

Solving the Payroll Problem using Business Rules of ARulesXL

Follow the steps of that procedure:

1. Open a new worksheet and define the facts (inputs) for the salary and the output. 1
2. Select the range in which you want place (declare) the Rule Set..... 1
3. Type the name you want give to the rule set in the opened dialog box 1
- 4) Define the Rules Set..... 2
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- 4-2) Define the rules 2
- 5) Define the output using RQuery() function 2

1. Open a new worksheet and define the facts (inputs) for the salary and the output.

Rename the worksheet if necessary (here renamed SalarySheet). The inputs defined as a table with columns and rows. The first three columns are input values. The value in cell for a given line (located by using the day name) can be referenced by its column name written without spaces between words (such as PlannedHours or WorkedHours).

Day	Planned Hours	Worked Hours	Salary
Monday	8	10	
Tuesday	8	12	
Wenesday	8	8	
Thursday	8	8	
Friday	5	11	
Saturday	0	8	
Sunday	0	0	
Total Salary			0

Input data and output column (Salary)

Type in cell A1 the title of this work
"Payroll Problem" (is only explanatory,
not required for the problem solution)
Type that table in the cells A3:D11
In the column Salary cells D4 to D10 will
be written the query on the rule set.
Cell D11 contains =Sum(D4:D10)

Define the fixed facts (parameters) in the cells A13:B16

Predefined Values (parameters)

Hourly salary:	18
Salary rise for overtime:	1.5
Weekend starts Friday on	13

Do not define yet the queries since you do not have defined the Rules Set. Define only the required formulas in Excel and use normal editing Excel functions.

2. Select the range in which you want place (declare) the Rule Set (F4:F13) and then press the right mouse button and choose New Rule Set from the opened popup.

3. Type the name you want give to the rule set in the opened dialog box (correct the range eventually). Type PayrollRulesSet as name for the Rule Set and then press the OK button.

The first cell in the range for the Rule Set must contain the rule set name.

- If you want enlarge the rules set range insert new rows/ columns using Excel Insert command;
- If you want delete rules from the rule set select first the rule(s) you want delete (highlight) and then choose Remove Set Rules from the ARulesXL menu (the popup opened by the right mouse button pressing or in the Add-Ins ribbon).
- To change the name of a Rules Set, simply edit his name.

4) Define the Rules Set.

The rules are declaratives so they are not introduced as the Excel formula after an = sign.

4-1) Define first the inputs using RArray() or RCell() functions

The definitions for input using RArray() and RCell() must be included in the Rules Set range and must be preceded by the = sign (assignment).

For our problem we use only RCell().

Type:

=RCell("HourlySalary",B14) in Rules Set cell F11

=RCell("HourlySalary",B14) in Rules Set cell F12

=RCell("WeekendStartsFridayOn",B16) in Rules Set cell F13

all these will be displayed on a declarative manner:

RCell: HourlySalary = 18 SalarySheet!B14
RCell: RiseOvertime = 1.5 SalarySheet!B15
RCell: WeekendStartsFridayOn = 13 SalarySheet!B16

4-2) Define the rules

Type each rule on a separate cell starting with F5

Salary= WorkedHours * HourlySalary WHEN (WorkedHours<=PlannedHours And NOT FreeTime)
--

Salary = PlannedHours * HourlySalary + RiseOvertime * (HourlySalary * (WorkedHours - PlannedHours)) WHEN (WorkedHours > PlannedHours or FreeTime)

FreeTime WHEN Day="Saturday" OR Day="Sunday"
--

FreeTime WHEN Day = "Friday" AND WorkedHours > WeekendStarts
--

5) Define the output using RQuery() function. Type in the first cell of the output column Salary (D4) the function:

=RQuery(PayrollRulesSet, "FIND Salary WHEN Day = _1 and PlannedHours = _2 and WorkedHours = _3", A4, B4, C4) and then copy this content in cells D5:D10

Press the right mouse button and choose from the opened popup or choose from ARulesXL menu in the Add-Ins ribbon Load Modified Rules. You must see the output evaluated

If you follow these steps the result must look like:

PayrollProblem.xls - Microsoft Excel

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Clipboard Font Alignment Number Styles Conditional Formatting Cell Styles Sort & Filter Find & Select

F4 PayrollRulesSet

Day	Planned Hours	Worked Hours	Salary
Monday	8	10	198
Tuesday	8	12	252
Wednesday	8	8	144
Thursday	8	8	144
Friday	5	11	252
Saturday	0	8	216
Sunday	0	0	0
Total Salary			1206

PayrollRulesSet

Salary = WorkedHours * HourlySalary WHEN (WorkedHours <= PlannedHours AND NOT FreeTime)
 Salary = PlannedHours * HourlySalary + RiseOvertime * (HourlySalary * (WorkedHours - PlannedHours)) WHEN (WorkedHours > PlannedHours OR FreeTime)
 FreeTime WHEN Day = "Saturday" OR Day = "Sunday"
 FreeTime WHEN Day = "Friday" AND WorkedHours > WeekendStarts

RCell: HourlySalary = 18 SalarySheet!B14
 RCell: RiseOvertime = 1.5 SalarySheet!B15
 RCell: WeekendStartsFridayOn = 13 SalarySheet!B16

Predefined Values (parameters)

Hourly salary:	18
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Ready