TDT4171 — Artificial Intelligence Methods
Assignment 2 - Bayesian networks

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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:

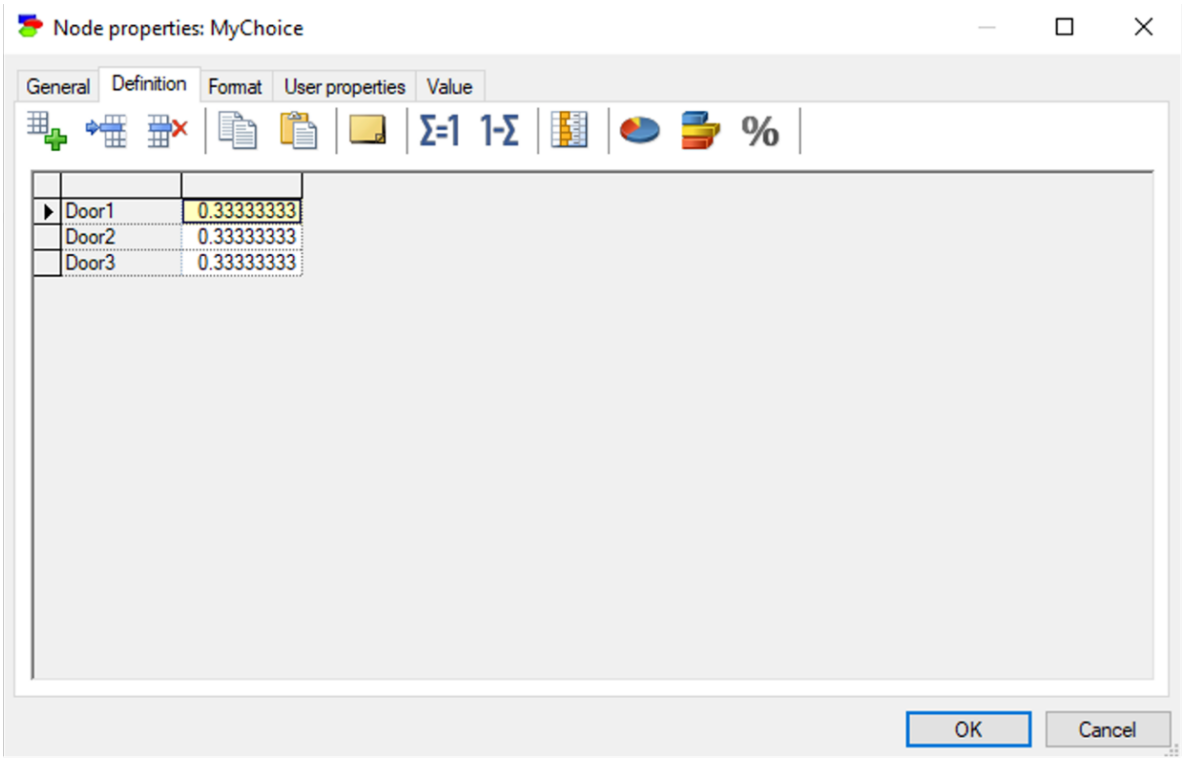


Figure 1: MyChoice

ContainsPrize:

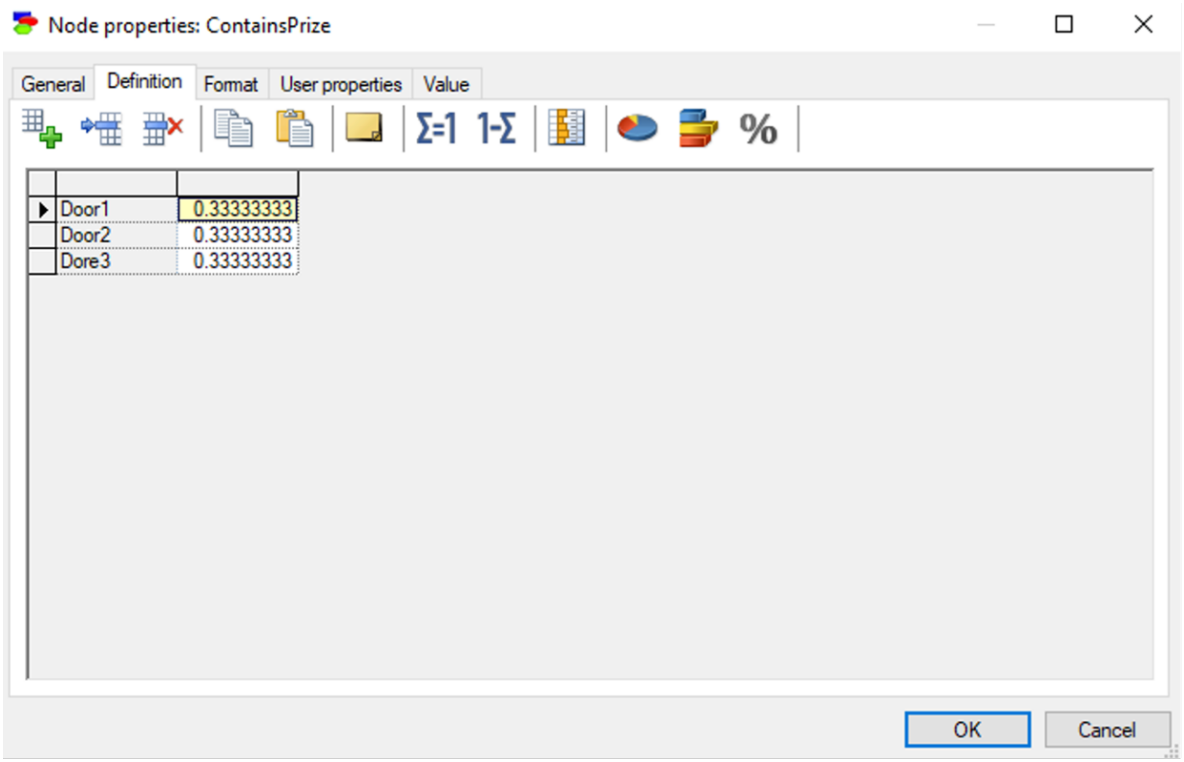
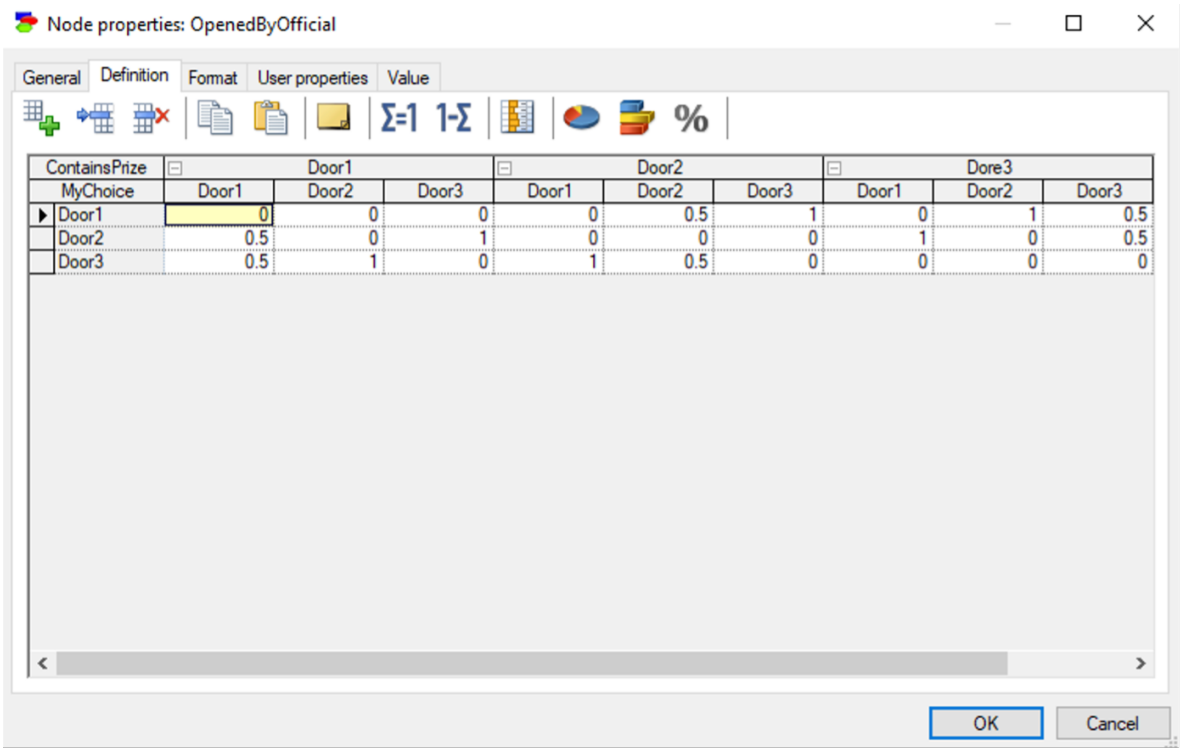


Figure 2: ContainsPrize

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

Figure 3: OpenedByOfficial

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

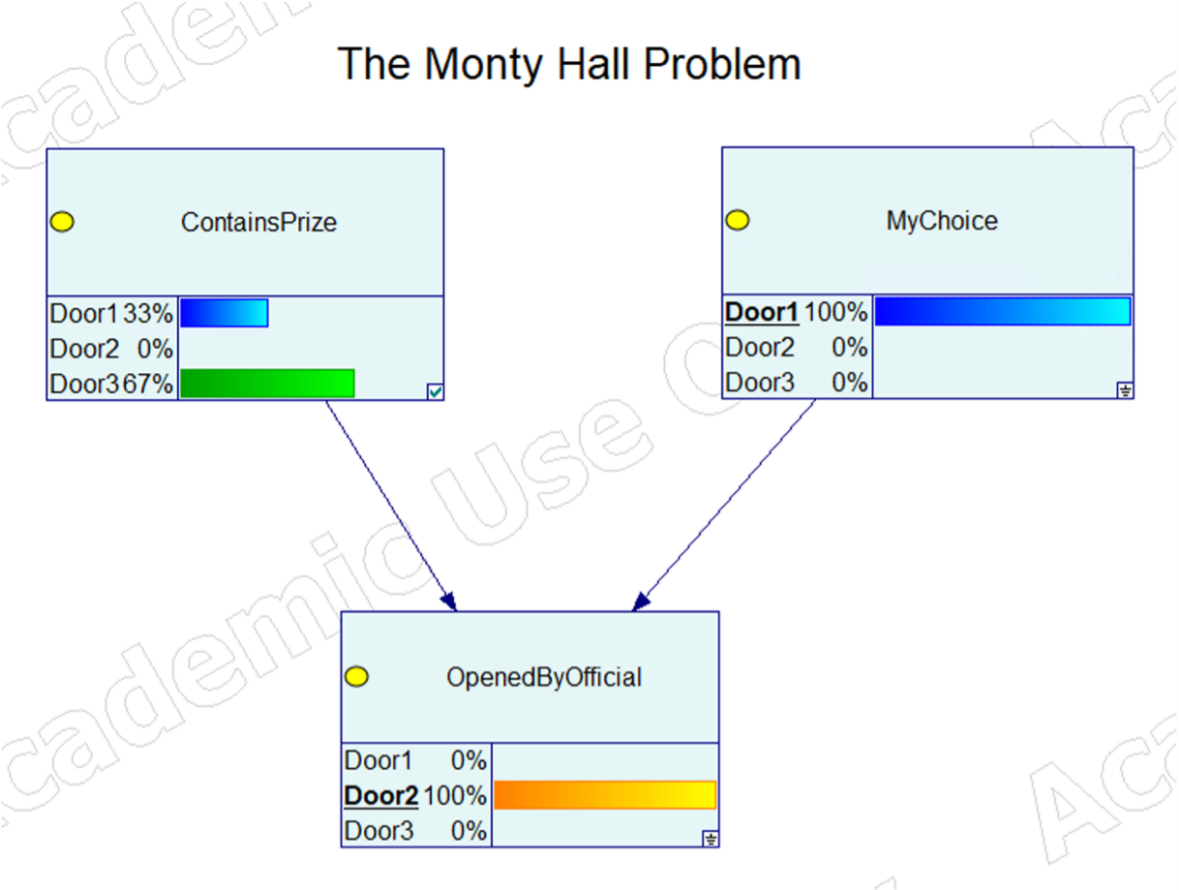


Figure 4: play1

Result: Highest probability to win if switching door

Play 2:

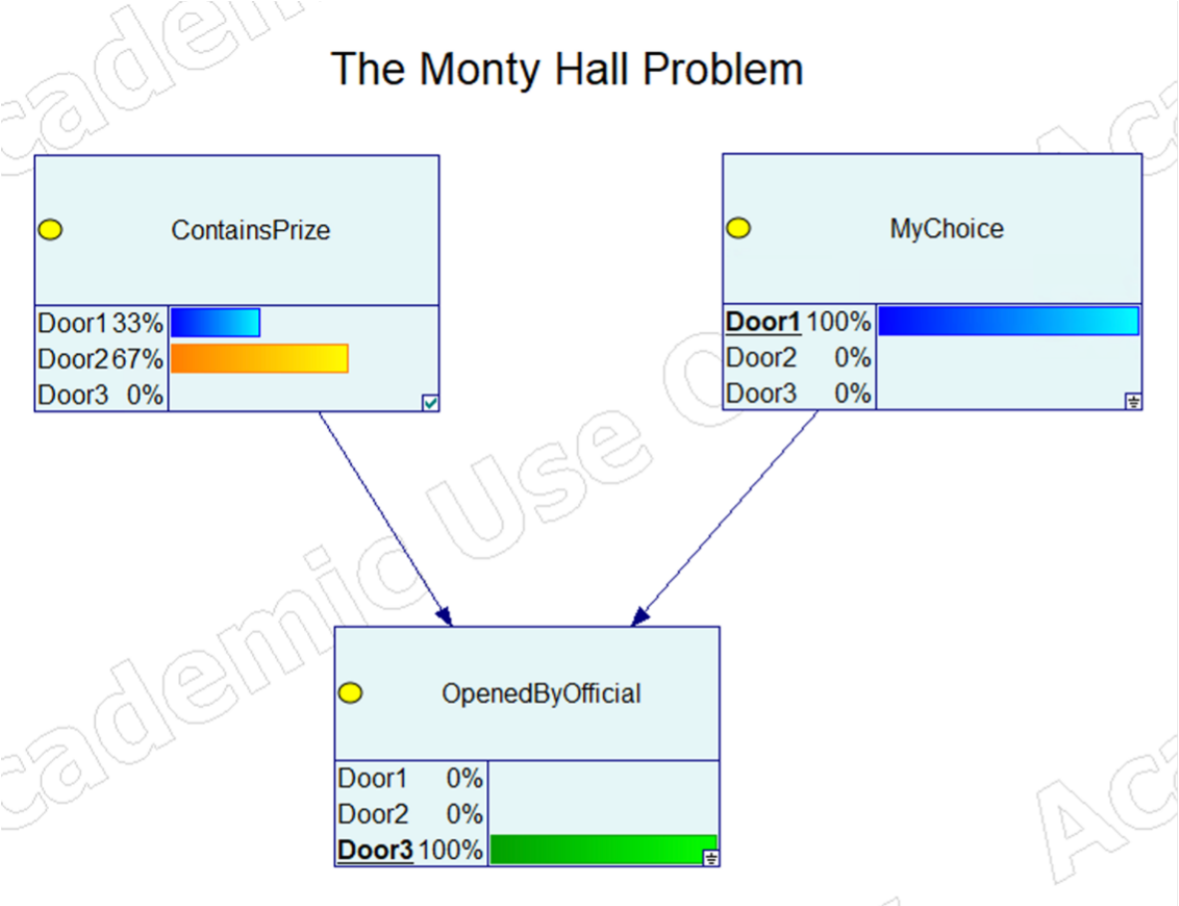


Figure 5: play2

Result: Highest probability to win if switching door

Play 3:

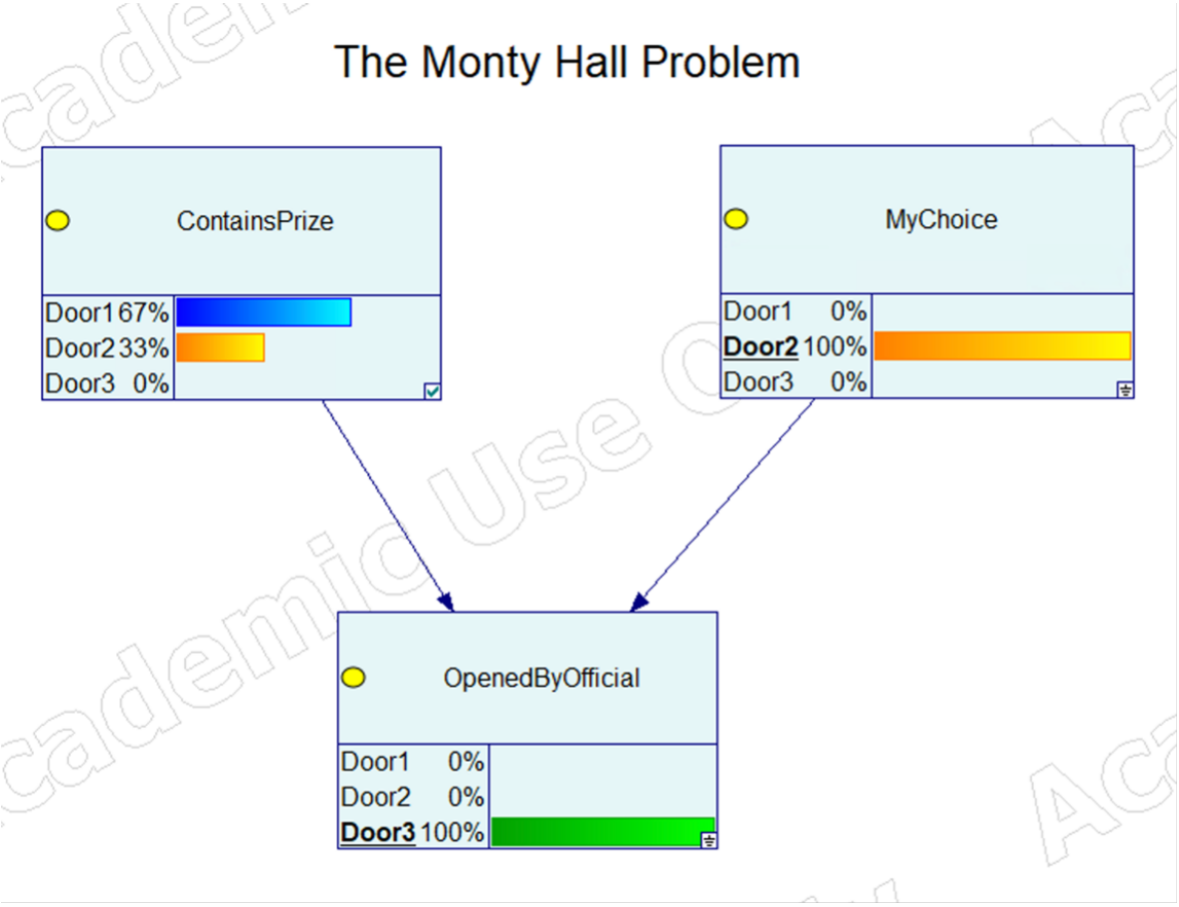


Figure 6: play3

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.