

Welcome to today's BRMS 30-minute webinar. We will begin shortly.

Hot Tips for Rule Modeling

Part II: When to Use Decision Tables & Decision Trees

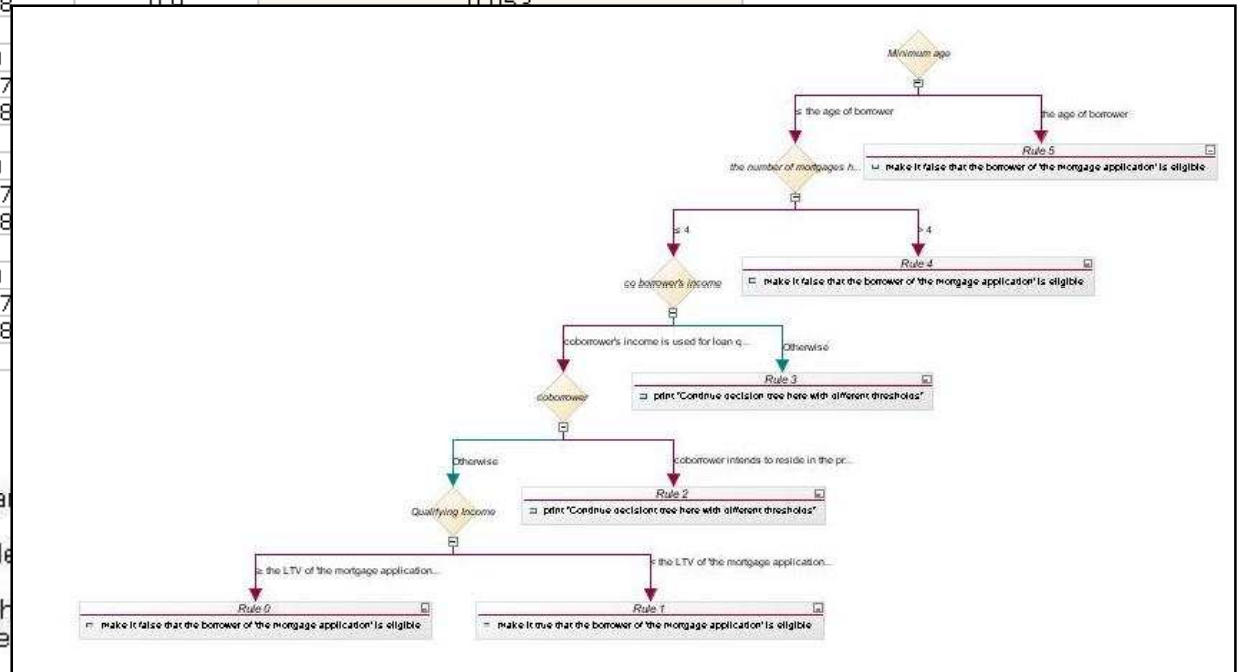
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- Most Rules are conceptualized as “if – then” rules
- BUT,
- Decision Tables provide rules in an Excel table like format, with columns that correspond to conditions and actions
 - Decision Trees provide a graphic, tree-like structure with nodes that correspond to conditions, and leaf nodes that correspond to results

Three kinds of Rule Artifacts

	Loan duration (y)		Loan to Value		Yearly interest rate
	Min	Max	Min	Max	
0			0	0.7	0.05
1		< 5	0.7	0.8	0.052
2			0.8	0.9	0.053
3					
4			0		
5	5	8	0.7		
6			0.8		
7					
8			0		
9	9	12	0.7		
10			0.8		
11					
12			0		
13	13	17	0.7		
14			0.8		
15					



definitions

set 'minimum income' to 0.37 * the year
 if
 the yearly repayment of 'the loan' is at least
 then
 in 'the loan report' , refuse the loan with
 " + (formatted amount) the yearly repayment

definitions

set 'maxAmount' to 1000000 ;
 if
 the amount of 'the loan' is at least maxAmount
 then
 in 'the loan report' , reject the data with the message "The loan cannot exceed " + maxAmount ;

All three artifacts are really Business Rules

When do we use decision tables?



- When the conditions and actions of the rules use the same objects and attributes repeatedly, for example:

IF
The yearly repayment of the loan is between 0 and 10000
And the score is at least 900
THEN set the grade of the loan to A

IF
The yearly repayment of the loan is between 10000 and 30000
And the score is between 600 and 900
THEN set the grade of the loan to B

IF
T
A
T
IF
T
A
T
IF
T
3
A
T

	Yearly repayment		Corporate score		Grade	Message
	Min	Max	Min	Max		
0			≥ 900		A	Very low risk loan
1	0	10,000	600	900	A	Very low risk loan
2			300	600	B	Low risk loan
3			≥ 900		A	Very low risk loan
4	10,000	30,000	600	900	B	Low risk loan
5			300	600	C	Average risk loan
6			≥ 900		B	Low risk loan
7	30,000	60,000	600	900	C	Average risk loan
8			300	600	D	Risky loan
9			≥ 900		C	Average risk loan
10	≥ 60,000		600	900	D	Risky loan
11			300	600	E	Very risky loan

and
and

- Many rules authored at one time – provides authoring efficiency
- Easily understood by business people
 - *Especially if the knowledge came from tables*
- Rules may be loaded from Excel Spreadsheets

- Don't overuse Decision Tables!
- Signs that your data may not belong here include
 - Lots of empty cells in the decision tables – the data is not as structured and redundant as needed
 - Data is needed by a database, or decision table is generated from a database table
 - ***This may mean your “decision table” is a lookup table!***
 - Actions are heavily repeated – this may be OK, or may be a clue that logic needs attention.

- Is the information in the decision table used by other parts of the system?
- Does the information need to respond to an SQL query?
- Are there few or only one condition column, and many action columns?
- Is it difficult to think of this information in terms of “if – then” statements?

You may use Decision Tables to codify lookups!

Remember that DT Rows *are* rules



Editor

if

all of the following conditions are true :

- the duration (in years) of **'the loan'** is between 5 and 8
- the Loan to Value of **'the loan'** is at least 0.7 and less than 0.8 ,

then

set the yearly interest rate of **'the loan'** to 0.057 ;



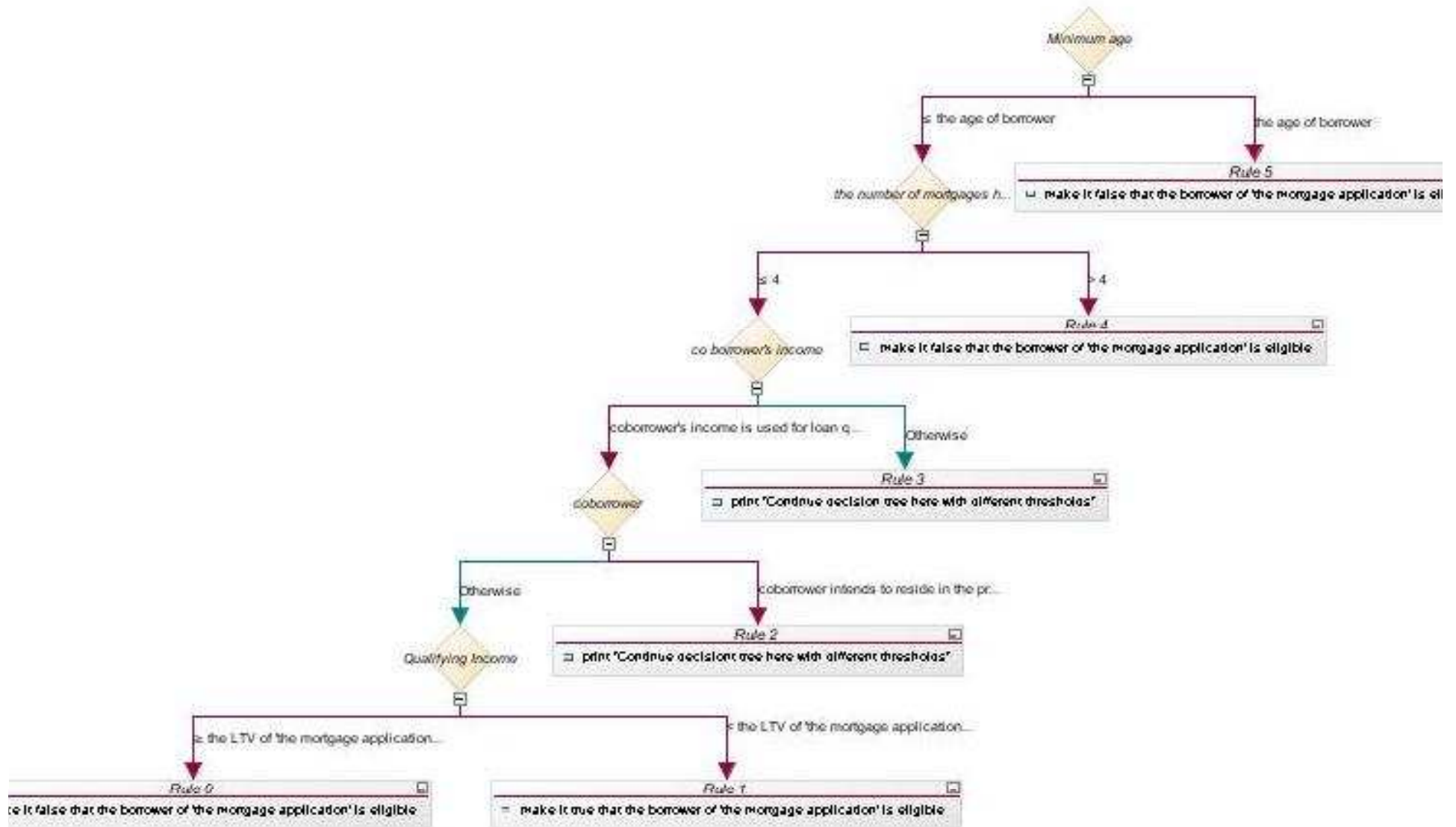
0 - 15 | 15 - 30 | 30 - 35 | All

	Loan duration (y)		Loan to Value		Yearly interest rate
	Min	Max	Min	Max	
0			0	0.7	0.05
1			0.7	0.8	0.052
2		< 5	0.8	0.9	0.053
3			≥ 0.9		0.055
4			0	0.7	0.056
5	5	8	0.7	0.8	0.057
6			0.8	0.9	0.058
7			≥ 0.9		0.059
8			0	0.7	0.06
9			0.7	0.8	0.061
10	9	12	0.8	0.9	0.062
11			≥ 0.9		0.063
12			0	0.7	0.064
13			0.7	0.8	0.065
14	13	17	0.8	0.9	0.066
15			≥ 0.9		0.067

- Less Common than decision tables
- Repeated logic, but asymmetric
- Can be harder for some business users to understand than tables OR rules
 - Use them when the expert knowledge is represented in tree form
- Classical uses include classification, diagnosis

- Nodes contain conditions
 - At each node ONE piece of information is evaluated
- Leaves contain actions
 - Each leaf contains all actions (should be one atomic action)
- Each path from root to leaf, including all traversed nodes is a rule

Decision Tree example



Also a collection of rules

definitions

set 'minimum age' to the minimum age for enforcing mortgages in the state of the property of 'the mortgage application' ;
set 'borrower' to the borrower of 'the mortgage application' ;
set 'coborrower' to a borrower in the co borrowers of 'the mortgage application' ;

if

<a boolean>

and all of the following conditions are true :

- 'minimum age' is at most the age of borrower
- the number of mortgages held by the borrower of 'the mortgage application' is at most 4
- coborrower's income is used for loan qualification
- it is not true that ((coborrower intends to reside in the property))
- the qualifying income of 'the mortgage application' is less than the LTV of 'the mortgage application' * 0.9 ,

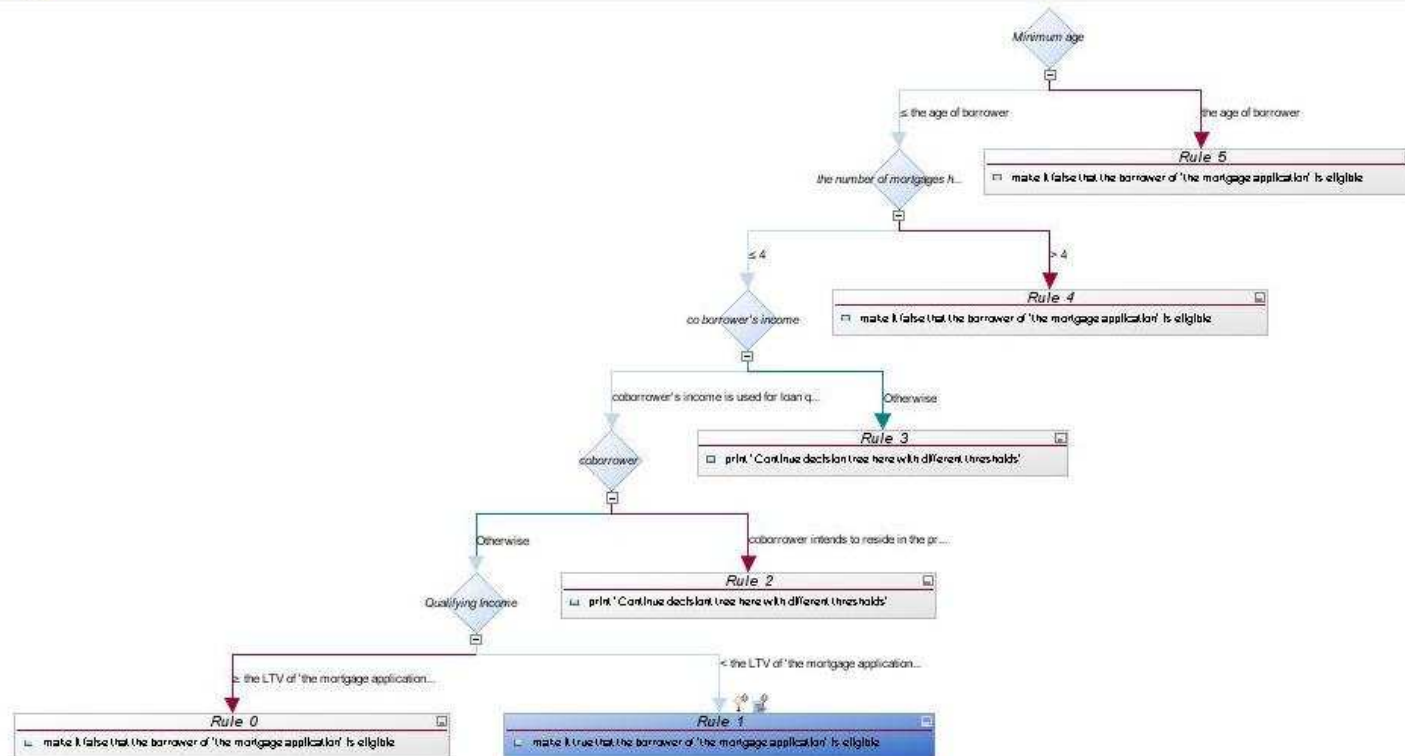
then

make it true that the borrower of 'the mortgage application' is eligible ;

Actions:

make it true that the borrower of 'the mortgage application' is eligible ;

SUBMIT



- Look for a lot of reuse of nodes
 - May mean you should use a table
- Is it hard to put together the tree, or to understand the logic
 - Then maybe BAL rules are better
- Generally, use a decision tree only if the knowledge is naturally represented in tree form

- Provide flexibility, and a variety of natural ways to represent rules
 - Business Rules (If – then) – for most situations
 - Decision Tables – repeated, symmetrical logic
 - Decision Trees – repeated, asymmetrical logic, decisions at nodes

Questions & Answers

Thank You.

*Any remaining questions will be answered on our
Business Rule Analysis & Modeling Blog*

<http://blogs.ilog.com/brmsmodeling/>



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