HITACHI
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Pentaho Data Integration

Data Enrichment

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Date

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Module Objectives

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When you complete this module, you should be able to:

- Understand how to implement the various Joins:
  - Cross Join
  - Merge Join
  - Database Join
- Understand the difference between Joins and Lookups
- Enrich the data with scripting steps

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Joins

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Topics

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- Merge
- Joins
- Lookups
- Scripting

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Join Rows (Cross | Cartesian)

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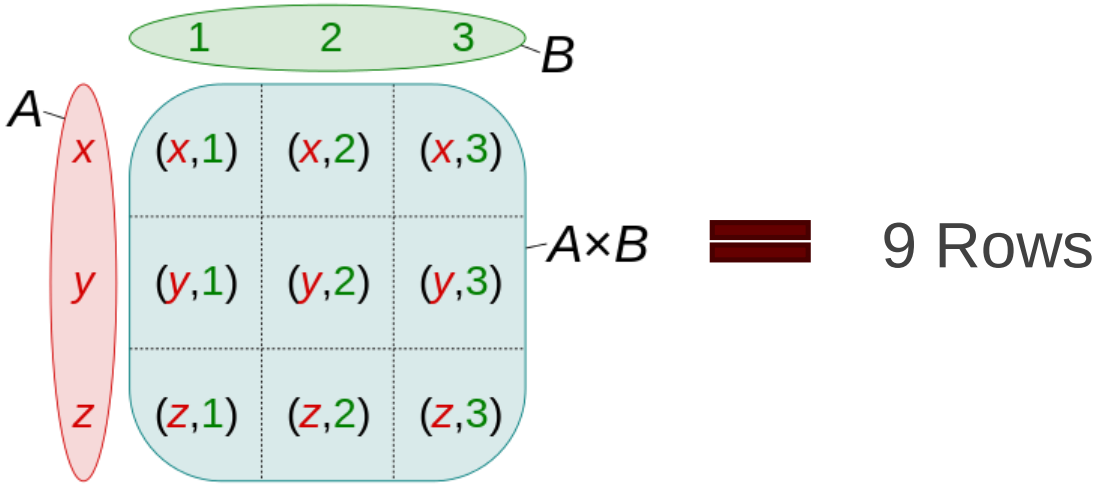
- The Join rows step allows you to produce combinations (Cartesian product) of all rows in the input streams. This normally happens when no matching **join** columns are specified. For example, if table A with 10 rows is joined with table B with 10 rows, a (**Cross) Join** will return 100 rows (Cartesian Product).
  - An alternative with a higher performance in most cases is the Merge Join step.



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Lab 1 – Join Rows

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Lab 1 - Join Rows (Name Selector)

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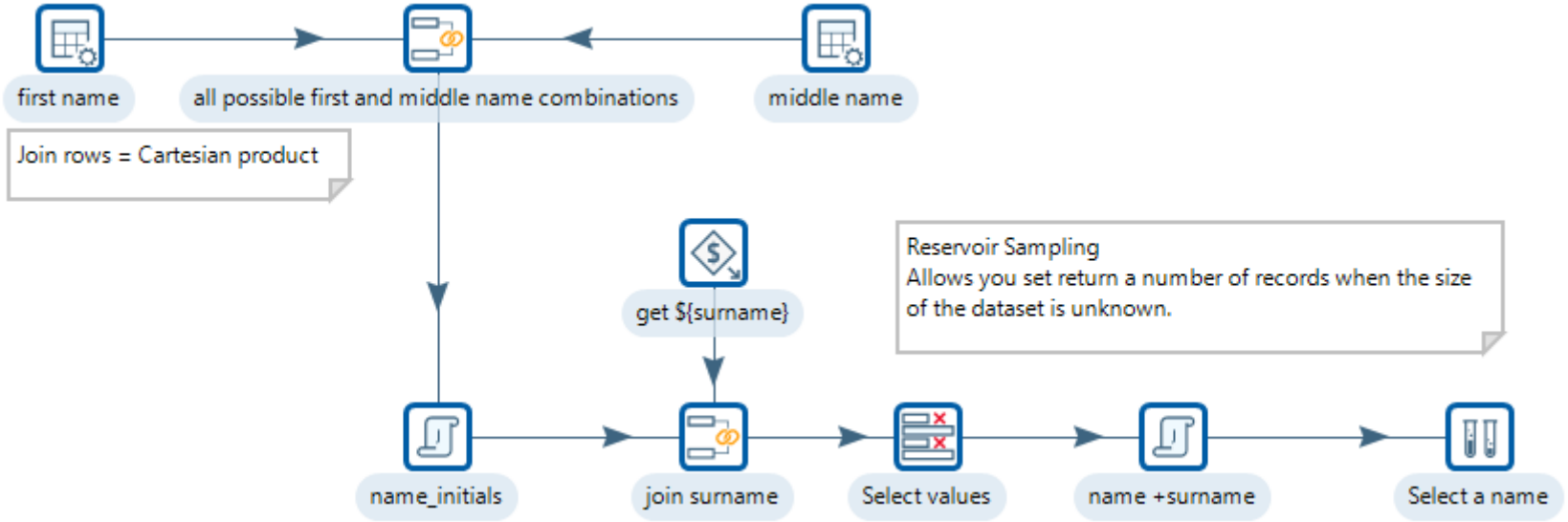

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Examples of SQL Joins

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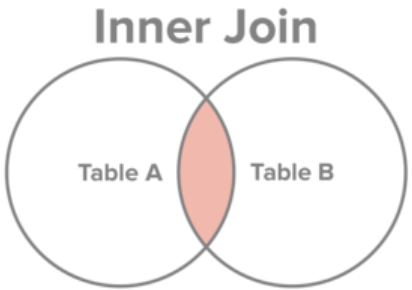
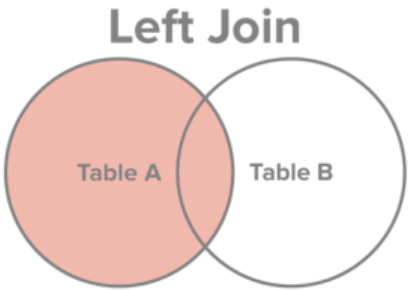
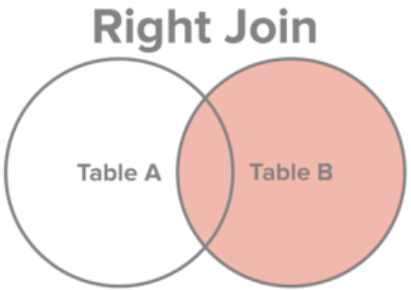


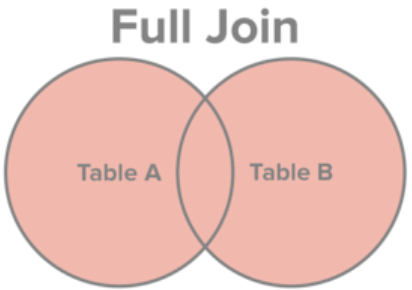
Select all records from Table A and Table B, where the join condition is met.



Select all records from Table A, along with records from Table B for which the join condition is met (if at all).



Select all records from Table B, along with records from Table A for which the join condition is met (if at all).



Select all records from Table A and Table B, regardless of whether the join condition is met or not.

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Lab 2 – Join Rows

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Lab 2 - Merge Join

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- Merge join step performs a merge join between data sets using data from two different input steps.
  - Join options: INNER, LEFT OUTER, RIGHT OUTER, and FULL OUTER

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Merge Join refresher.

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Table a

ID	Value
1	A
2	B
3	C
4	D

Table b

ID	Value
1	Red
3	Blue
5	Yellow

a	b
A	Red
C	Blue

A regular INNER join between two tables will produce a result set with only the common values from both tables.

a	b
A	Red
B	NULL
C	Blue
D	NULL

A LEFT OUTER join will display all the values from the left table, matching values from the right table, and inserting NULL values for non-matching values.

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Merge Join refresher.

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Table a

ID	Value
1	A
2	B
3	C
4	D

Table b

ID	Value
1	Red
3	Blue
5	Yellow

a	b
A	Red
C	Blue
NULL	Yellow

A RIGHT OUTER join will display all the values from the right table, matching values from the left table, and inserting NULL values for non-matching values.

a	b
A	Red
B	NULL
C	Blue
D	NULL
NULL	Yellow

A full OUTER join is not available in MySQL. It takes the values from both tables, inserting NULL values for non-matching values.

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Lab 2 - Merge Join - Overview

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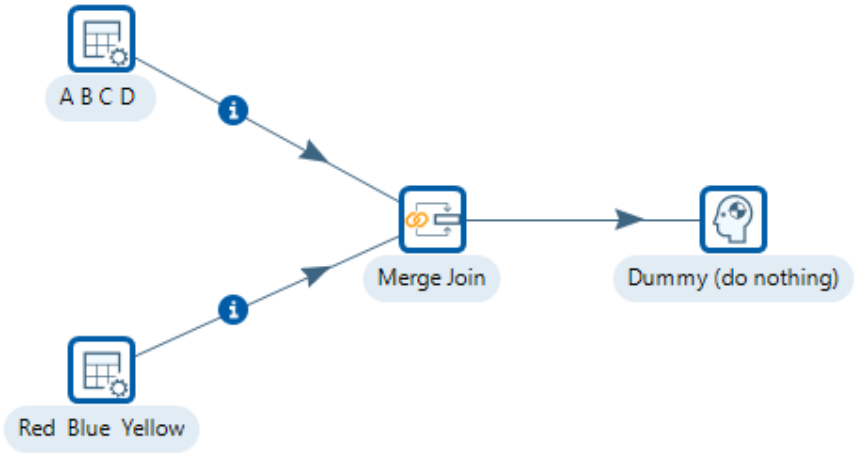
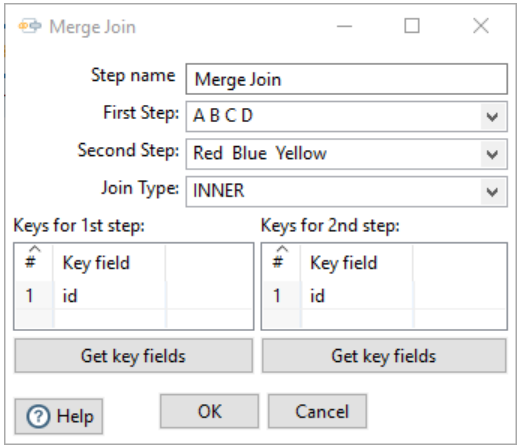
Simple merge join demonstration.





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Lab 2 - Merge Join - Orders

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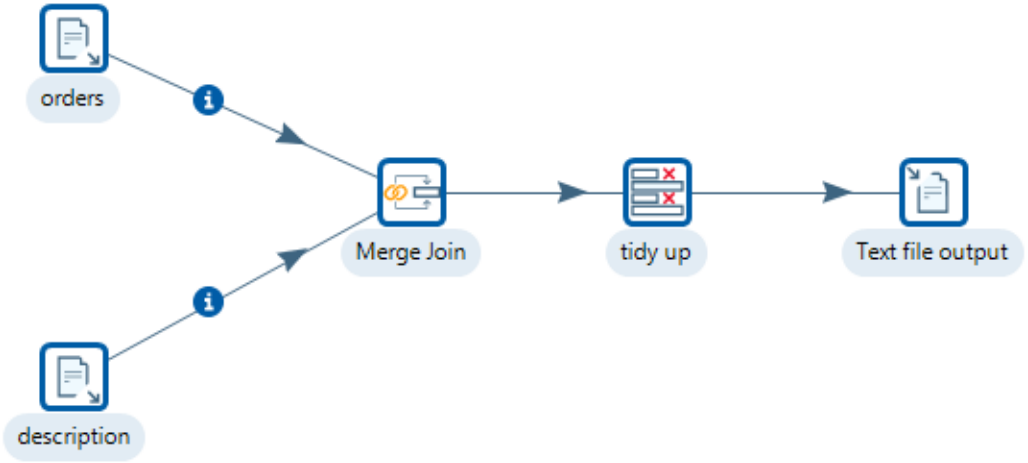
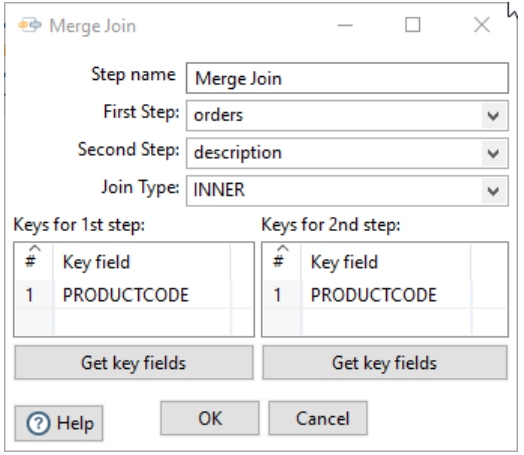
Solves the problem of merge rows.. GD4-1-1
With a 'join' you dont have to ensure that each data stream has the same structure / layout.





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Lab 3 – Database Join

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Lab 3 - Database Join

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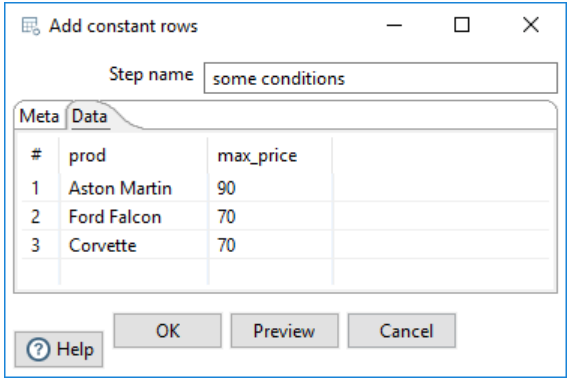
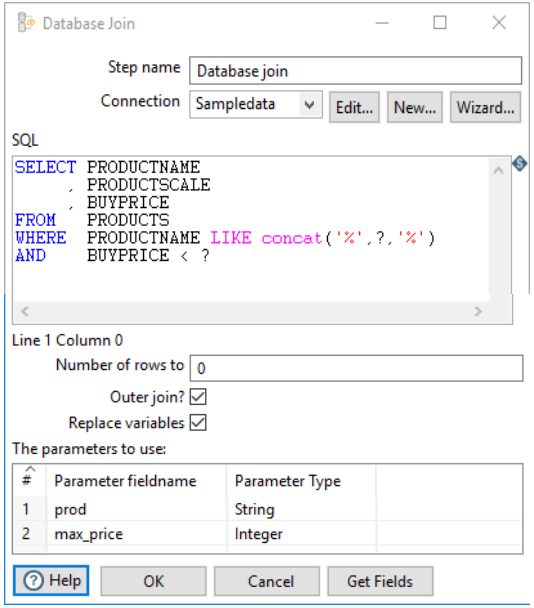
- Searching for information in databases, text files, web services, and so on, is a very common task.
- The Database Join compares a dataset of records against the table using variables / parameters.





As its uses an Outer Join, All the rows from the datasets are returned.

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Lab 3 - Database Join

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- The first record

```
WHERE PRODUCTNAME LIKE concat ('%','Aston Martin','%') AND BUYPRICE < 90
```

The other database fields are returned as stream fields.

- The second record

```
WHERE PRODUCTNAME LIKE concat ('%',‘Ford Falcon','%') AND BUYPRICE < 70
```

No ‘Ford Falcon’ values were found with a BUYPRICE <70, so the fields returned NULL values.

- The third record

```
WHERE PRODUCTNAME LIKE concat ('%’,‘Chevette','%') AND BUYPRICE < 70
```

The other database fields are returned as stream fields.

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Lookups

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Database Lookup Tables

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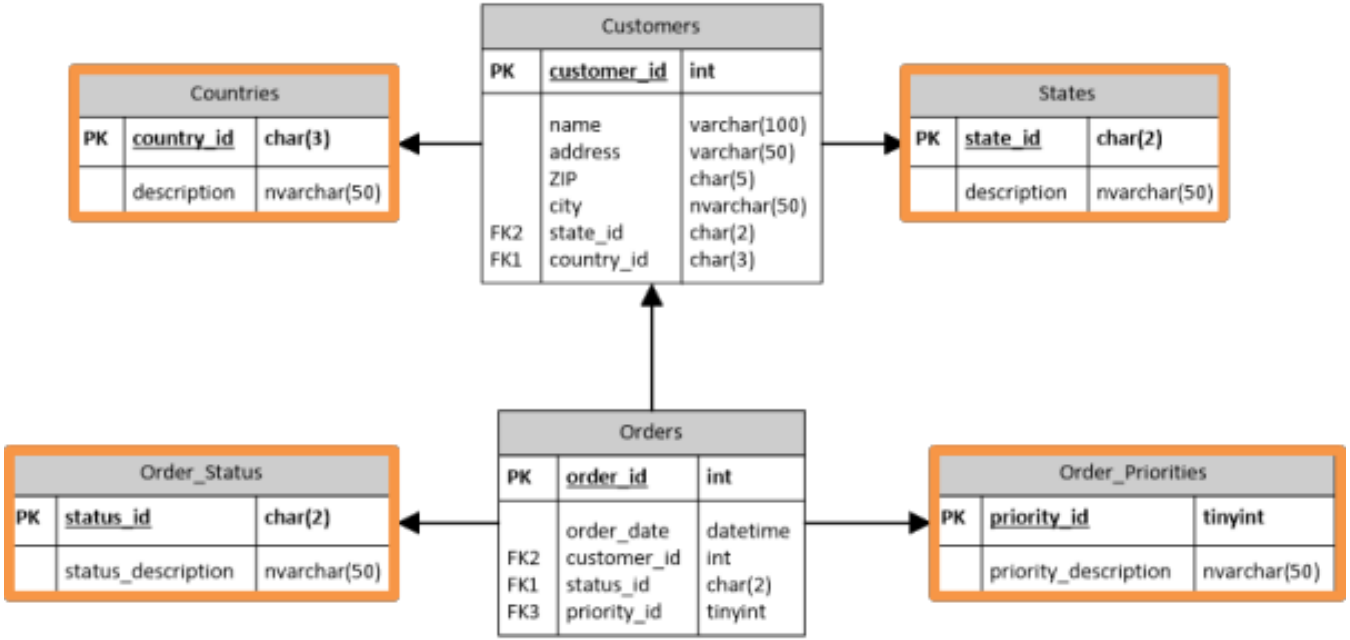
- Besides transforming the data, you may need to search and bring data from other sources.



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Lab 1 – Database Lookups

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Lab 1 - Database Lookup

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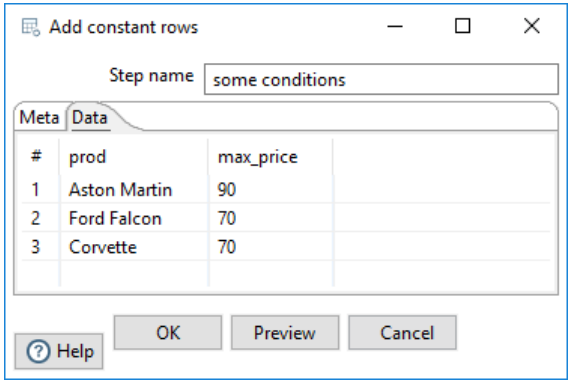
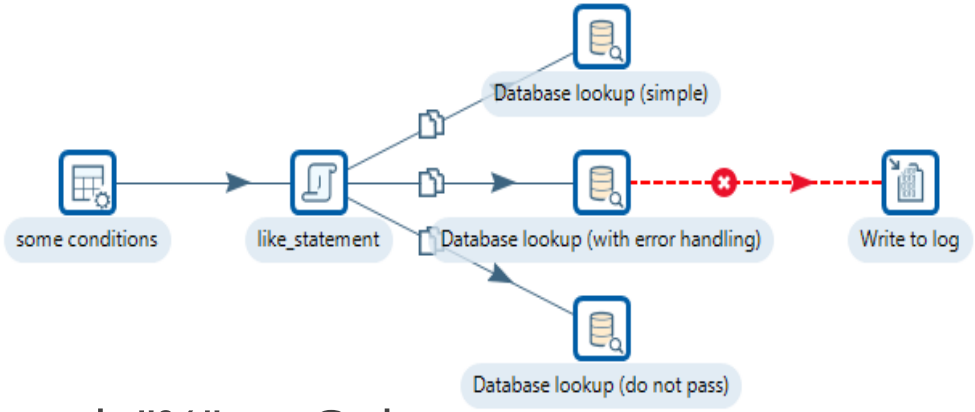
- Simple - straightforward lookup, returns a single
- Error - rows that don't compare are streamed to error step
- Do not pass – don't pass error





- like_statement "%"+prod+"%" String

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Lab 1 - Database Lookup

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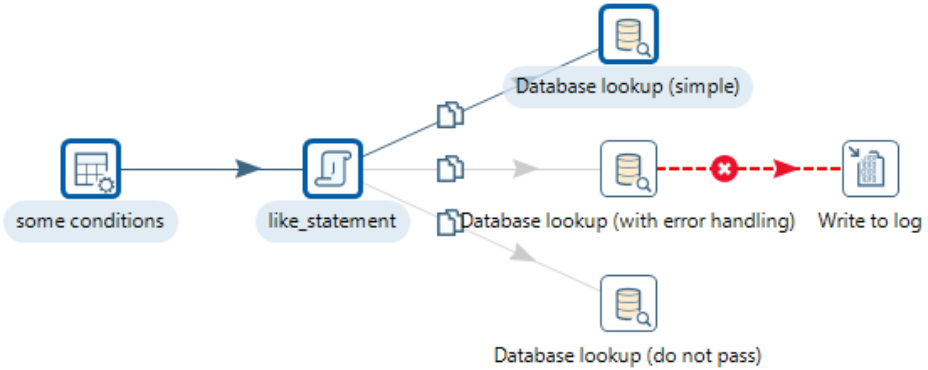
- Simple



Execution Results

Execution History | Logging | Step Metrics | Performance Graph | Metrics | Preview data

First rows | Last rows | Off — Inspect Data

#	prod	max_price	like_statement	PRODUCTNAME	PRODUCTSCALE
1	Aston Martin	90	%Aston Martin%	1965 Aston Martin DB5	1:18
2	Ford Falcon	70	%Ford Falcon%	not available	<null>
3	Corvette	70	%Corvette%	1958 Chevy Corvette Limited Edition	1:24

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Lab 1 - Database Lookup

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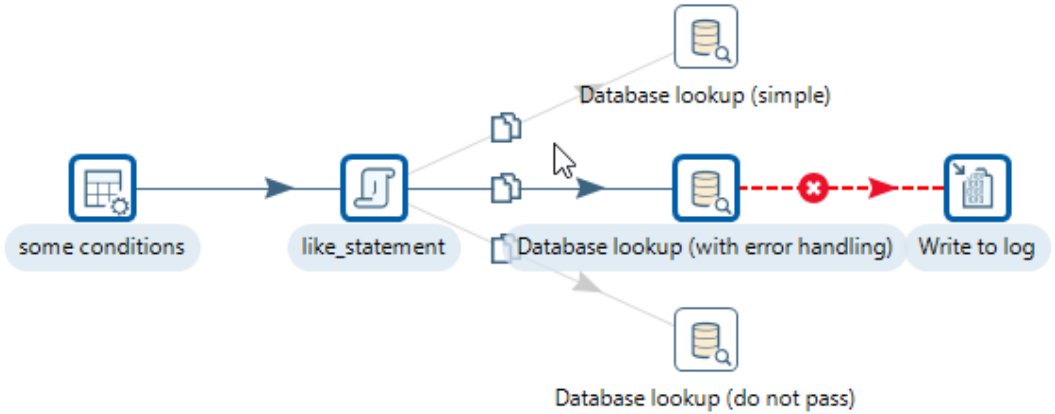
- Error




```
2016/12/10 18:26:48 - Spoon - Launching transformation [GD4-2-1_databse_lookup]...
2016/12/10 18:26:48 - Spoon - Started the transformation execution.
2016/12/10 18:26:48 - GD4-2-1_databse_lookup - Dispatching started for transformation [GD4-2-1_databse_lookup]
2016/12/10 18:26:48 - some conditions.0 - Finished processing (I=0, O=0, R=0, W=3, U=0, E=0)
2016/12/10 18:26:48 - like_statement.0 - Finished processing (I=0, O=0, R=3, W=3, U=0, E=0)
2016/12/10 18:26:48 - Write to log.0 -
2016/12/10 18:26:48 - Write to log.0 - ------------> Linenr 1----------------------------
2016/12/10 18:26:48 - Write to log.0 - no productname match at that price
2016/12/10 18:26:48 - Write to log.0 -
2016/12/10 18:26:48 - Write to log.0 - Ford Falcon
2016/12/10 18:26:48 - Write to log.0 - 70
2016/12/10 18:26:48 - Write to log.0 - %Ford Falcon%
2016/12/10 18:26:48 - Write to log.0 -
2016/12/10 18:26:48 - Write to log.0 - ====================
2016/12/10 18:26:48 - Database lookup (with error handling).0 - Finished processing (I=2, O=0, R=3, W=2, U=0, E=1)
2016/12/10 18:26:48 - Write to log.0 - Finished processing (I=0, O=0, R=1, W=1, U=0, E=0)
2016/12/10 18:26:48 - Spoon - The transformation has finished!!
```

Execution Results

Execution History | Logging | Step Metrics | Performance Graph | Metrics | Preview data

First rows | Last rows | Off — Inspect Data

#	prod	max_price	like_statement	PRODUCTNAME	PRODUCTSCALE
1	Aston Martin	90	%Aston Martin%	1965 Aston Martin DB5	1:18
2	Corvette	70	%Corvette%	1958 Chevy Corvette Limited Edition	1:24

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Lab 1 - Database Lookup

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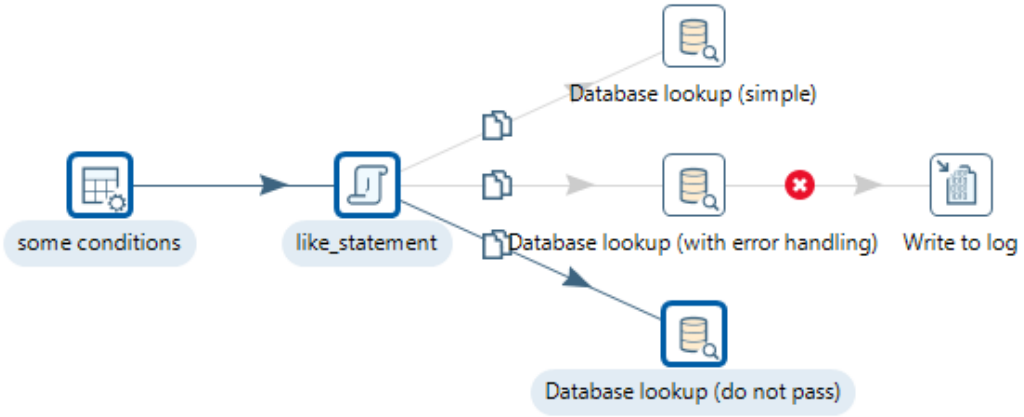
- Do not pass



Execution Results

Execution History | Logging | Step Metrics | Performance Graph | Metrics | Preview data

First rows | Last rows | Off | Inspect Data

#	prod	max_price	like_statement	PRODUCTNAME	PRODUCTSCALE
1	Aston Martin	90	%Aston Martin%	1965 Aston Martin DB5	1:18
2	Corvette	70	%Corvette%	1958 Chevy Corvette Limited Edition	1:24

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Scripting

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Scripting

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- Love-hate relationship: maintainability vs. power and flexibility
- Historically, Java Script step was PDI's "duct tape", taking care of complex transformation work
- Over the years more standard steps and job entries got introduced
- As a general rule of thumb, avoid using scripting altogether

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Lab 1 – Formula

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Lab 1 - Formula Step

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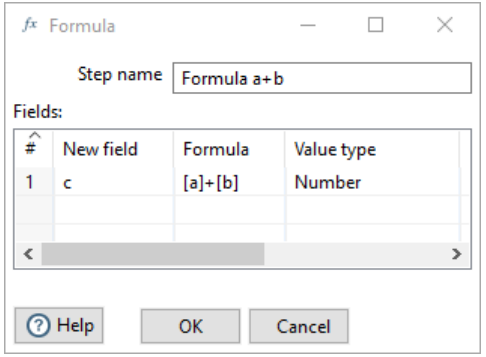
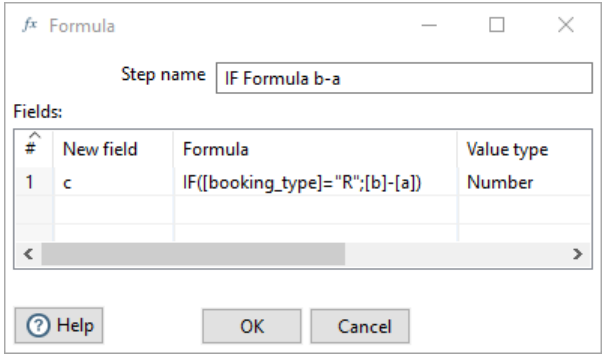
- Oasis OpenFormula syntax (also used in Calc, OpenOffice)

  http://docs.oasis-open.org/office/v1.2/OpenDocument-v1.2-part2.html

- Allows for more flexible formulas than the predefined ones in the Calculator step

- Conditional logic
  - No fields selector





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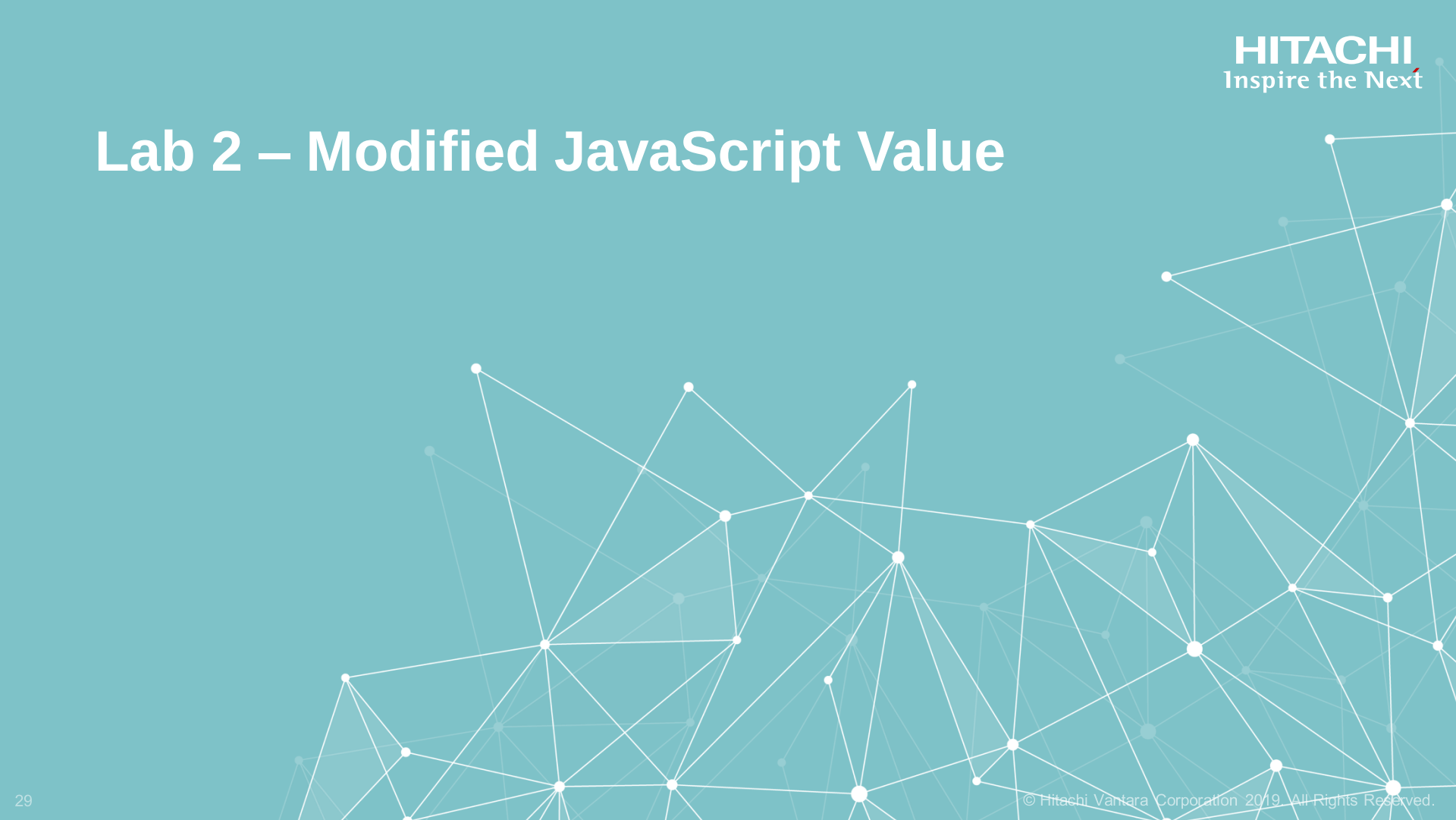
Lab 2 – Modified JavaScript Value



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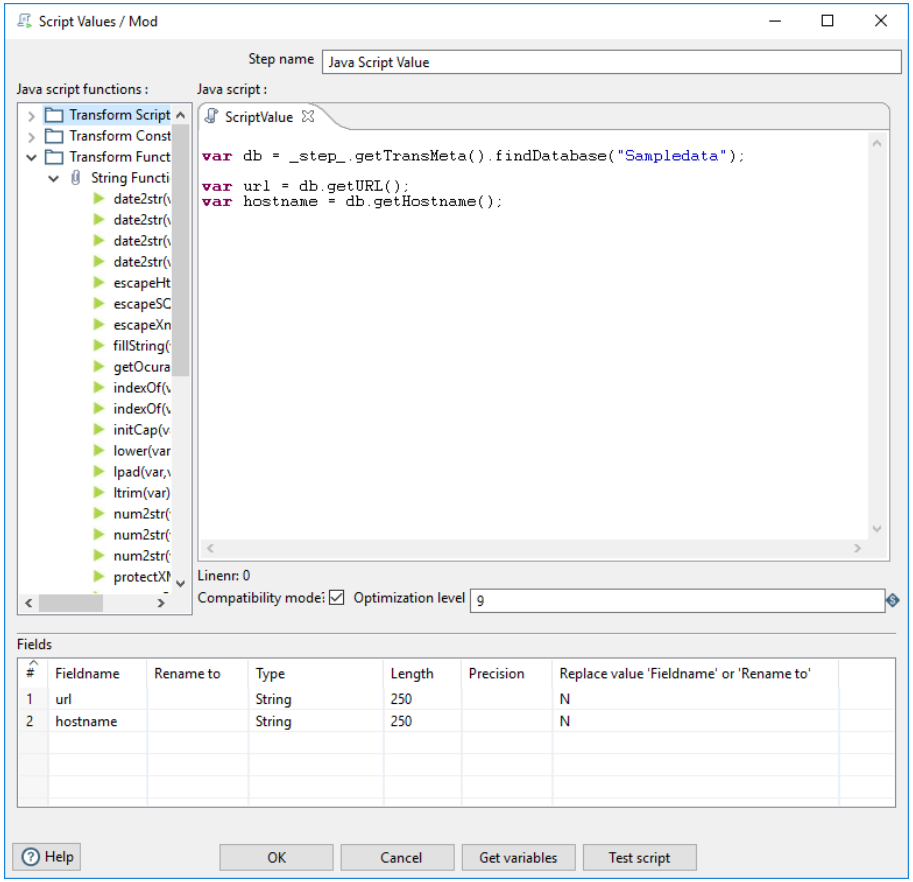
Modified JavaScript Value

- Using JavaScript in a transformation.
- Lots of inbuilt functions..
- Look in the samples folder ..



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Compatibility Mode

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What does the compatibility switch do?

- There are two version of the JavaScript engine: the 2.5 version and the 3 version. If "compatibility mode" is checked (and by default it is), JavaScript works like it did in version 2.5. Obviously the new version should be used if possible so uncheck "compatibility mode" if you can.

- The big difference between the two versions is that in 2.5, value objects are directly modifiable and their type can be changed (a date variable can be converted into a string). This can cause errors. Because this is no longer possible in the 3.0 version, the JavaScript should also be faster.

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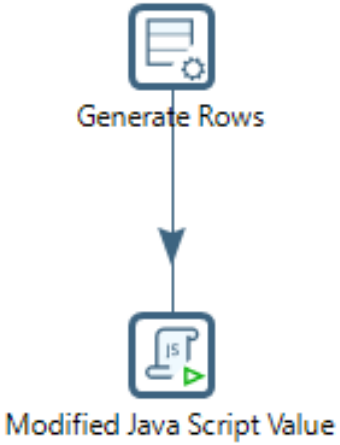
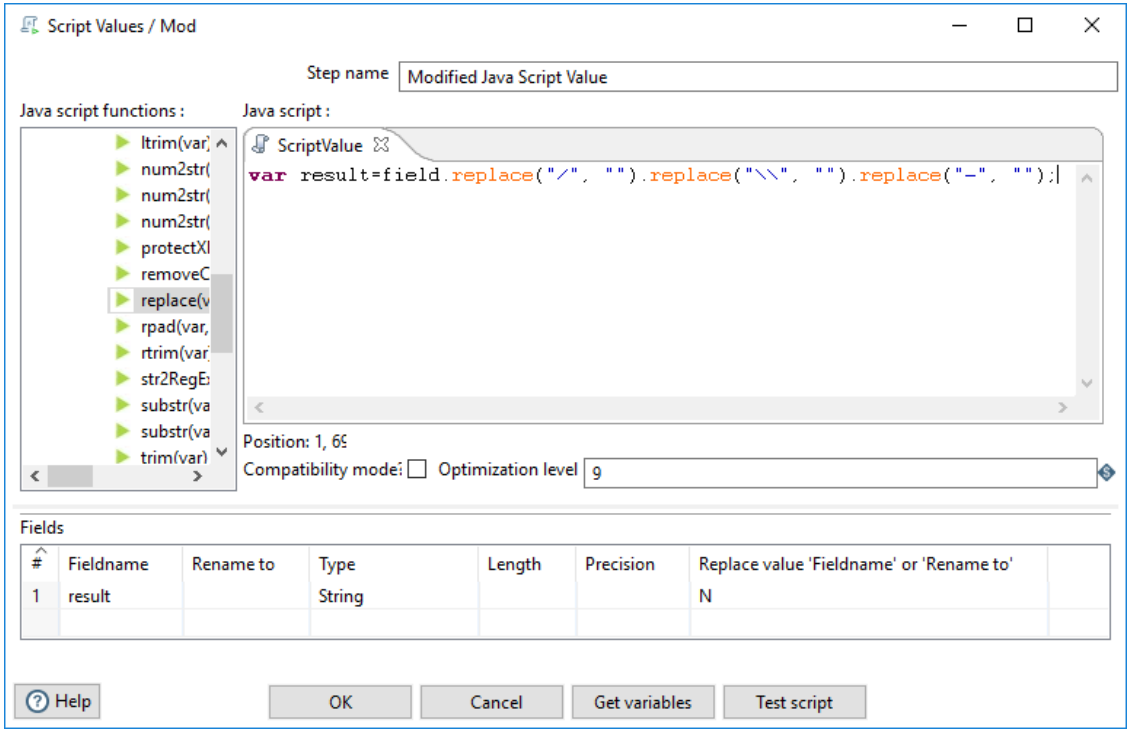
Lab 3 - Modified JavaScript Value





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Lab 3 – Java Class

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User Defined Java Class

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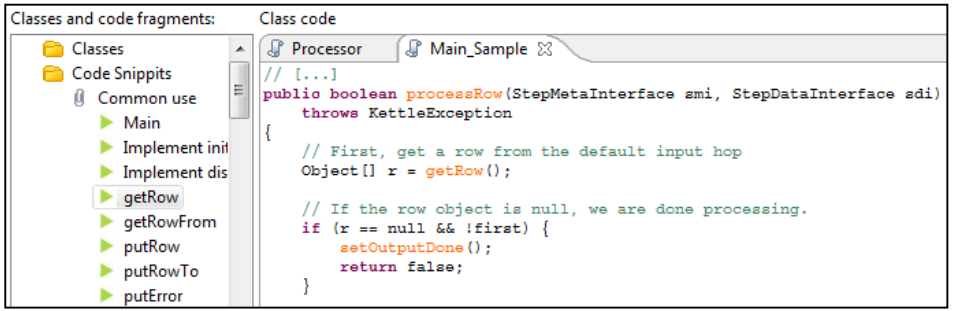
- Instead of just a single expression, this step lets you define a complete class, which allows you to write a Kettle plugin as a step.

  http://rpbouman.blogspot.co.uk/2009/11/pentaho-data-integration-javascript.html

  http://wiki.pentaho.com/display/EAI/Writing+your+own+Pentaho+Data+Integration+Plug-In

- The benefit of User Defined Java Class is to simplify the deployment process.

- Code snippets provide samples:



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User Defined Java Class

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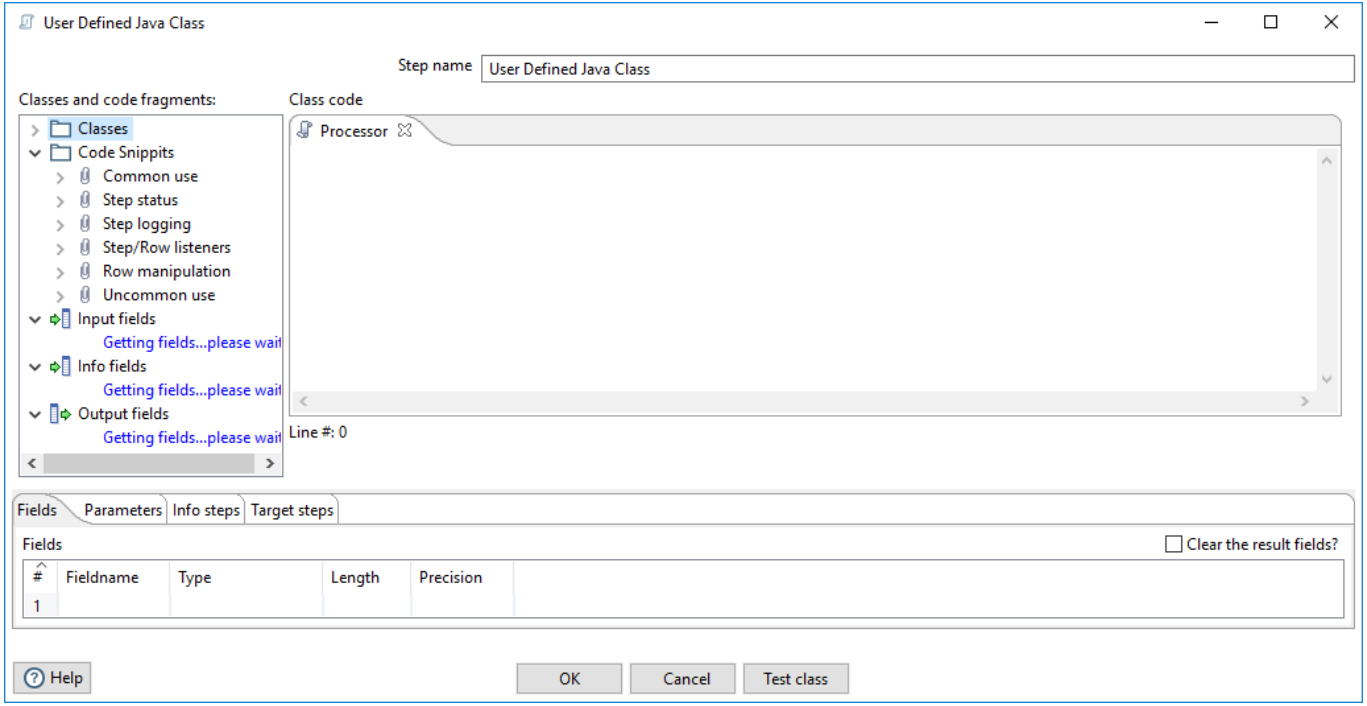
- Code snippet samples



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Module Recap

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- In this module, you should have learned to:
- Understand how to implement the various Joins:
  - Cross Join
  - Merge Join
  - Database Join
- Understand the difference between Joins and Lookups
- Enrich the data with scripting steps

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Thank You

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