# DMCommunity Challenge – September

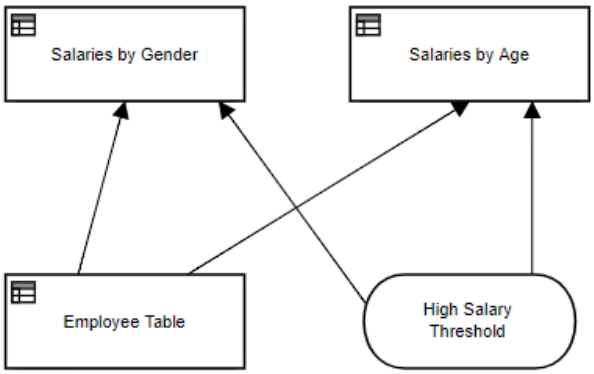
Bruce Silver, methodandstyle.com

## The Problem

As stated:

*A human resource office has information about all employees in every department including: salary, marital status, age, etc. Help the office to create a decision model that for each department calculates minimal, maximal, and average salaries along with a number of high-paid employees using rules like "Salary > 85000".*

| Name | Marital Status | Gender | Age | Salary |
|---|---|---|---|---|
| Robinson | Married | Female | 25 | 20000 |
| Warner | Married | Male | 45 | 150000 |
| Stevens | Single | Male | 24 | 35000 |
| White | Married | Female | 32 | 75000 |
| Smith | Single | Male | 46 | 110000 |
| Green | Married | Female | 28 | 40000 |
| Brown | Married | Male | 32 | 65000 |
| Klaus | Married | Male | 54 | 85000 |
| Houston | Single | Female | 47 | 35000 |
| Long | Married | Male | 29 | 40000 |
| Short | Single | Male | 22 | 20000 |
| Doe | Single | Female | 21 | 21000 |




## Analysis

This is not really a business decision but calculations on tabular data that could be embedded in some larger decision logic. This case shows off the capabilities of DMN and FEEL very well. The table provided omits a column for Department Number, so I added that, assigning the first 6 to Department 10 and the second 6 to Department 20. The tool is Trisotech DMN Modeler with embedded RedHat Drools 7 for execution.

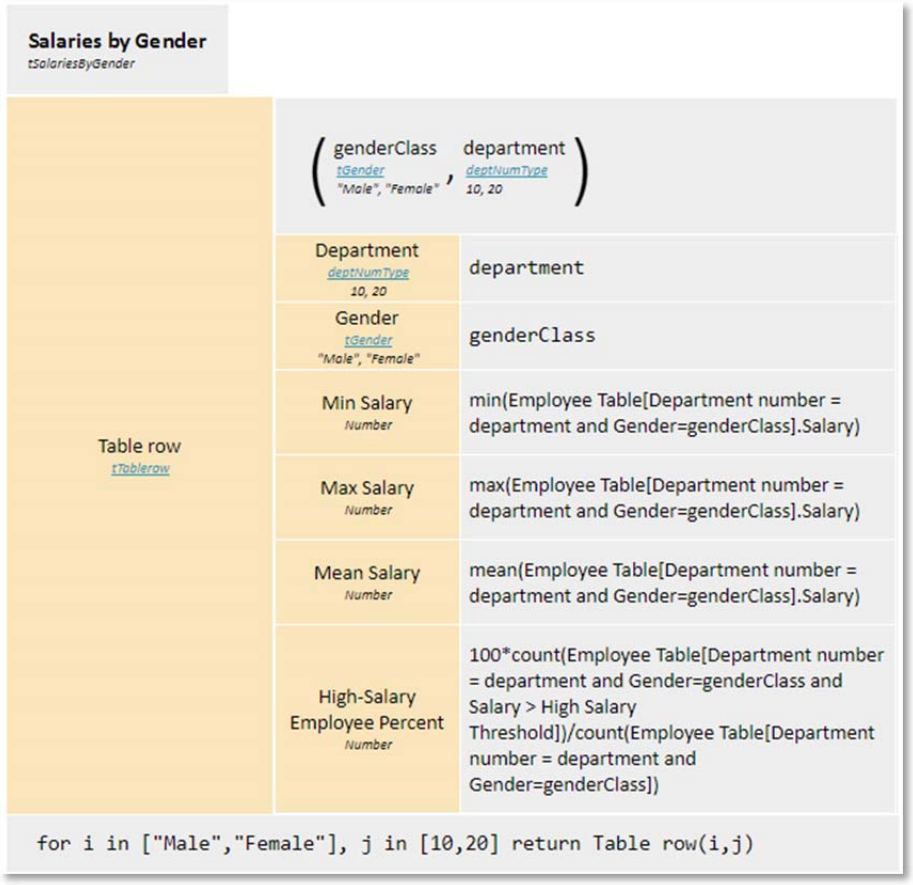
This is really about presentation of the results. I chose a tabular breakdown of salary metrics by department and gender, and another by department and age category. The DRD is shown above. The input is specified as a zero-input decision, *Employee Table*. Trisotech allows import of the table from Excel. There is one adjustable parameter, *High Salary Threshold*. I ran it with the suggested value $85,000.

*Salaries by Gender* is a context. Context entry *Table row* is a function definition, with parameters *genderClass* and *department*. *Table row* is a nested context, each context entry defining a column in the row. The final result box of *Salaries by Gender* iterates *Table row* over each gender and department, creating the table. Double iteration is supported by FEEL and by RedHat execution.

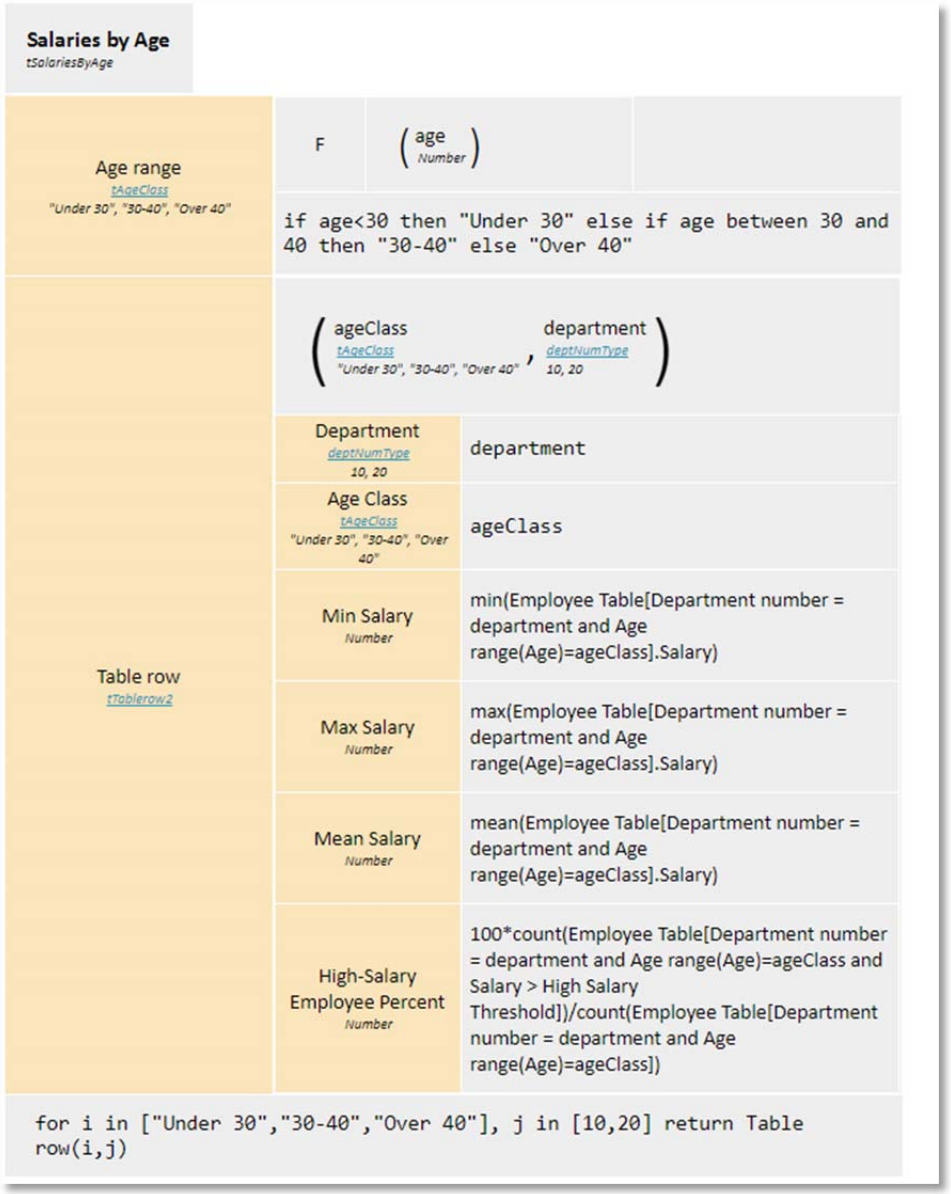
*Salaries by Age* is similar, except that here we need an additional function *Age range* to classify the employee age into one of 3 categories. This is the first context entry. *Table row* is similar to the one in *Salaries by Gender*, except that the logic now references the *Age range* function. Again, the final result box performs double iteration to create the table.

## Elements

**Salaries by Gender2 (Decision)**



## Salaries by Age (Decision)



**Salaries by Age**
*tSalariesByAge*

Age range
tAgeClass
"Under 30", "30-40", "Over 40"

F ( age Number )

```
if age<30 then "Under 30" else if age between 30 and 40 then "30-40" else "Over 40"
```

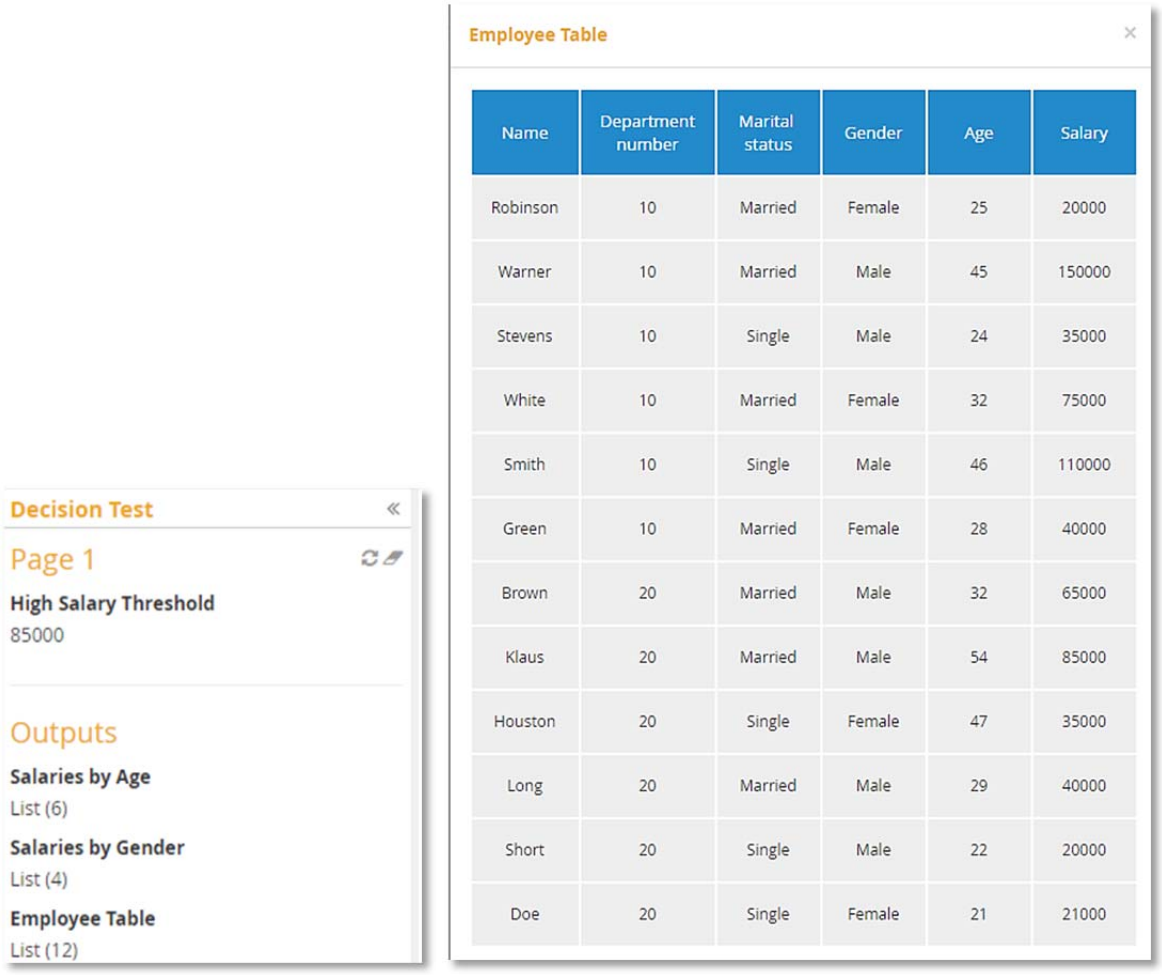
Table row
tTablerow2

( ageClass tAgeClass "Under 30", "30-40", "Over 40" , department deptNumType 10, 20 )

| | |
|---|---|
| Department deptNumType 10, 20 | department |
| Age Class tAgeClass "Under 30", "30-40", "Over 40" | ageClass |
| Min Salary Number | min(Employee Table[Department number = department and Age range(Age)=ageClass].Salary) |
| Max Salary Number | max(Employee Table[Department number = department and Age range(Age)=ageClass].Salary) |
| Mean Salary Number | mean(Employee Table[Department number = department and Age range(Age)=ageClass].Salary) |
| High-Salary Employee Percent Number | 100*count(Employee Table[Department number = department and Age range(Age)=ageClass and Salary > High Salary Threshold])/count(Employee Table[Department number = department and Age range(Age)=ageClass]) |

```
for i in ["Under 30","30-40","Over 40"], j in [10,20] return Table row(i,j)
```

## Execution


Employee Table
Name
Department number
Marital status
Gender
Age
Salary
Robinson 10 Married Female 25 20000
Warner 10 Married Male 45 150000
Stevens 10 Single Male 24 35000
White 10 Married Female 32 75000
Smith 10 Single Male 46 110000
Green 10 Married Female 28 40000
Brown 20 Married Male 32 65000
Klaus 20 Married Male 54 85000
Houston 20 Single Female 47 35000
Long 20 Married Male 29 40000
Short 20 Single Male 22 20000
Doe 20 Single Female 21 21000
Decision Test
Page 1
High Salary Threshold
85000
Outputs
Salaries by Age
List (6)
Salaries by Gender
List (4)
Employee Table
List (12)

## Salaries by Gender

| Department | Gender | Min Salary | Max Salary | Mean Salary | High-Salary Employee Percent |
|---|---|---|---|---|---|
| 10 | Male | 35000 | 150000 | 98333.333333 | 66.666667 |
| 20 | Male | 20000 | 85000 | 52500 | 0 |
| 10 | Female | 20000 | 75000 | 45000 | 0 |
| 20 | Female | 21000 | 35000 | 28000 | 0 |

## Salaries by Age

| Department | Age Class | Min Salary | Max Salary | Mean Salary | High-Salary Employee Percent |
|---|---|---|---|---|---|
| 10 | Under 30 | 20000 | 40000 | 31666.666667 | 0 |
| 20 | Under 30 | 20000 | 40000 | 27000 | 0 |
| 10 | 30-40 | 75000 | 75000 | 75000 | 0 |
| 20 | 30-40 | 65000 | 65000 | 65000 | 0 |
| 10 | Over 40 | 110000 | 150000 | 130000 | 100 |
| 20 | Over 40 | 35000 | 85000 | 60000 | 0 |