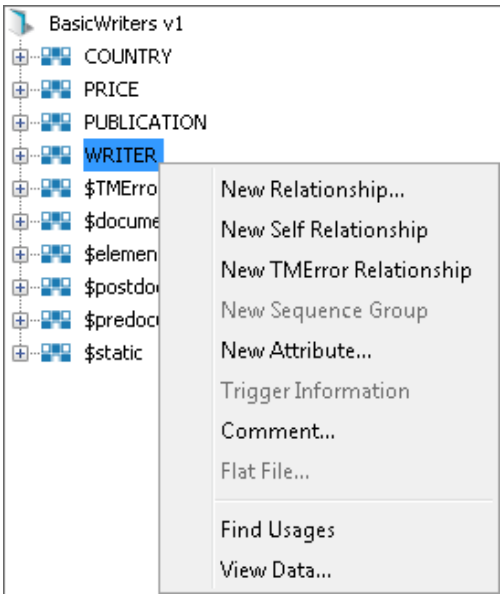
```
[TMHOME]\Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Target\A\BasicWriters
```

4) Go to the driver field and display the list of options available. Select the option called **org.apache.derby.jdbc.EmbeddedDriver**. The Adapter Configuration window will look similar to the image below. **user** and **password** are not required.

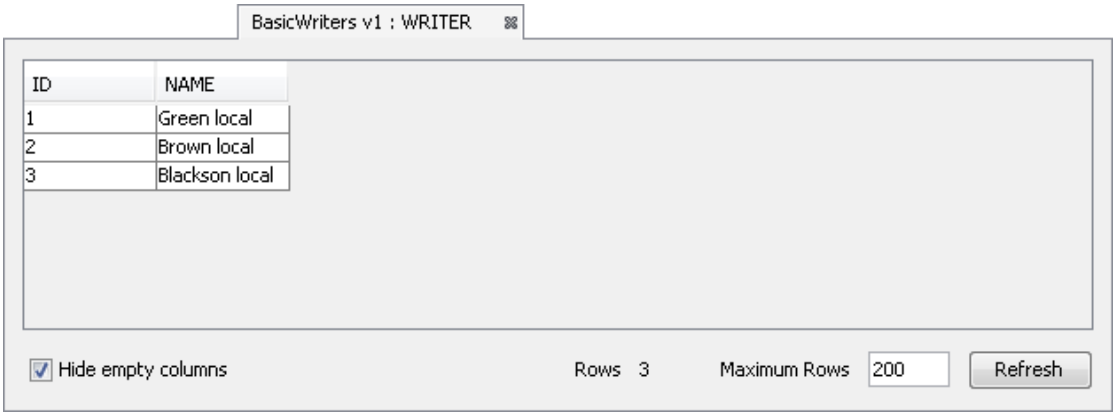
5) Click the 

button to connect to the data store. A message box will appear telling you that the connection is being made.

6) Move your cursor over the **WRITER** element in the data model and display the context menu for the element.



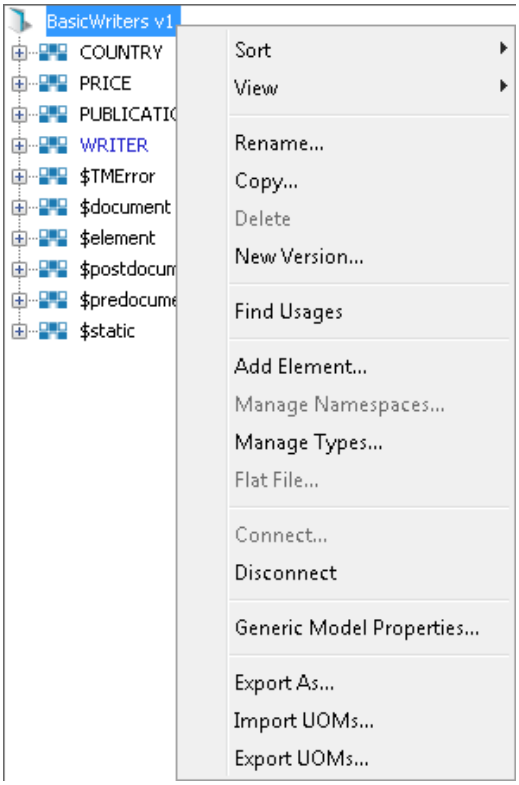
7) Select the View Data... option from the menu. This will open a new pane in the Editor pane displaying the writer data as shown below.



8) Let's check the data. We can see the results of our transform with the three writers and their associated local variable value displayed. This is as we expected from the information reported by the output when we debugged the project.

9) Let's close the data pane and disconnect from the data store. Click on the icon to close the data view pane for **WRITER**.

10) Now move the cursor over the name of the data model in the **Transform Target** pane again and display the context menu for the data model.



11) Note that the Disconnect option is active now. Click on this to disconnect from the data store.

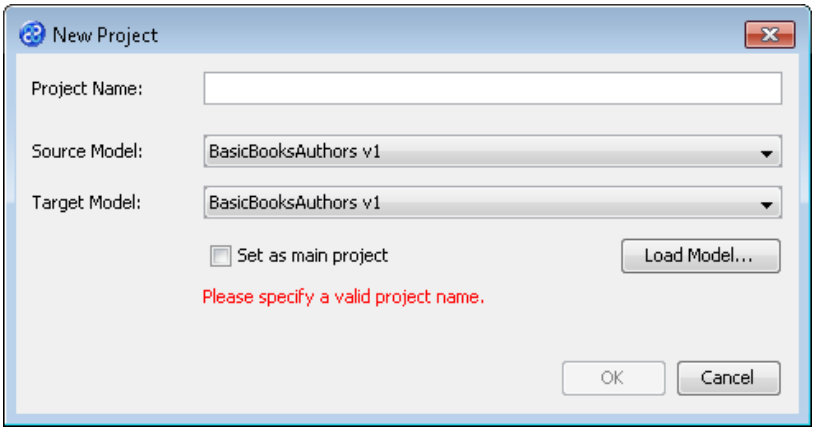
Exercise 7 - Create a New Project

Create a new project using the data model **WRITERS v1** as your **Source Model** and the data model **BasicWriters** as your **Target Model**. Let's create a project using our data models.

1) Using your mouse click on the File option from the menu bar of TM Designer.

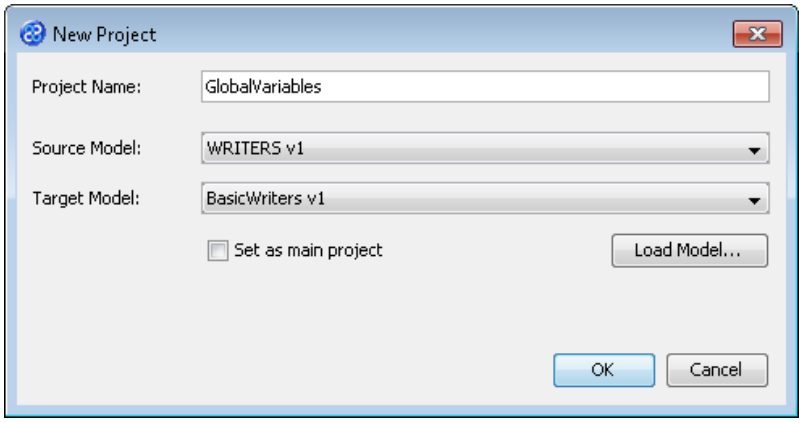
2) From the menu, click once on the New Project... option.

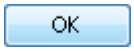
3) The **New Project** window will open.



4) In the **Project Name** field we will provide a name for the project. Let's call our project **GlobalVariables** by typing the name into the field.

5) Now we must select the target and source models for our project. In the **Source Model** field select **WRITERS v1** from the list. In the **Target Model** field select **BasicWriters v1**.



6) Now click once on the  button. Your project will be created and be displayed in the **Projects** pane.

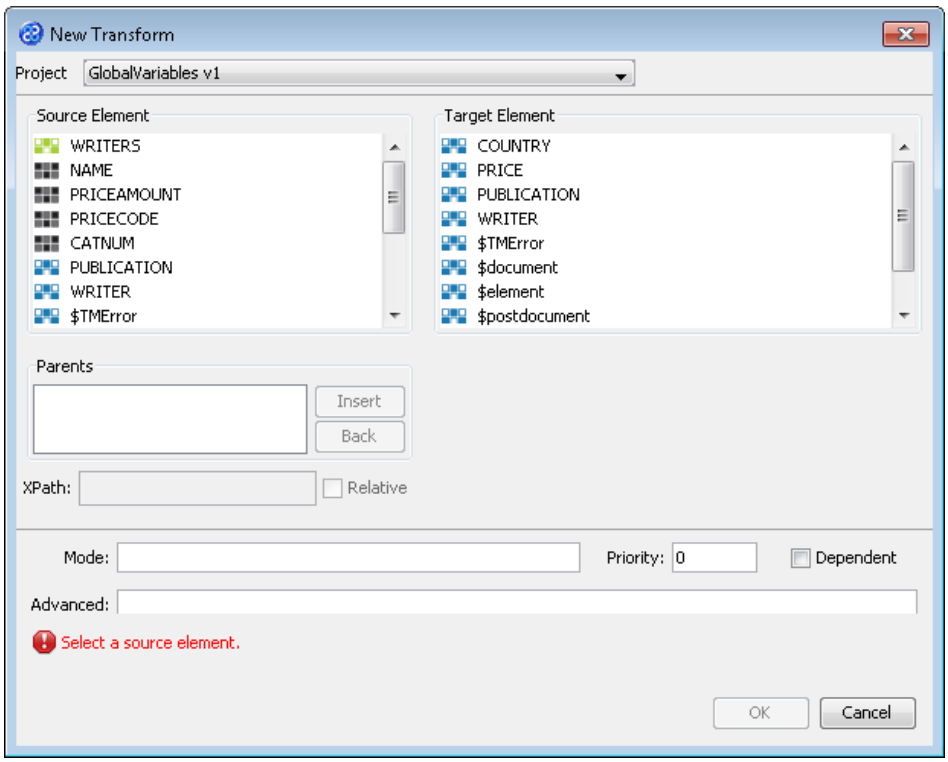
Exercise 8 - Create a $document Global Variable Transform

This exercise creates a $document transform into which we will place four global variables.

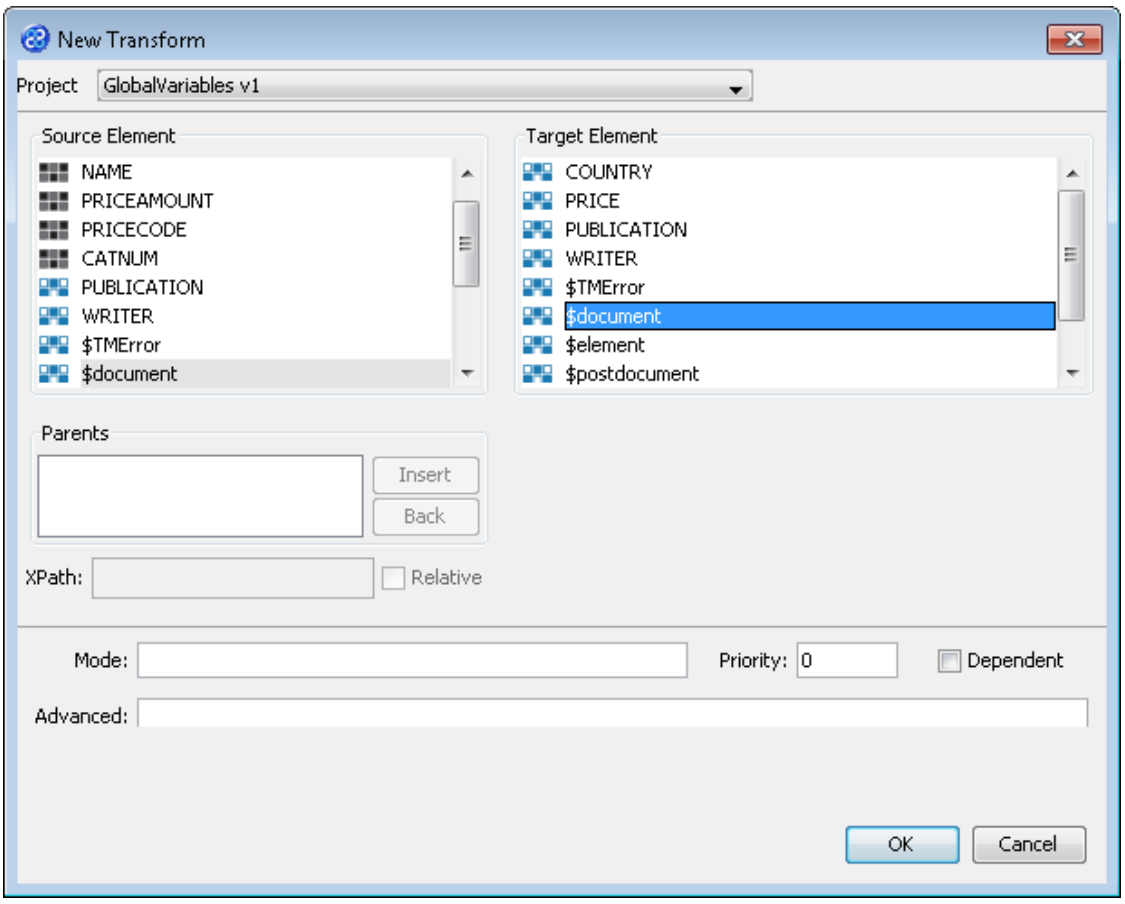
1) Click once on the File menu bar option.

2) Click once on the New Transform... option from the sub-menu.

3) This will open the **New Transform** window. Ensure that you have the correct project selected in the **Project** drop down list, in our case this will be **GlobalVariables v1**.



4) With the **New Transform** window open, we will select the elements for the source and target. In this case the source and target element will be the same, **$document**. The **New Transform** window will look like the one below.



5) Click once on the OK button to create your new transform.

6) The Editor pane will open ready for you to write your transform code once the **New Transform** is created.

7) Now we will write our transform. The transform code simply multiplies 5 by 7 or `globalIntA` by `globalIntB` and places the result in a global variable called `globalResult`. Then a string, `' global'` is concatenated with `globalResult` to give a variable, ' global35' which we will use in our next transform.

```
-- Create your global variables

GLOBAL
globalVar : string;
globalIntA : int := 5;
globalIntB : int := 7;
globalResult : int;
END_GLOBAL;

-- Define the results to be buffered in memory

globalResult := globalIntA * globalIntB;
globalVar := ' global'&globalResult;
```

8) We have completed our transform.

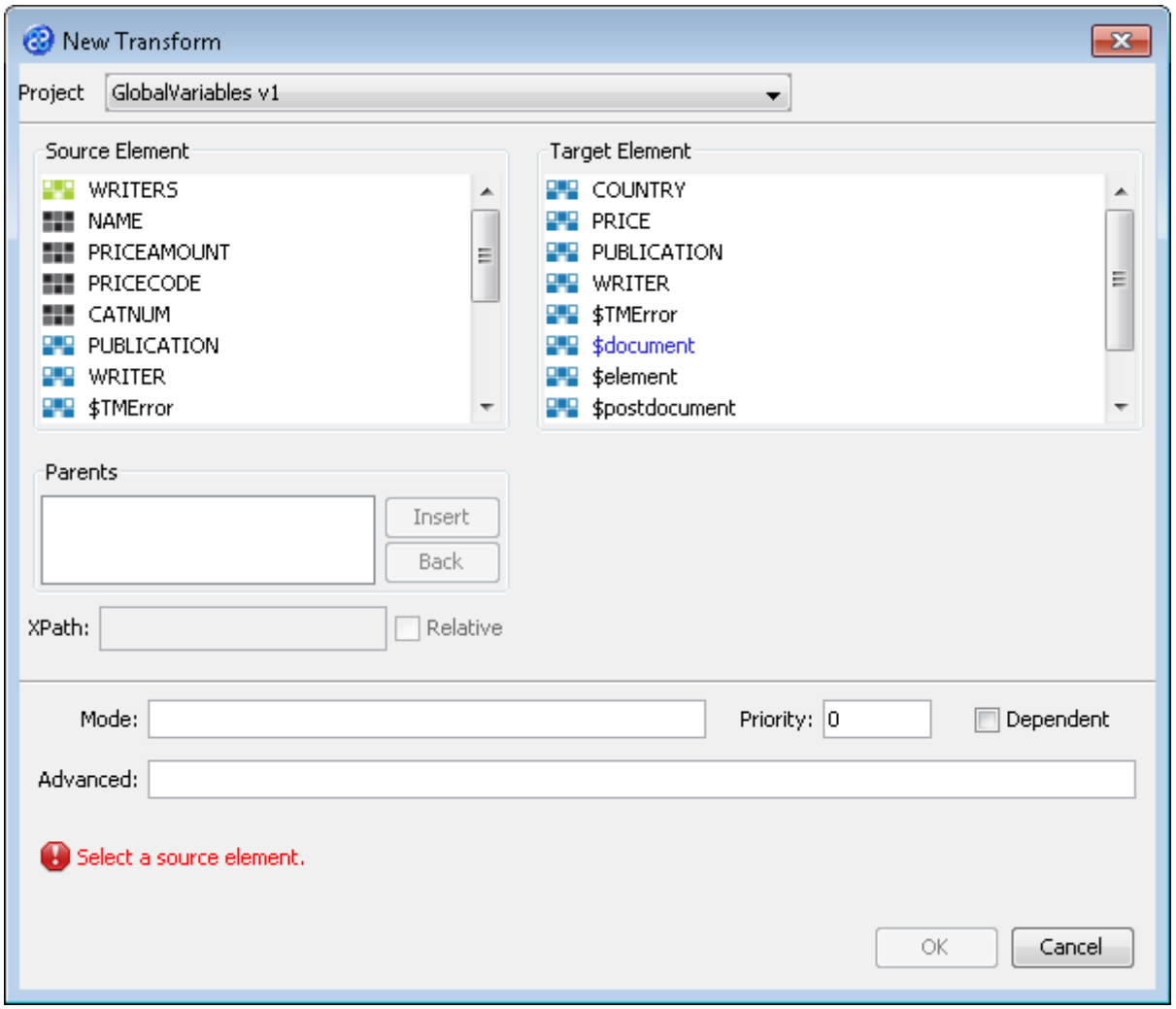
9) Click once on the File menu bar option.

10) Click once on the Save menu bar option to save your transform.

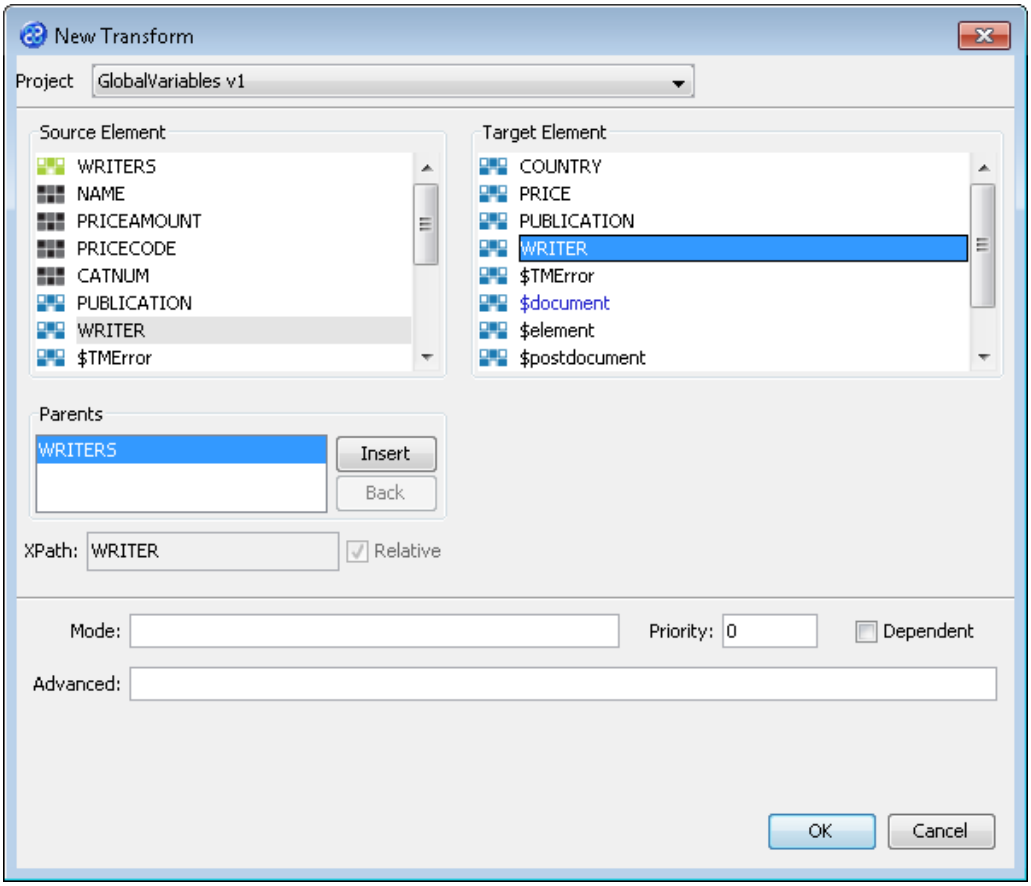
Exercise 9 - Create a Transform Using the $document Transform

This exercise creates a transform which will use information from the $document transform created in the previous exercise.

1) Click once on the File menu bar option.
2) Click once on the New Transform... option from the sub-menu.
3) This will open the **New Transform** window. Ensure that you have the correct project selected in the **Project** drop down list, in our case this will be **GlobalVariables v1**.



4) With the **New Transform** window open, we will select the elements for the source and target. In this case the source and target element will be the same, **WRITER**. The **New Transform** window will look like the one below.



5) Click once on the OK button to create your new transform.

6) The Editor pane will open ready for you to write your transform code once the **New Transform** is created.

7) Now we will write our transform.

```
LOCAL
localVar : string;
END_LOCAL;

localVar := ' local';

--map direct attributes
<ID> := <id>;
NAME := name & localVar & globalVar;
```

8) We have completed our transform.

9) Click once on the File menu bar option.

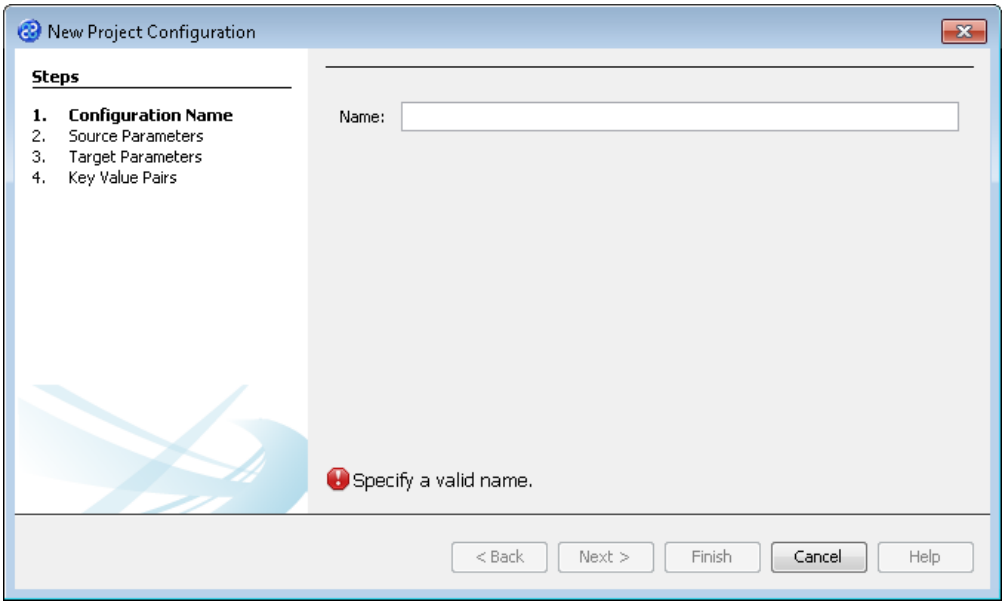
10) Click once on the Save menu bar option to save your transform.

Exercise 10 - Run the Project

Now let's Run our project.

1) Click once on the Run menu bar option.

2) Click once on the Run GlobalVariables v1 option from the sub-menu. TM Designer will now open the New Project Configuration window where you will set the connection information for the project.



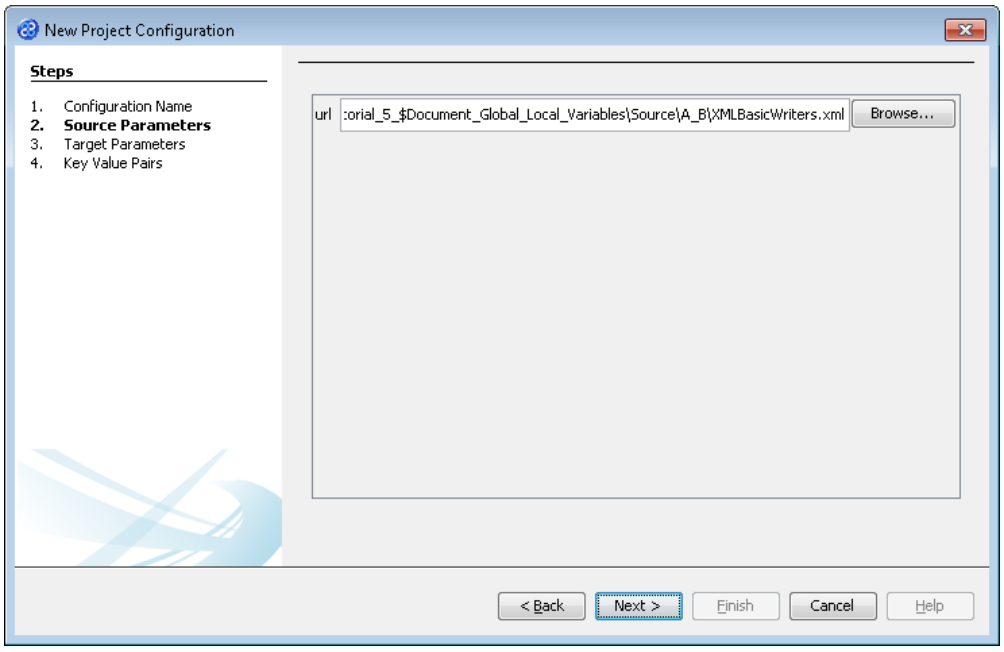
3) Let's give this configuration the name Tutorial1A. Type **Config1** into the **Name** field.

4) Click the Next > button to move to **Step 2. Source Parameters** where we will provide the details for the source data store connection.

5) Go to the **url** field of the **Source Parameters** step. In this field we will specify the location of the source data store. You can type the path and file name manually or you can use the button to select the directory and file. This will be in the following directory.

[TMHOME]\Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Source\A_B

6) The **Source Parameters** step should look similar to the image below.



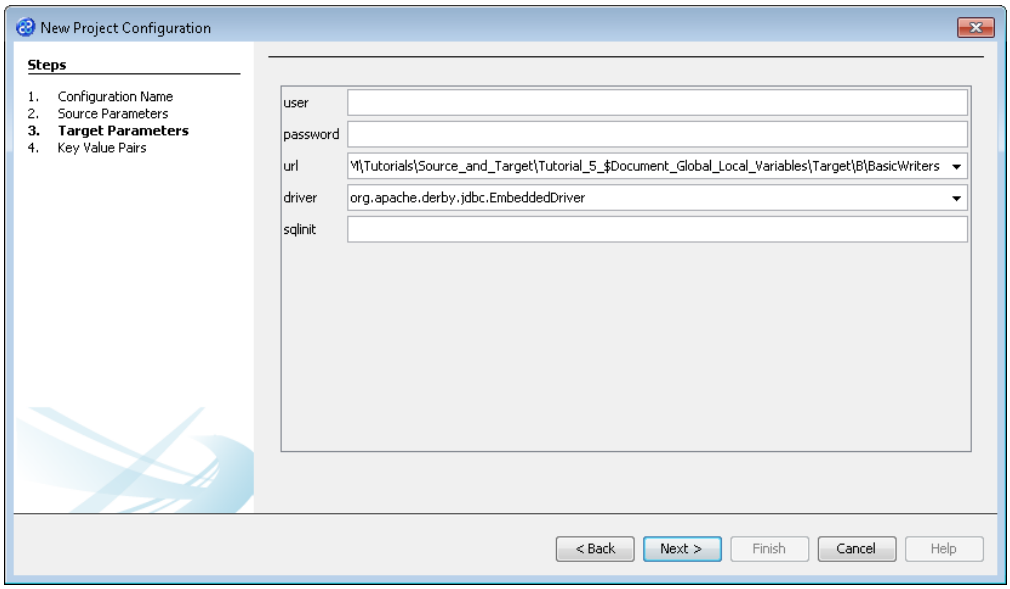
7) Click the Next > button to move to **Step 3. Target Parameters** where we will provide the details for the target data store connection.

8) Go to the **url** field. You will now need to provide the details of where to go to connect to the source data. View the list of options and select the option called **jdbc:derby:<YOUR_NAME>** from the drop down list. Now replace the <YOUR_NAME> part of the list item, including the angle brackets with the directory where the Derby database is stored. This will be in the following location.

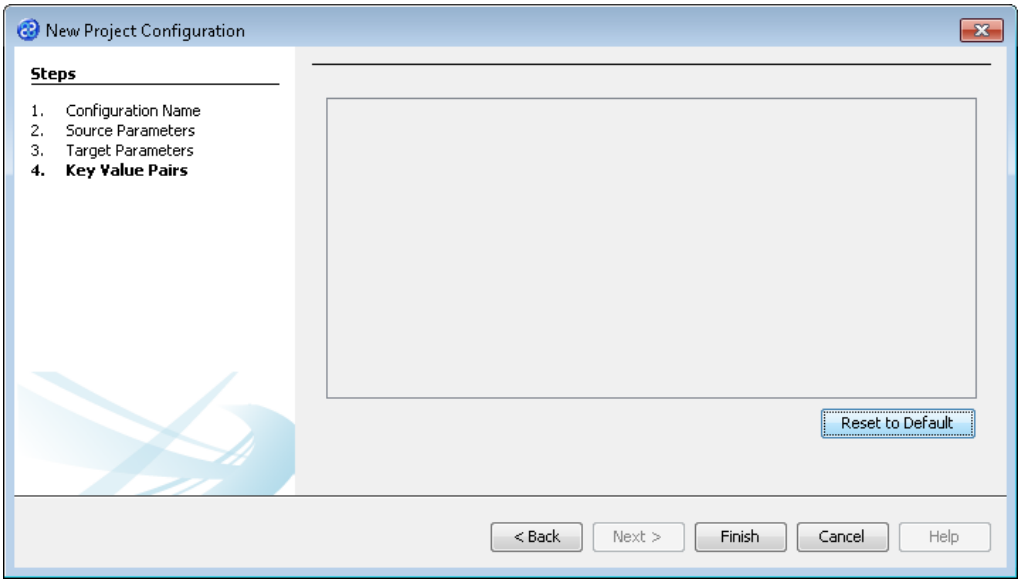
```
[TMHOME]\Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Target\B\BasicWriters
```

9) Go to the driver field and display the list of options available. Select the option called **org.apache.derby.jdbc.EmbeddedDriver**. The Adapter Configuration window will look similar to the image below. **user, password** and **sqlinit** do not require values.

10) The **Target Parameters** step should look similar to the image below.

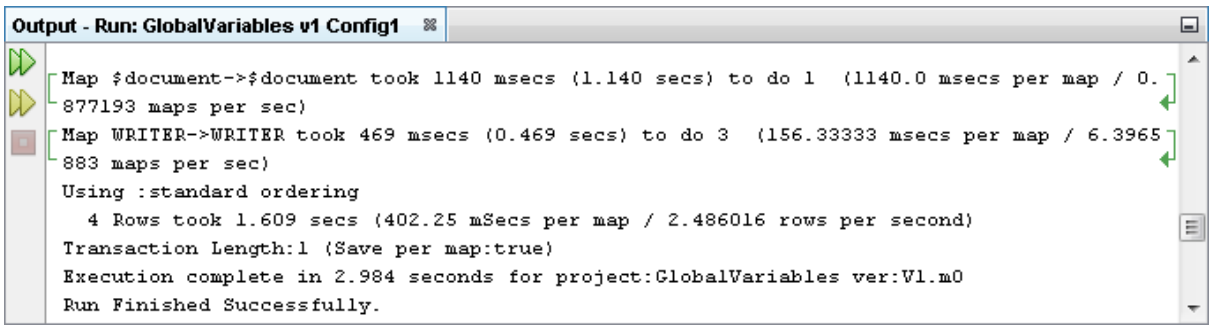


11) Click the Next > button to move to **Step 4. Key Value Pairs**. We do not need to specify any key value pairs in this exercise.



12) Click the Finish button to save the project configuration and to run the project within TM Designer. This performs the same execution as the **Launch Migrator...** option from the project context menu.

13) TM Designer will open the Output - Run pane with the results of running the project as shown below.

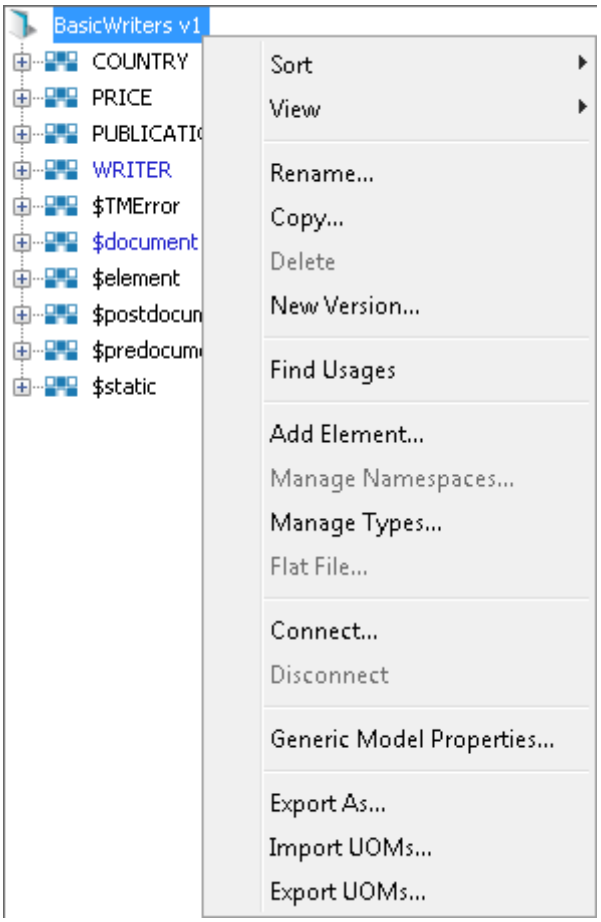


14) Let's now check the data using the View Data... functionality.

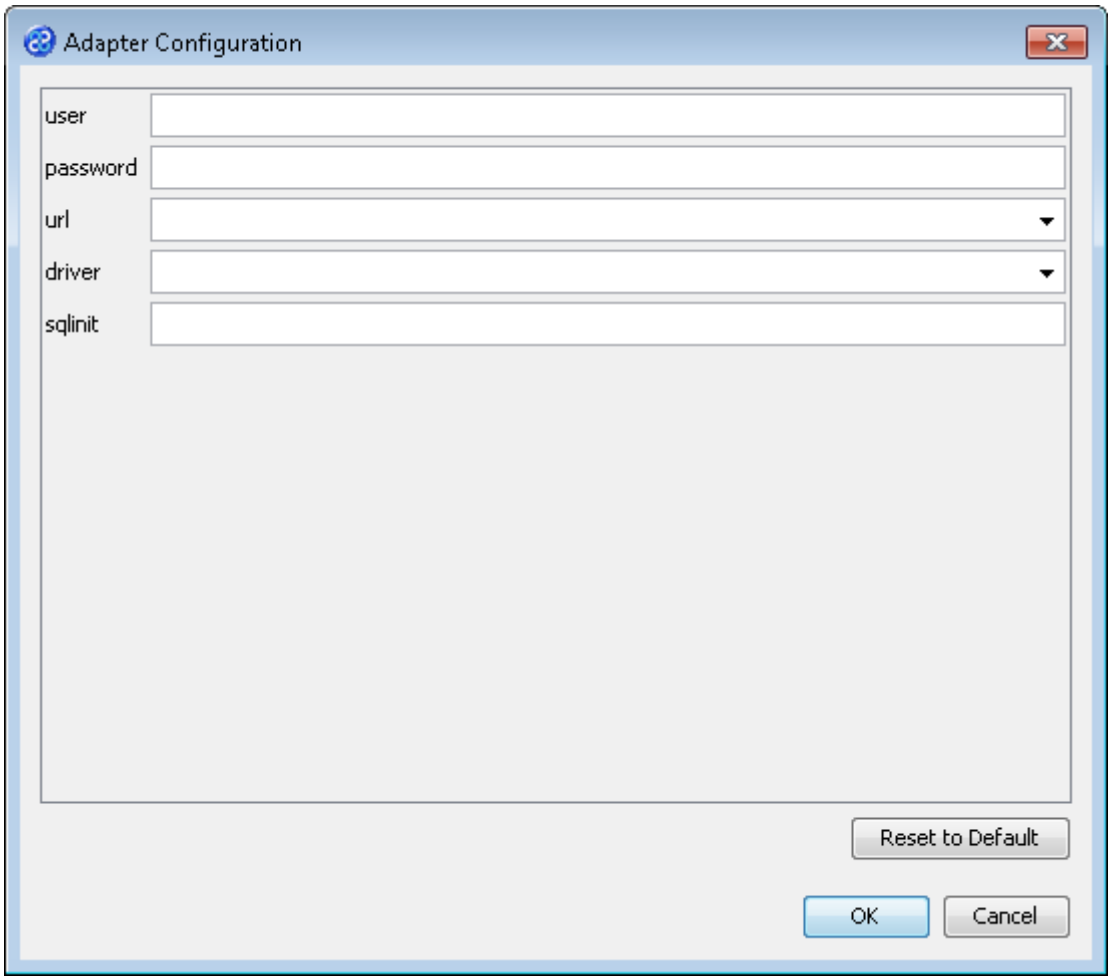
Exercise 11 - View the Target Data

Let's check our target data store to see if our data has been transformed as expected.

1) With the Editor pane still open, move the cursor over the name of the data model in the Transform Target pane and display the context menu for the data model.



2) Select the Connect... option from the menu. The Adapter Configuration window will open ready for the connection details to be entered for the target data store.



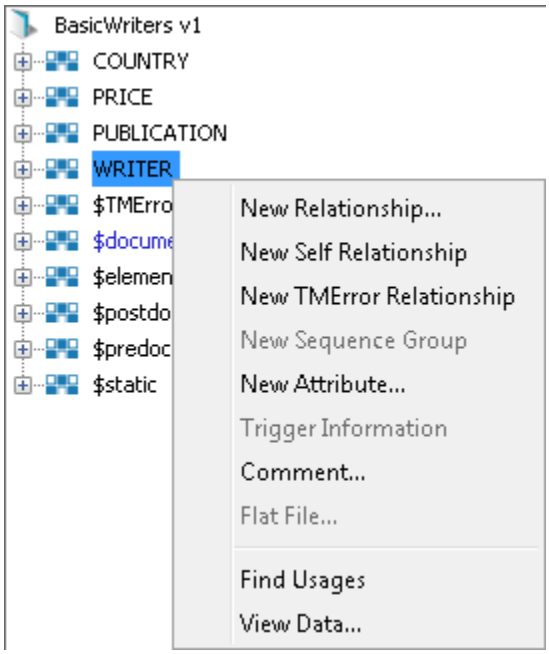
3) Let's provide the relevant connection information as shown below. Go to the **url** field. You will now need to provide the details of where to go to get the source data. View the list of options and select the option called **jdbc:derby:<YOUR_NAME>** from the drop down list. Now replace the <YOUR_NAME> part of the list item, including the angle brackets, with the directory where the Derby database is stored. This will be in the following location.

```
[TMHOME]Tutorials\Source_and_Target\Tutorial_5_$Document_Global_Local_Variables\Target\B\BasicWriters
```

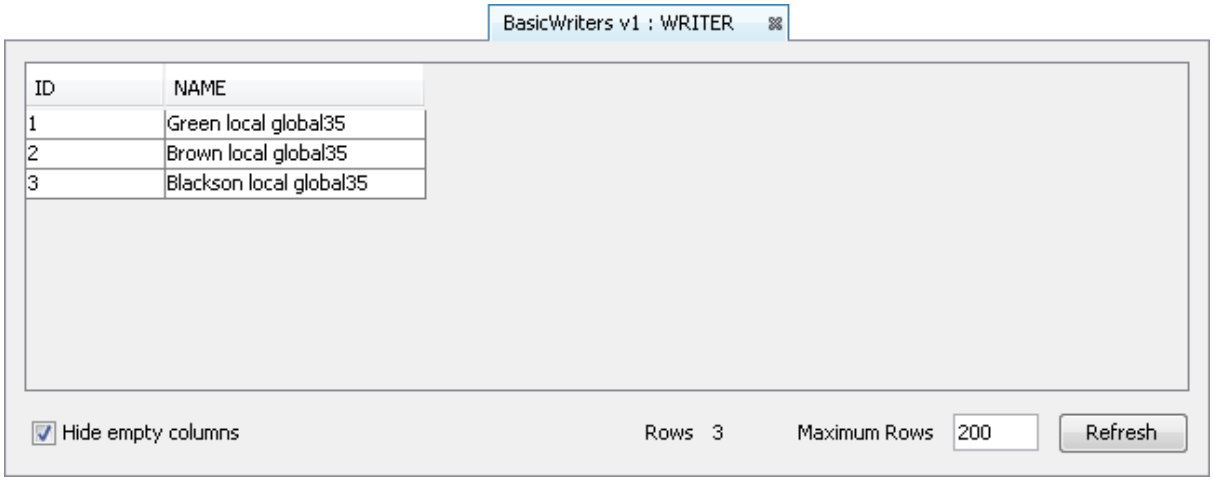
4) Go to the driver field and display the list of options available. Select the option called **org.apache.derby.jdbc.EmbeddedDriver**. The Adapter Configuration window will look similar to the image below. **user** and **password** are not required.

5) Click the OK button to connect to the data store. A message box will appear telling you that the connection is being made.

6) Move your cursor over the **WRITER** element in the data model and display the context menu for the element.



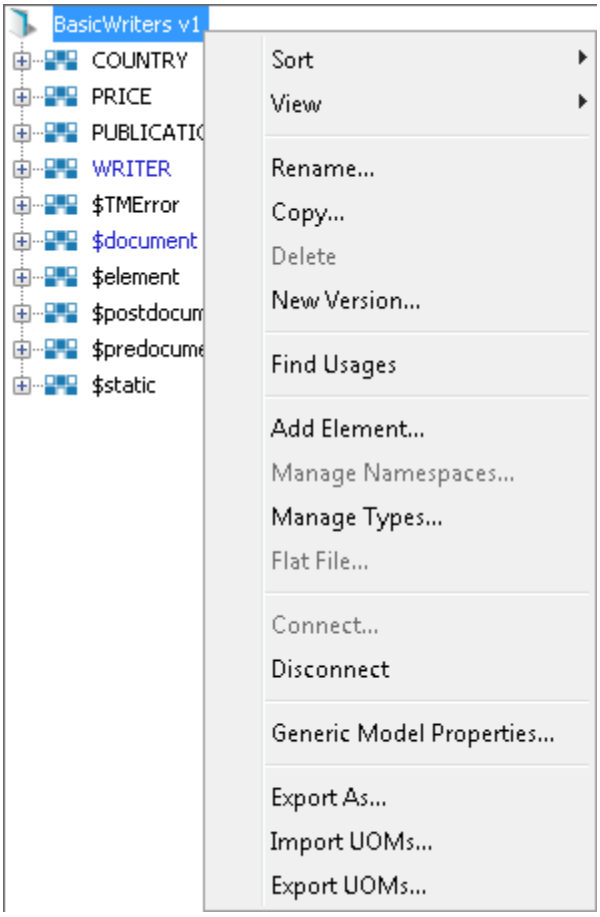
7) Select the View Data... option from the menu. This will open a new pane in the Editor pane displaying the writer data as shown below.



8) Let's check the data. We can see the results of our transform with the three writers and their associated local and global variable values displayed. This is as we expected from the information reported by the output pane.

9) Let's close the data pane and disconnect from the data store. Click on the ⊠ icon to close the data view pane for **WRITER**.

10) Now move the cursor over the name of the data model in the **Transform Target** pane again and display the context menu for the data model.



11) Note that the Disconnect option is active now. Click on this to disconnect from the data store.