TDT4171 — Artificial Intelligence Methods
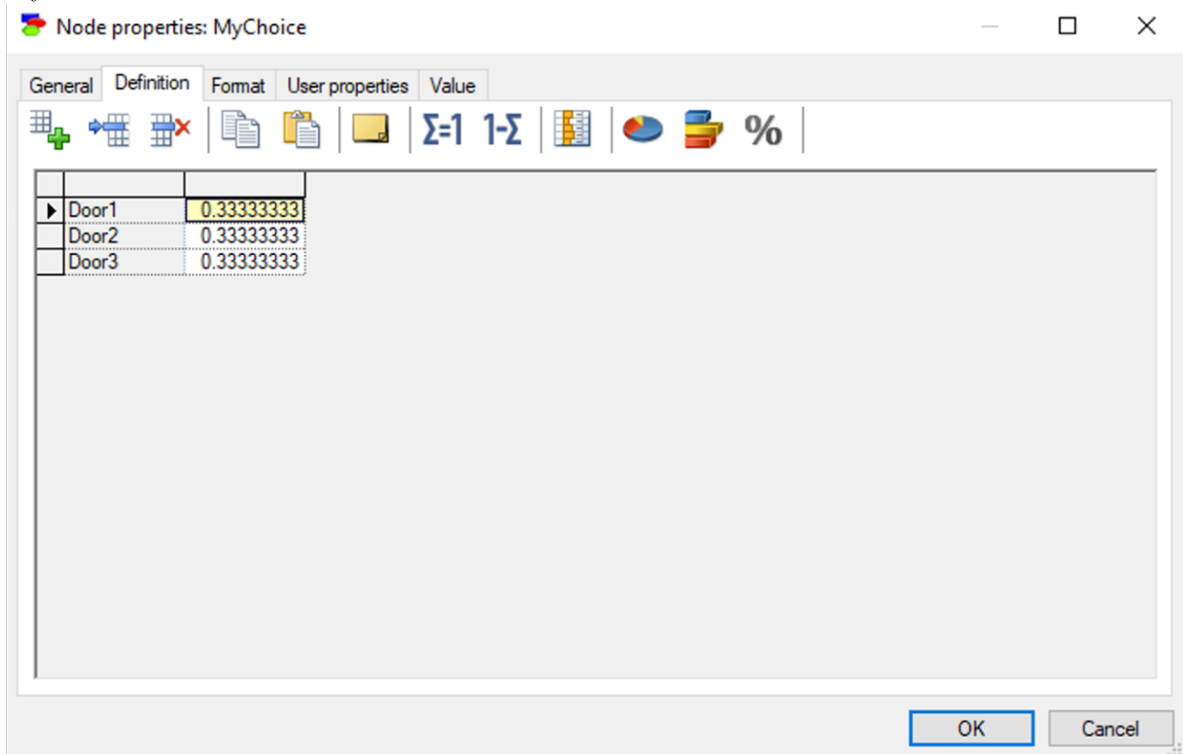# Assignment 2 - Bayesian networks

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January 2023

Solving the monty hall problem using the graphical network interface GeNIe tool by creating a Bayesian network that represents the problem.
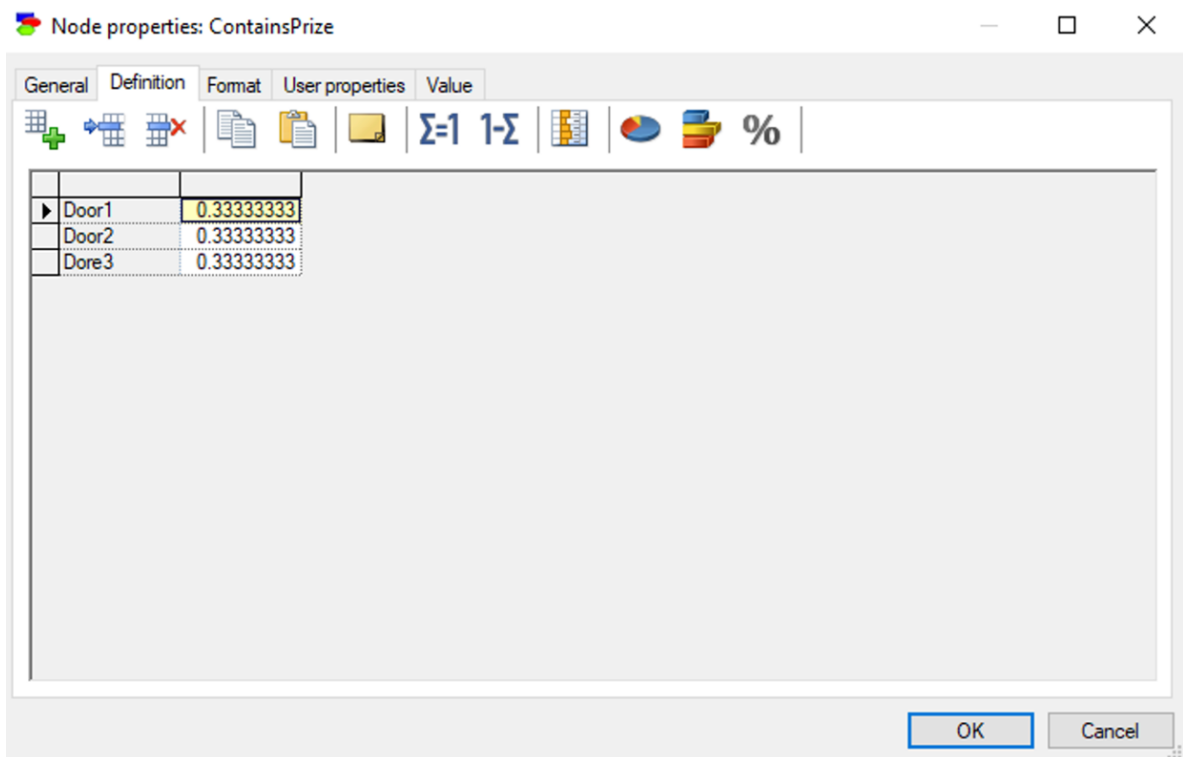
Created three nodes with the following states (door1, door2, door3) and probabilities:
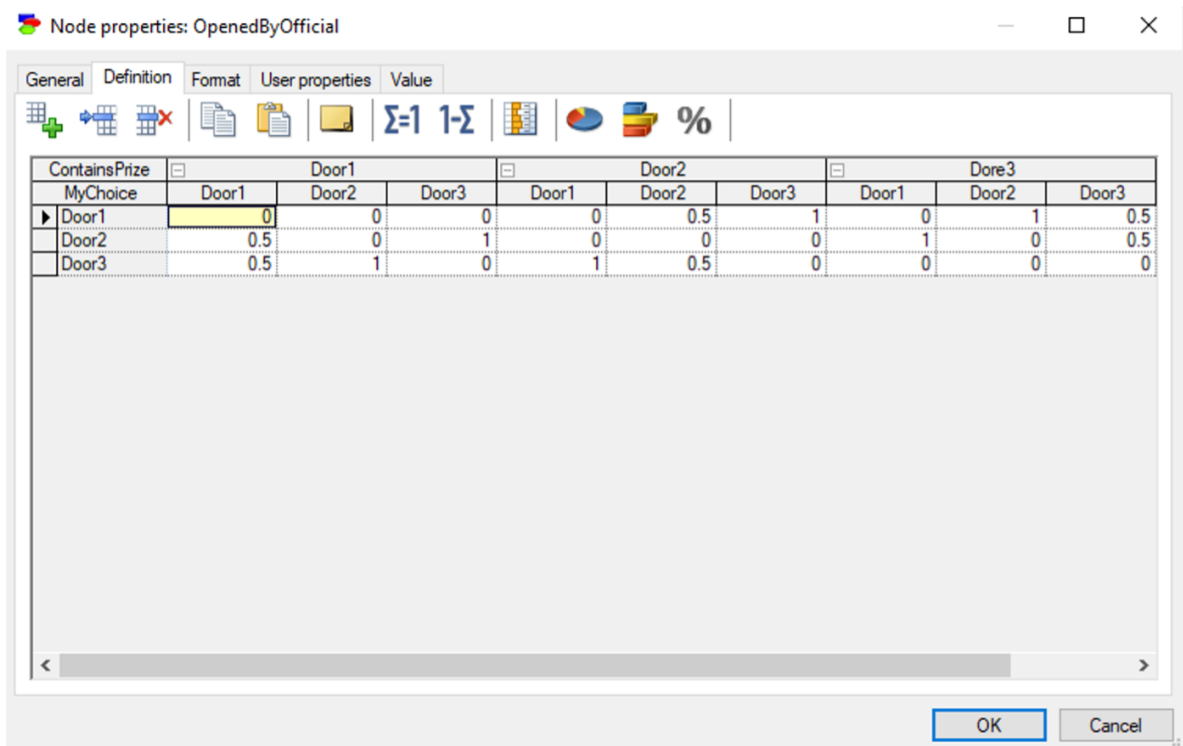
MyChoice:

ContainsPrize:

OpenedByOfficial:

- The two rules provided gives the following conditional probability table

ContainsPrize	Door1			Door2			Dore3		
MyChoice	Door1	Door2	Door3	Door1	Door2	Door3	Door1	Door2	Door3
Door1	0	0	0	0	0.5	1	0	1	0.5
Door2	0.5	0	1	0	0	0	1	0	0.5
Door3	0.5	1	0	1	0.5	0	0	0	0

Playing three rounds of the game to see different outcomes:
Play 1:

The Monty Hall Problem

ContainsPrize

Door1	33%
Door2	0%
Door3	67%

MyChoice

Door1	100%
Door2	0%
Door3	0%

OpenedByOfficial

Door1	0%
Door2	100%
Door3	0%
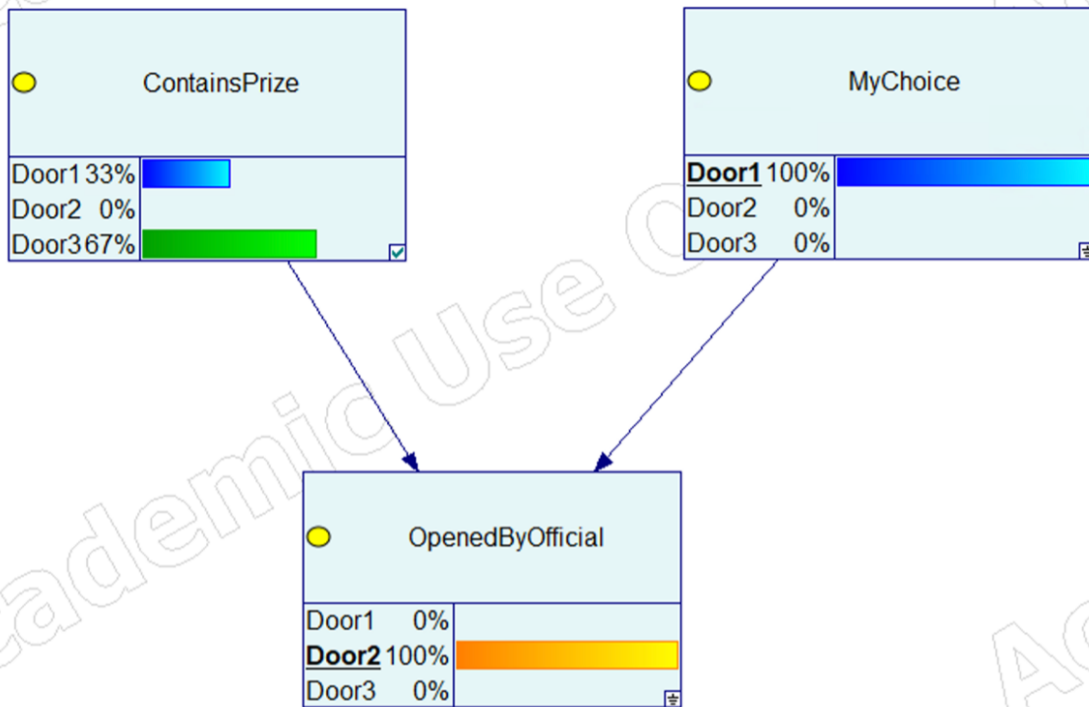
Result: Highest probability to win if switching door
Play 2:

The Monty Hall Problem

ContainsPrize	
Door1	33%
Door2	67%
Door3	0%

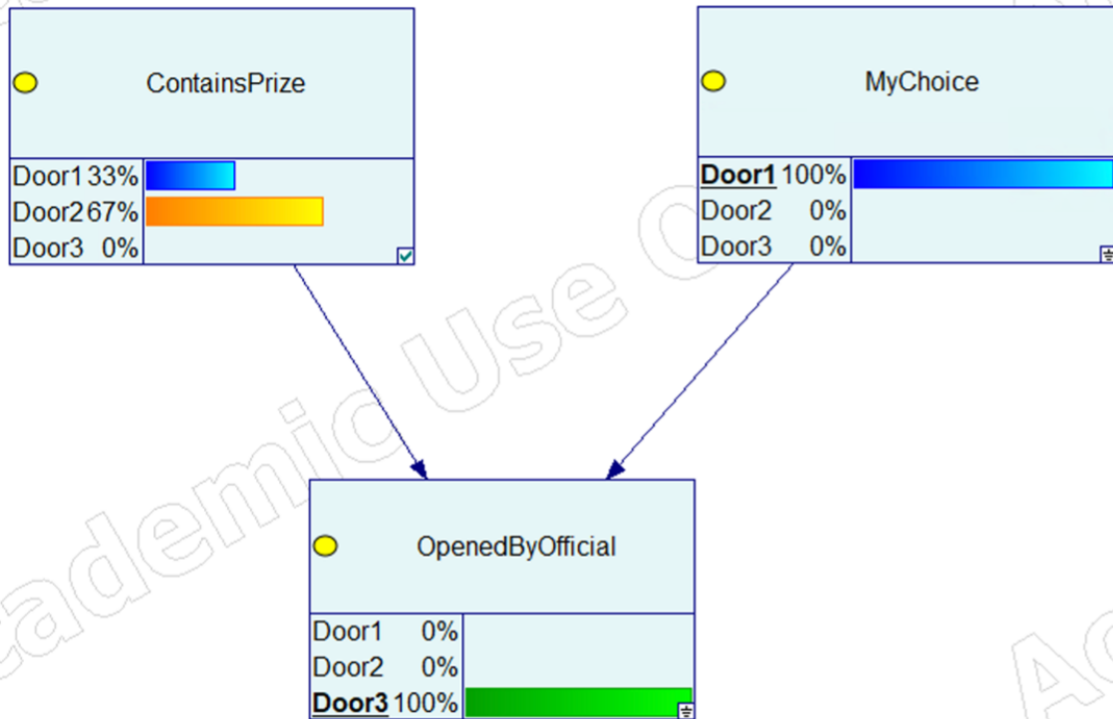| MyChoice	
Door1	100%
Door2	0%
Door3	0%

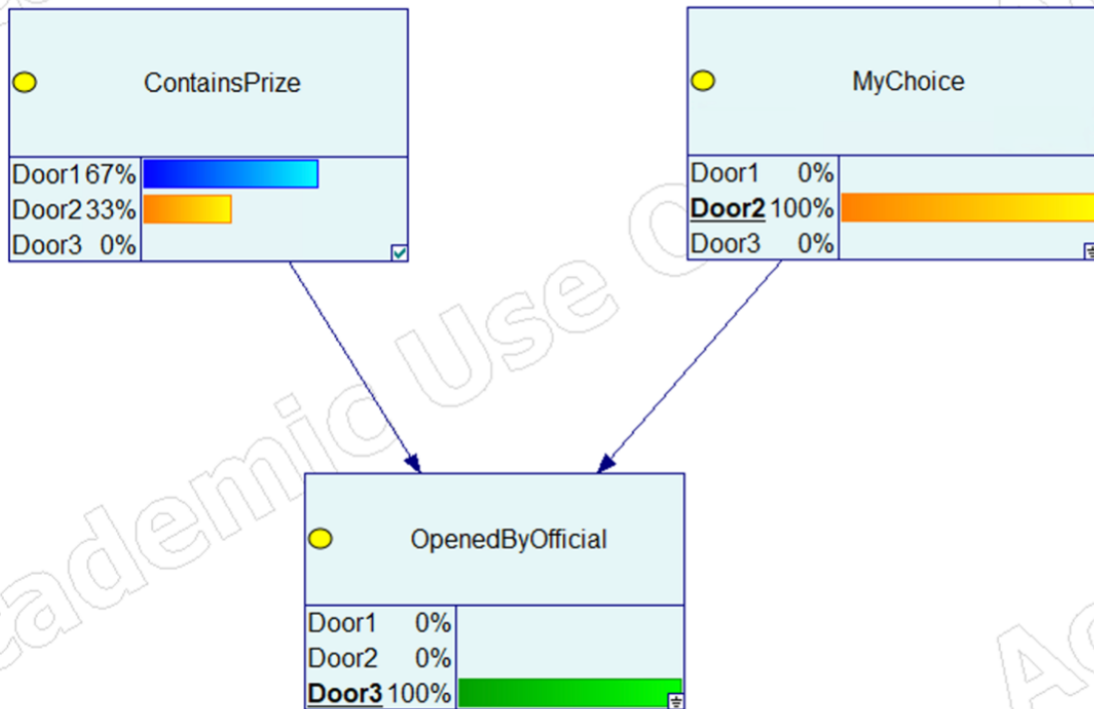| OpenedByOfficial	
Door1	0%
Door2	0%
Door3	100%

Result: Highest probability to win if switching door

Play 3:

The Monty Hall Problem

Result: Highest probability to win if switching door

Conclution

From the result above, we see that the winning prize has the highest probability of being behind the door you did not choose of the two remaining after the official opened a door. It would therefore be wise to change the door when the official asks if you want to change.