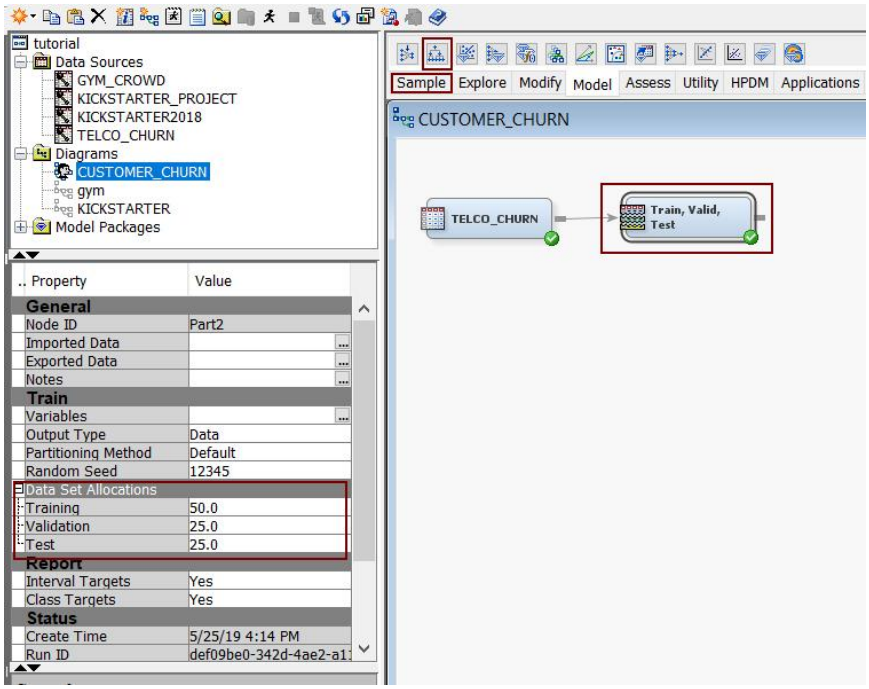
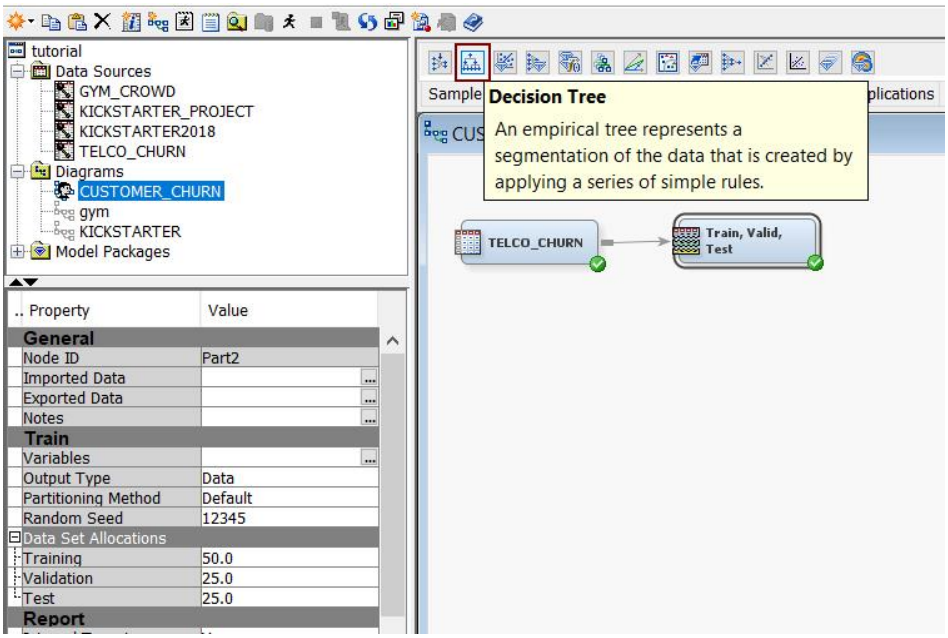
DECISION TREE

1. For the decision tree, you should partition the data into a train (50%), validation (25%) and test (25%) datasets: **SAMPLE → DATA SET ALLOCATIONS**

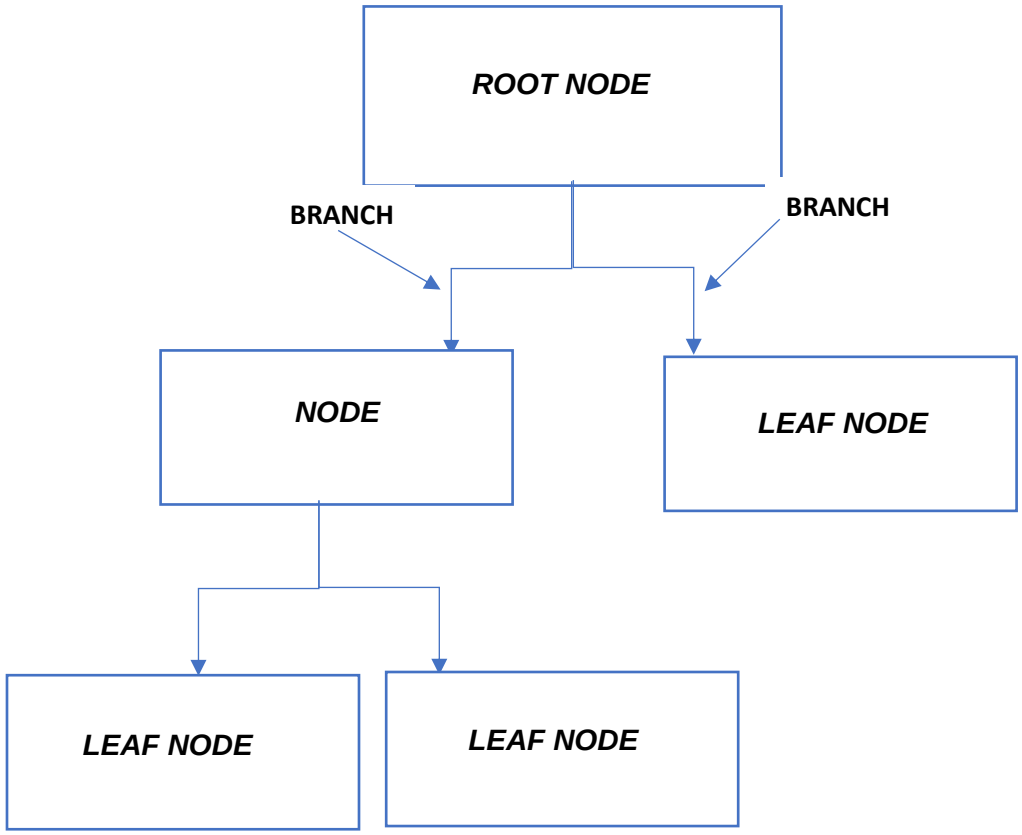
DRAG-AND-DROP THE DATASET → SAMPLE → DRAG-AND-DROP DATA PARTITION → DATA SET ALLOCATIONS → TRAIN: 50%, VALIDATION: 25%, TEST: 25% → MODEL → DRAG-AND-DROP DECISION TREE → MAKE ADJUSTMENTS → RUN



2. **MODEL → DECISION TREE (attach it to the partition node)**



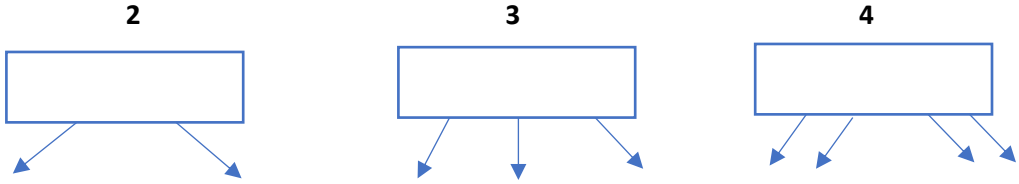
3. Tree structure



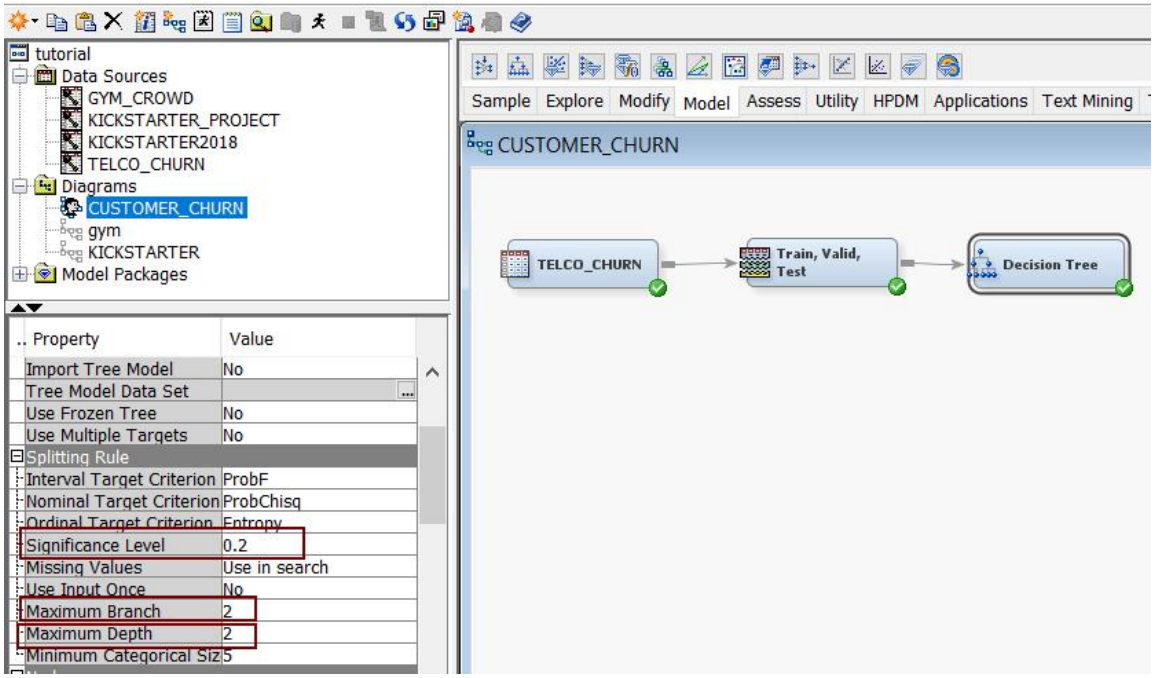
4. Splitting rule.

Here you can assign the following:

- **Significance level** (default = 0.2)
- **Maximum branch** – how many branches each node will have:

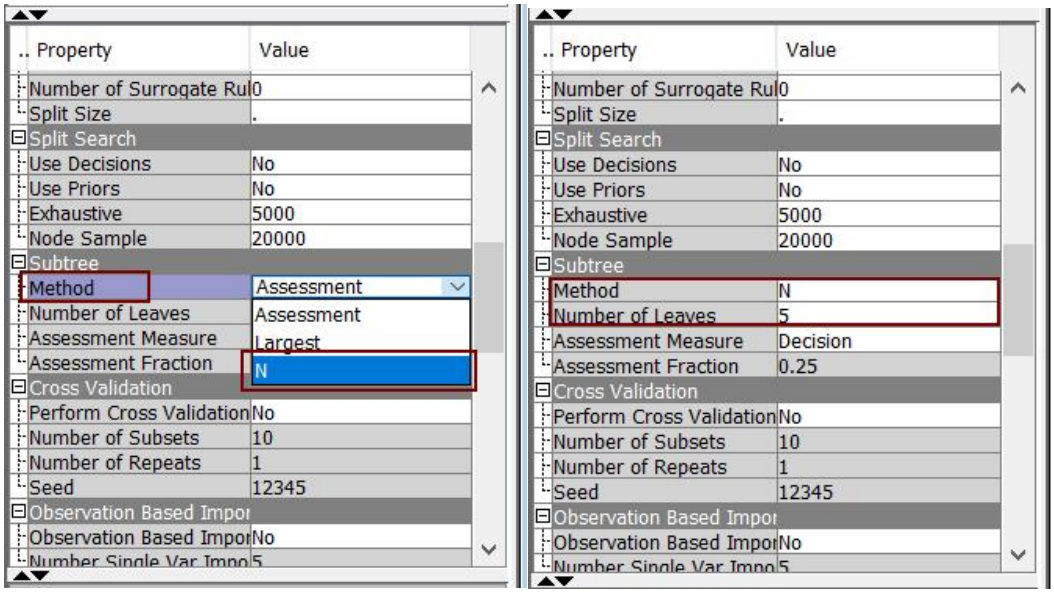


- **Maximum Depth** – how many nodes in addition to the root node the tree should have (the root node is considered to be a zero node). The tree in the example above (3) has a maximum depth of 2 nodes: Root node, which is considered a 0 node, and two downward nodes.

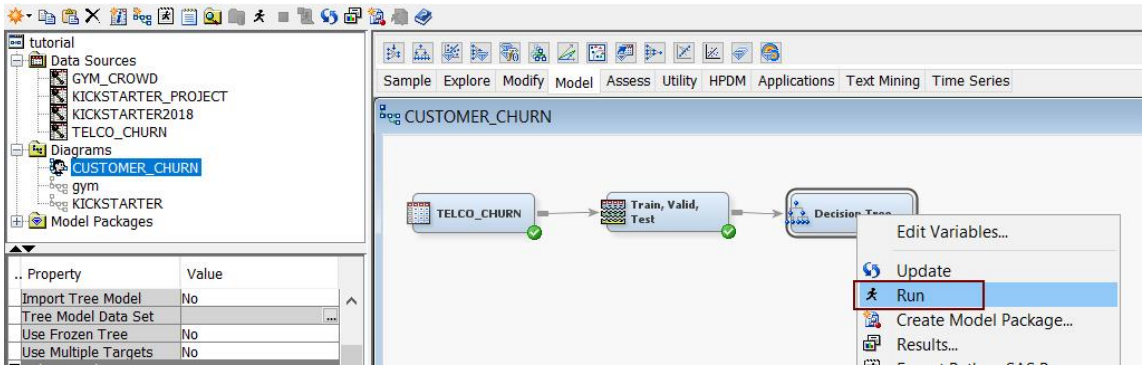


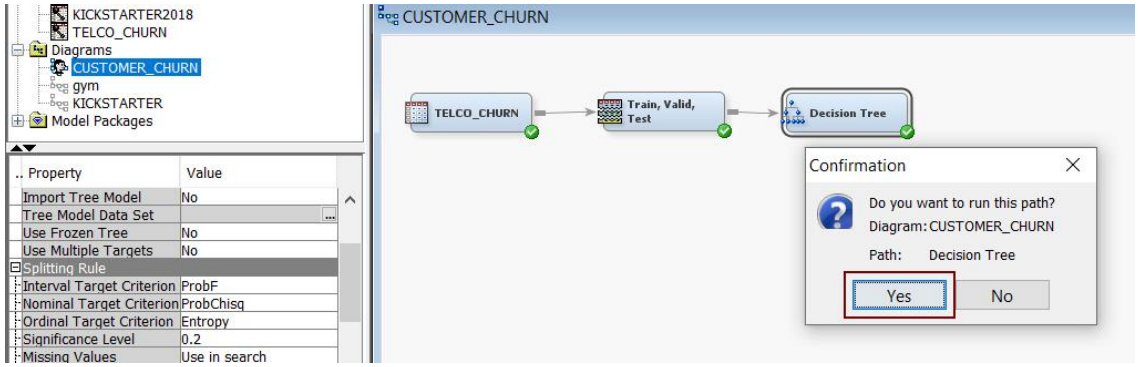
5. Subtree:

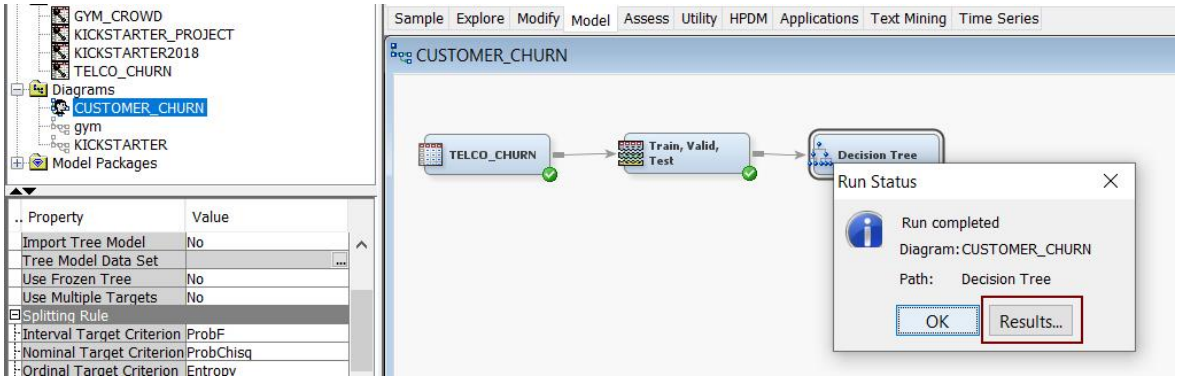
Here you can adjust how many ending nodes (or leaves, leaf nodes) the final tree should have). To be able to select adjust that, choose **METHOD → N → NUMBER OF LEAVES (SET THE NUMBER)**



6. Once you have made all the adjustments, **RIGHT-CLICK ON THE DECISION TREE NODE → RUN → YES → RESULTS**



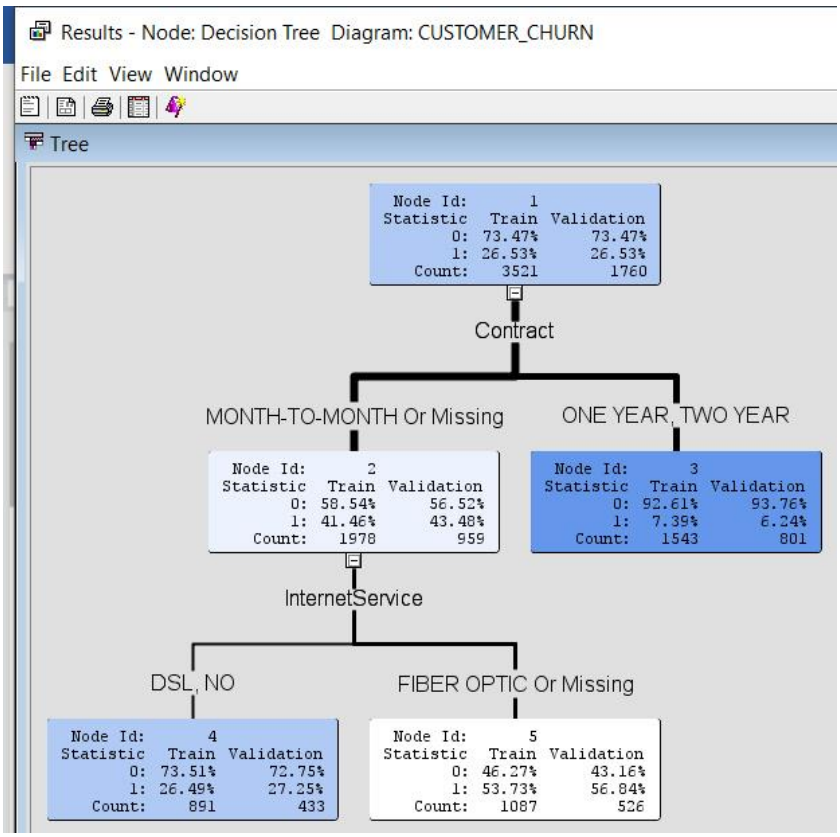




A) A tree example.

The resulting tree (shown below) has the following settings:

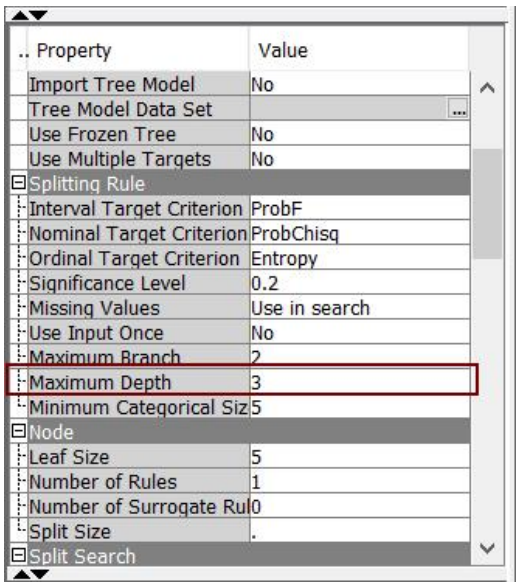
- **Maximum branch:** 2
- **Maximum depth:** 2

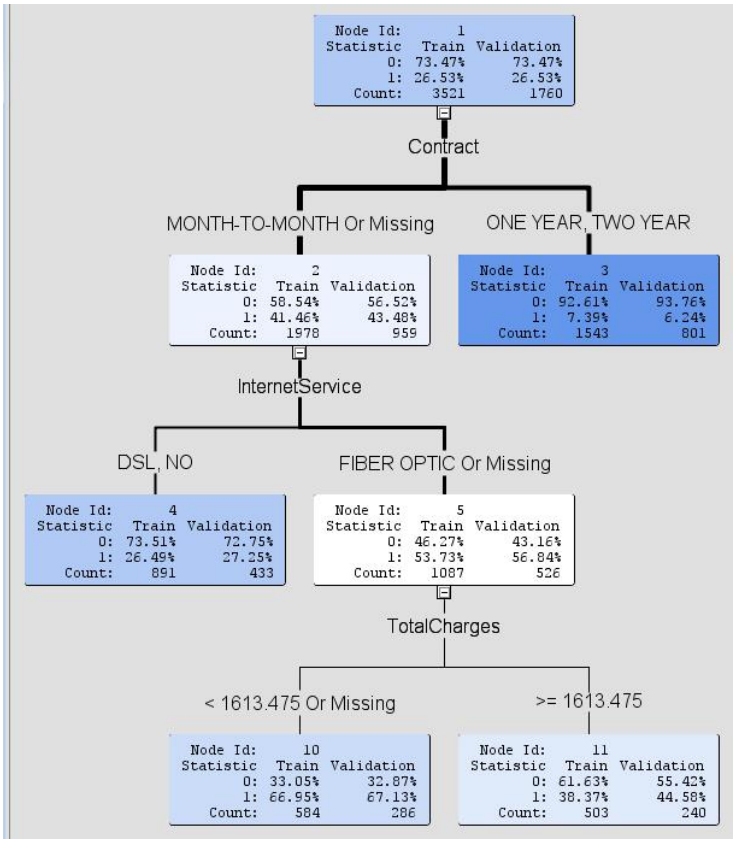


B) Another example:

Maximum branch: 2

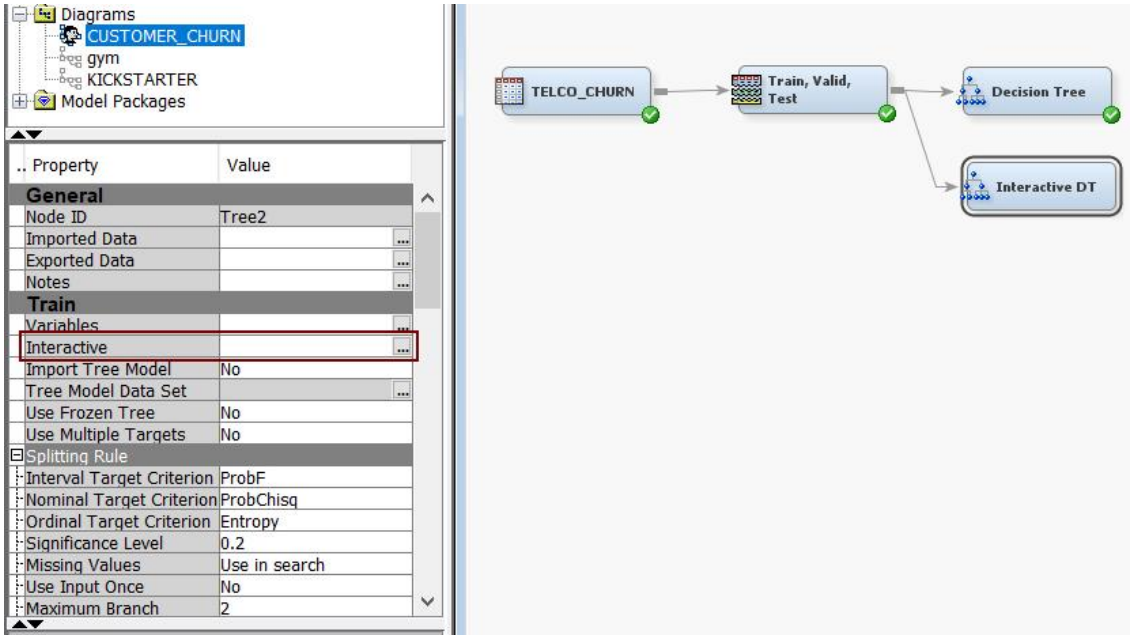
Maximum depth: 5

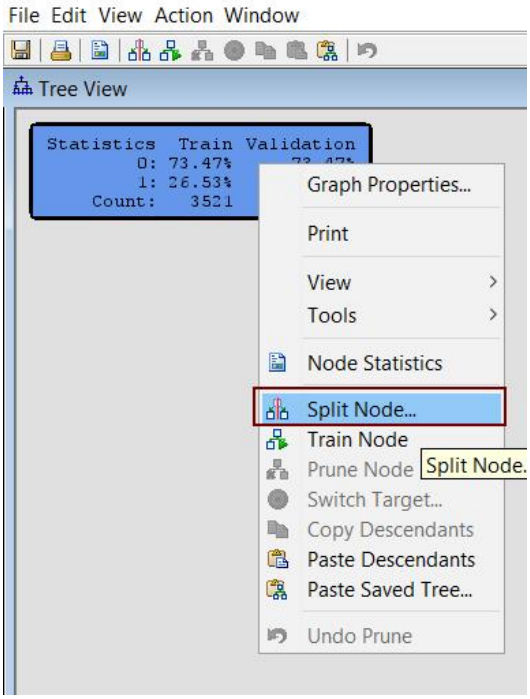


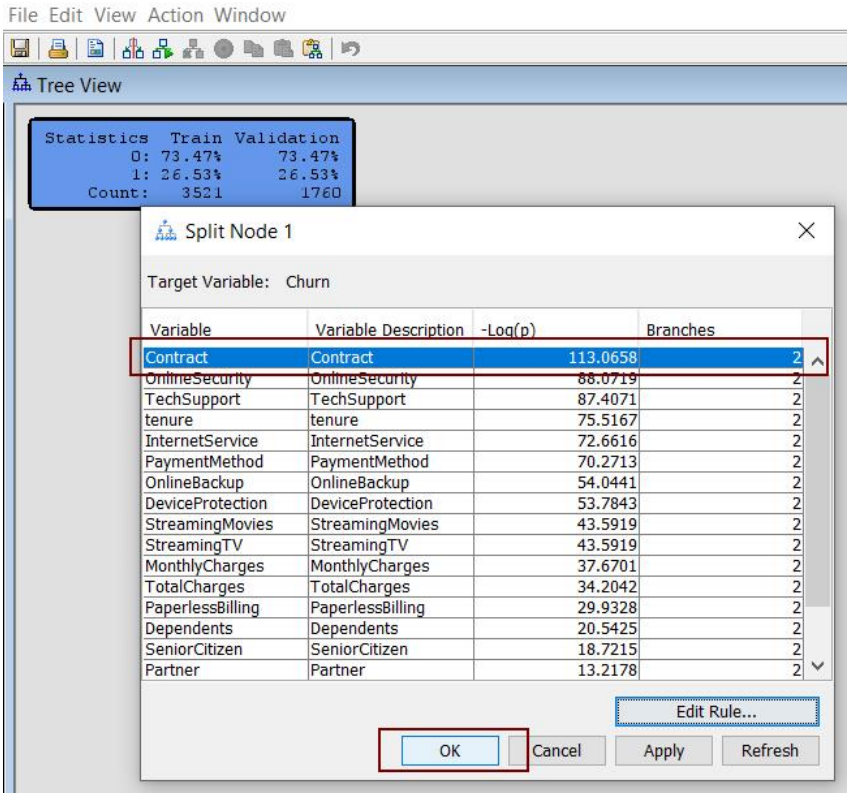


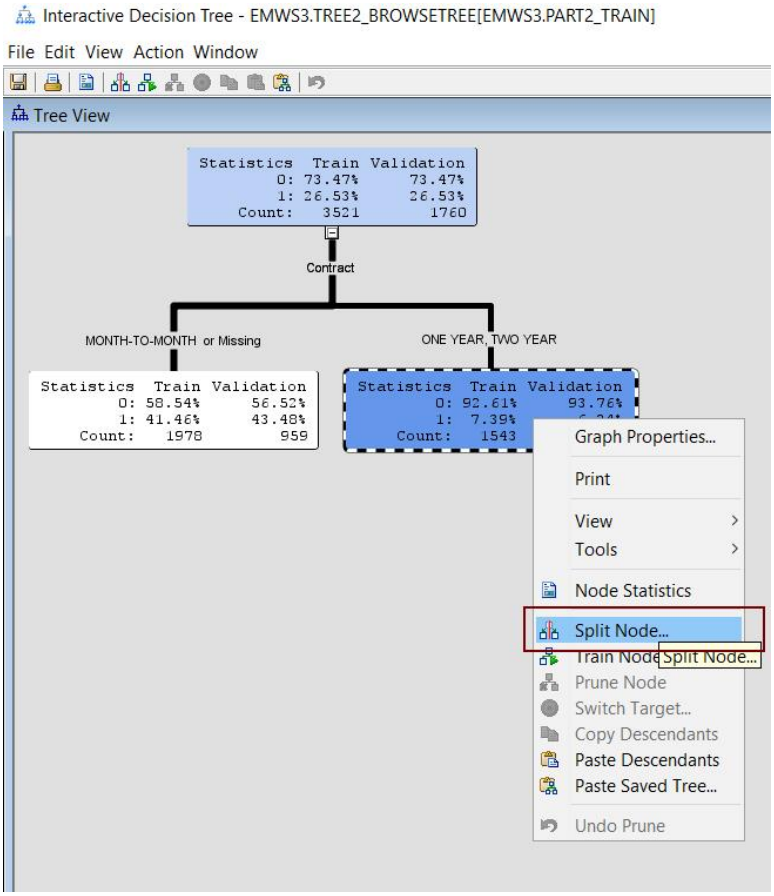
7. **Interactive tree.** This gives you control over building your tree. Just do the following:

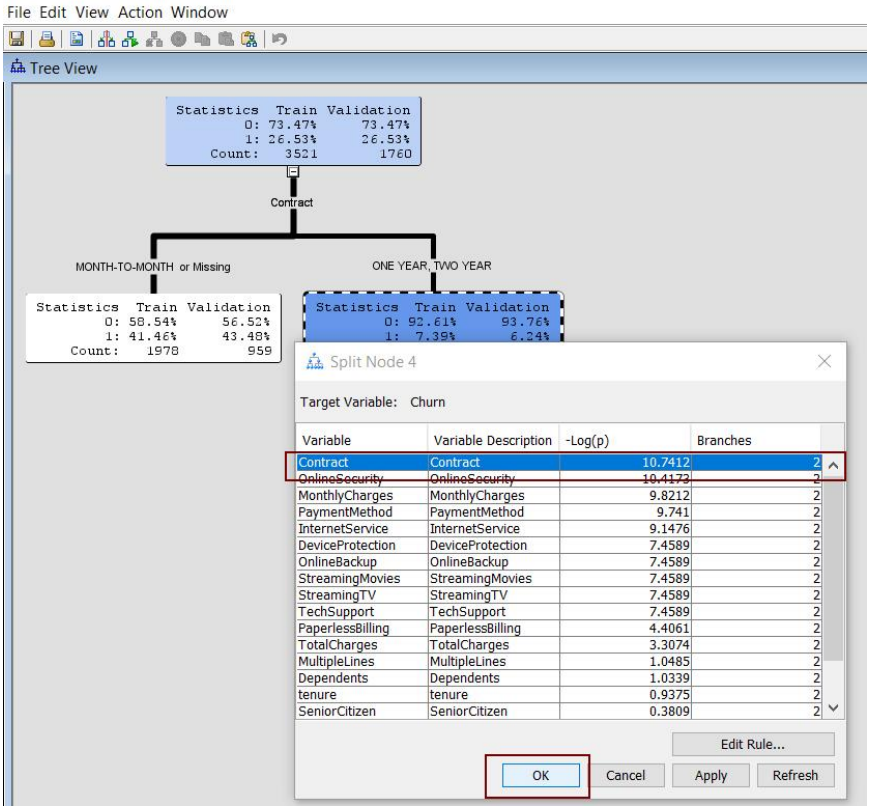
DRAG-AND-DROP A DECISION TREE → TRAIN → INTERACTIVE → RIGHT-CLICK ON THE NODE → SPLIT NODE → CHOOSE THE VARIABLE → OK → CONTINUE → STOP WHENEVER YOU THINK YOU HAVE THE TREE OF THE RIGHT SIZE.



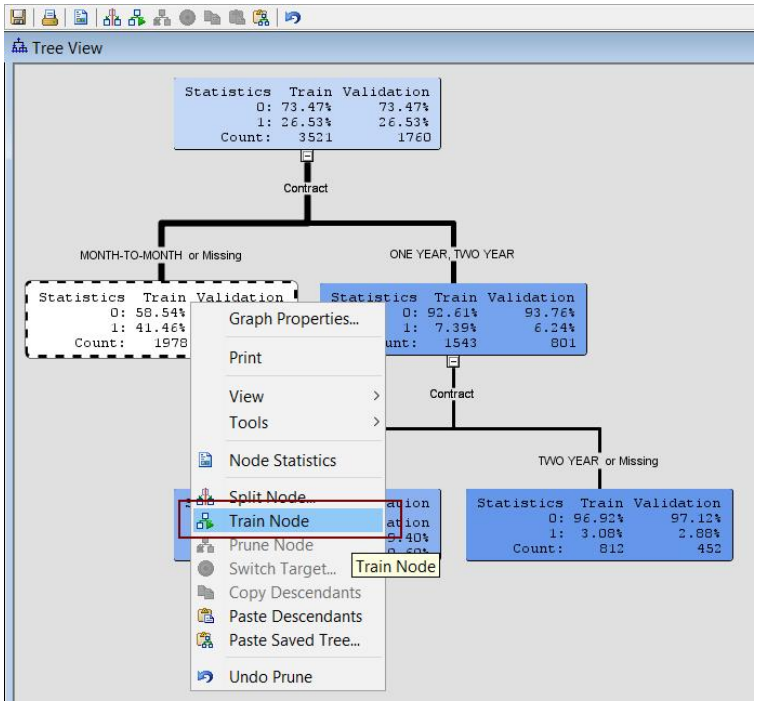

File Edit View Action Window
Tree View
Statistics Train Validation
0: 73.47%
1: 26.53%
Count: 3521
Graph Properties...
Print
View
Tools
Node Statistics
Split Node...
Train Node
Prune Node
Split Node.
Switch Target...
Copy Descendants
Paste Descendants
Paste Saved Tree...
Undo Prune

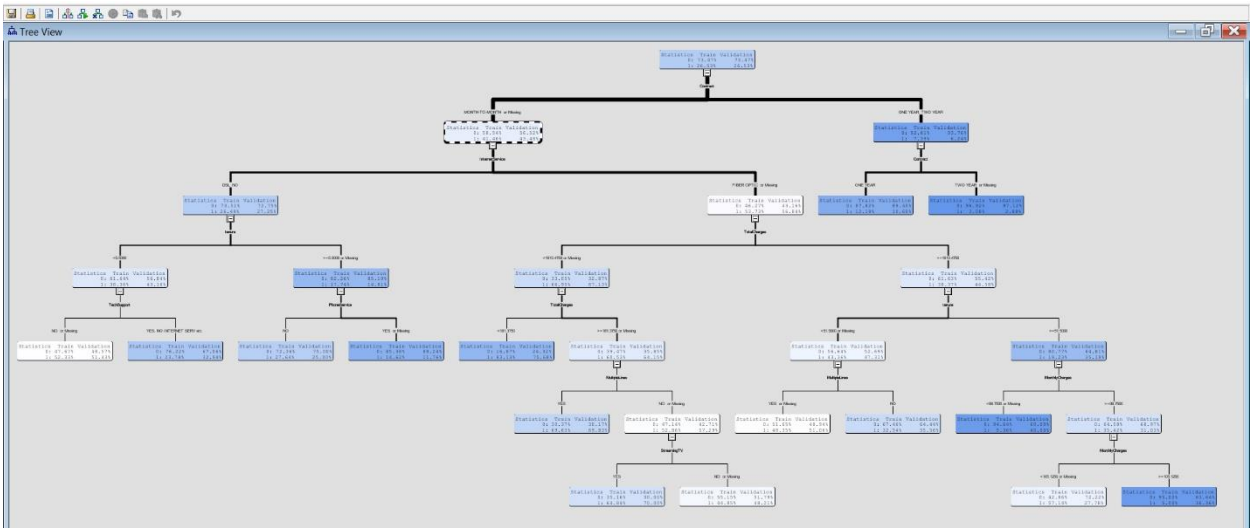

File Edit View Action Window
Tree View
Statistics Train Validation
0: 73.47% 73.47%
1: 26.53% 26.53%
Count: 3521 1760
Split Node 1
Target Variable: Churn
Variable | Variable Description | -Log(p) | Branches
Contract | Contract | 113.0658 | 2
OnlineSecurity | OnlineSecurity | 88.0719 | 2
TechSupport | TechSupport | 87.4071 | 2
tenure | tenure | 75.5167 | 2
InternetService | InternetService | 72.6616 | 2
PaymentMethod | PaymentMethod | 70.2713 | 2
OnlineBackup | OnlineBackup | 54.0441 | 2
DeviceProtection | DeviceProtection | 53.7843 | 2
StreamingMovies | StreamingMovies | 43.5919 | 2
StreamingTV | StreamingTV | 43.5919 | 2
MonthlyCharges | MonthlyCharges | 37.6701 | 2
TotalCharges | TotalCharges | 34.2042 | 2
PaperlessBilling | PaperlessBilling | 29.9328 | 2
Dependents | Dependents | 20.5425 | 2
SeniorCitizen | SeniorCitizen | 18.7215 | 2
Partner | Partner | 13.2178 | 2
Edit Rule...
OK
Cancel
Apply
Refresh


Interactive Decision Tree - EMWS3.TREE2_BROWSETREE[EMWS3.PART2_TRAIN]
File Edit View Action Window
Tree View
Statistics Train Validation
0: 73.47% 73.47%
1: 26.53% 26.53%
Count: 3521 1760
Contract
MONTH-TO-MONTH or Missing
ONE YEAR, TWO YEAR
Statistics Train Validation
0: 58.54% 56.52%
1: 41.46% 43.48%
Count: 1978 959
Statistics Train Validation
0: 92.61% 93.76%
1: 7.39%
Count: 1543
Graph Properties...
Print
View
Tools
Node Statistics
Split Node...
Train Node
Split Node...
Prune Node
Switch Target...
Copy Descendants
Paste Descendants
Paste Saved Tree...
Undo Prune


File Edit View Action Window
Tree View
Statistics Train Validation
0: 73.47% 73.47%
1: 26.53% 26.53%
Count: 3521 1760
Contract
MONTH-TO-MONTH or Missing
ONE YEAR, TWO YEAR
Statistics Train Validation
0: 58.54% 56.52%
1: 41.46% 43.48%
Count: 1978 959
Statistics Train Validation
0: 92.61% 93.76%
1: 7.39% 6.24%
Split Node 4
Target Variable: Churn
Variable Variable Description -Log(p) Branches
Contract Contract 10.7412 2
OnlineSecurity OnlineSecurity 10.4173 2
MonthlyCharges MonthlyCharges 9.8212 2
PaymentMethod PaymentMethod 9.741 2
InternetService InternetService 9.1476 2
DeviceProtection DeviceProtection 7.4589 2
OnlineBackup OnlineBackup 7.4589 2
StreamingMovies StreamingMovies 7.4589 2
StreamingTV StreamingTV 7.4589 2
TechSupport TechSupport 7.4589 2
PaperlessBilling PaperlessBilling 4.4061 2
TotalCharges TotalCharges 3.3074 2
MultipleLines MultipleLines 1.0485 2
Dependents Dependents 1.0339 2
tenure tenure 0.9375 2
SeniorCitizen SeniorCitizen 0.3809 2
Edit Rule...
OK
Cancel
Apply
Refresh

8. In addition to choosing **SPLIT NODE**, you can choose **TRAIN NODE.** It will keep creating a subtree until it exhausts all the options.

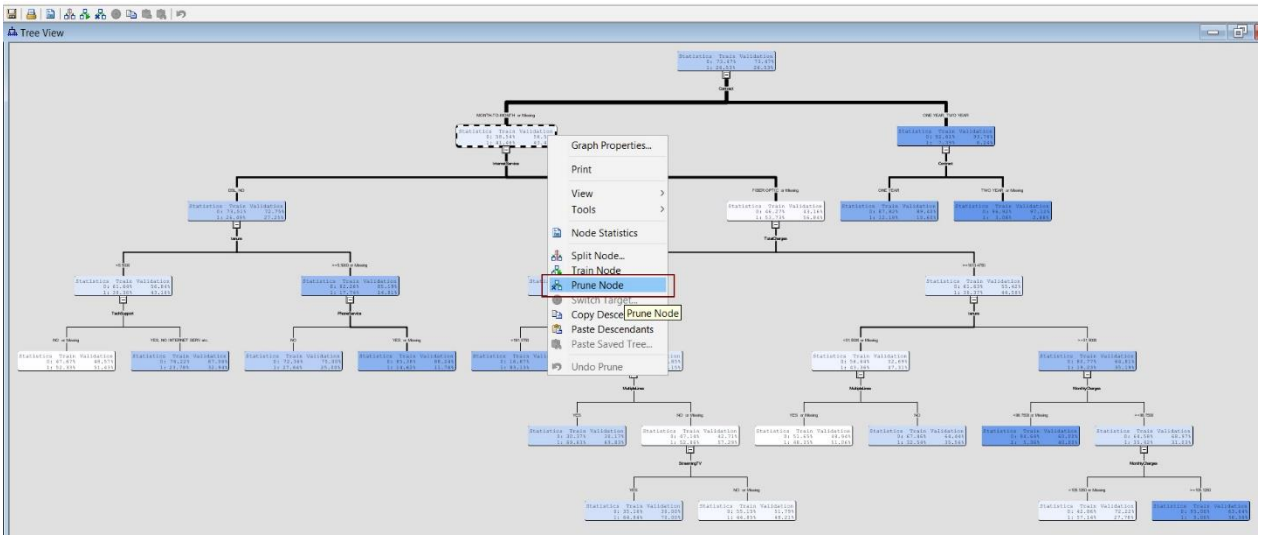




9. Once you decide that your tree is too long, you can shorten it by choosing **PRUNE NODE.** Just do the following:

RIGHT-CLICK ON THE NODE YOU WANT TO STOP YOUR TREE AT → PRUNE NODE

The tree before pruning (see below).



The tree after pruning (see below).