Artificial Intelligence Methods

Assignment 2

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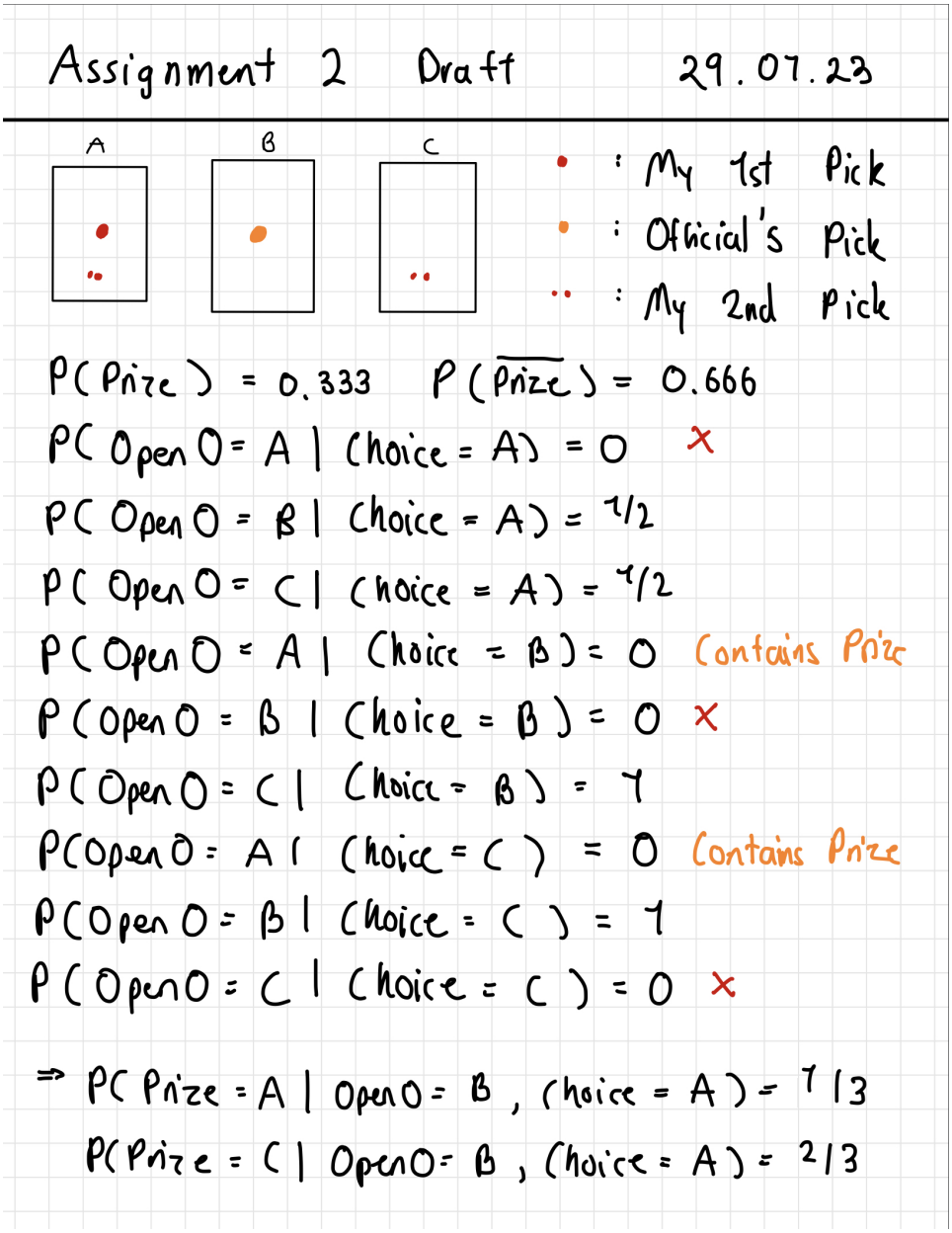
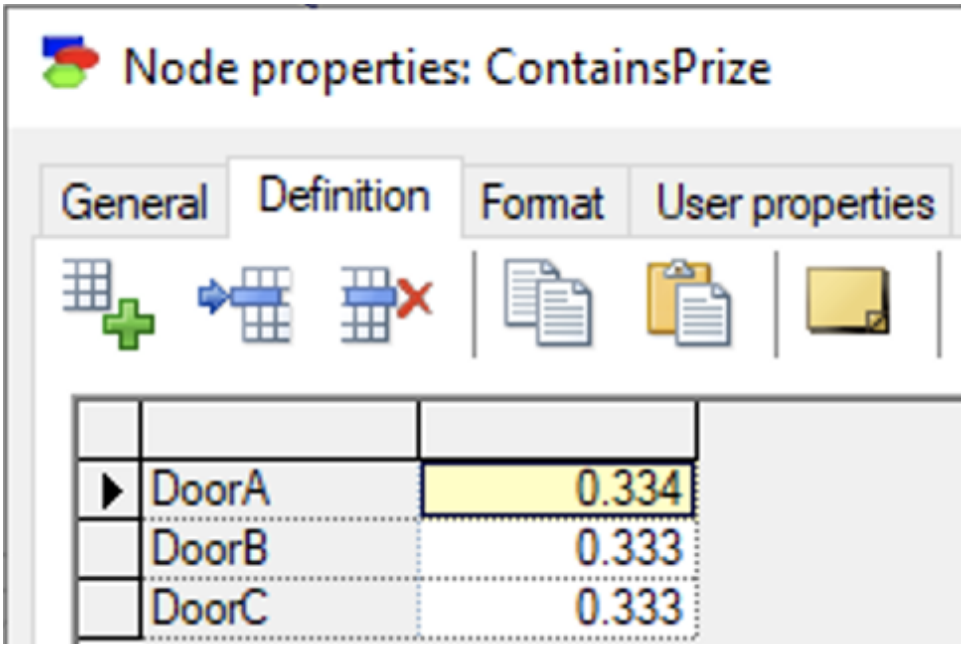
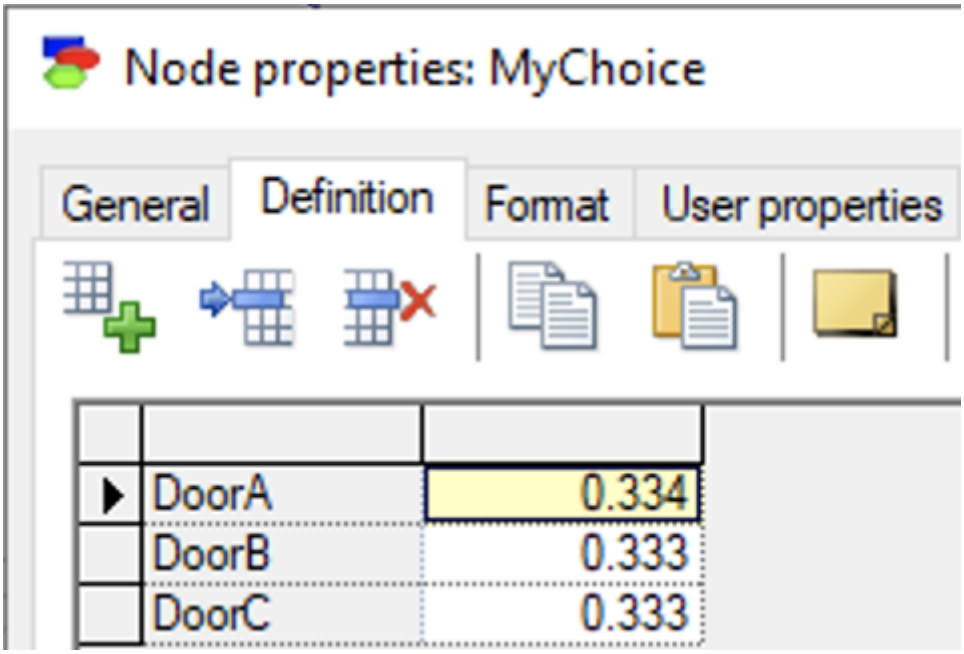
1 The Monty Hall Problem

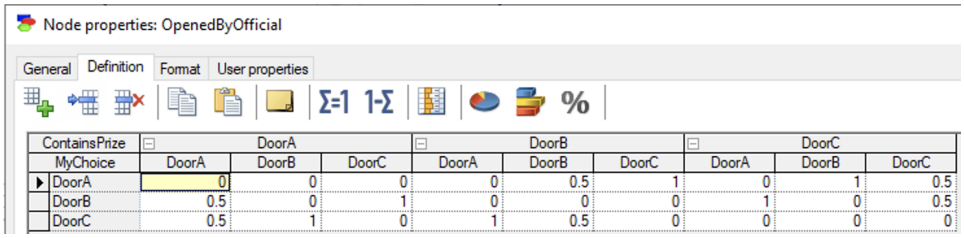
Should I alter my choice?

Yes, I should definitely alter my choice. Underneath follows a couple screen-shots from geNIe in which I've did inference on whether to change door after the official has opened another door. I've also included a draft by hand where I did the calculations for the probability tables for the nodes (mostly for OpenedByOfficial since this table was the largest to complete).

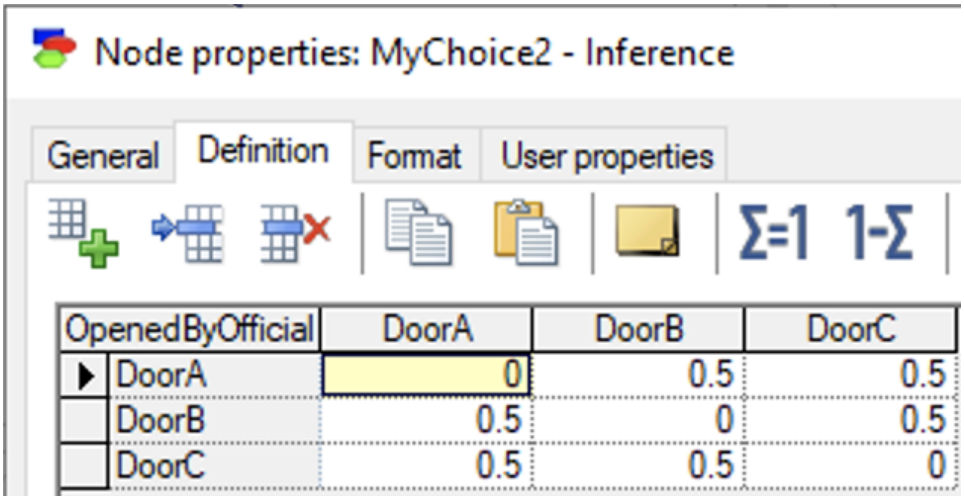



Node properties: ContainsPrize
General
Definition
Format
User properties
DoorA 0.334
DoorB 0.333
DoorC 0.333

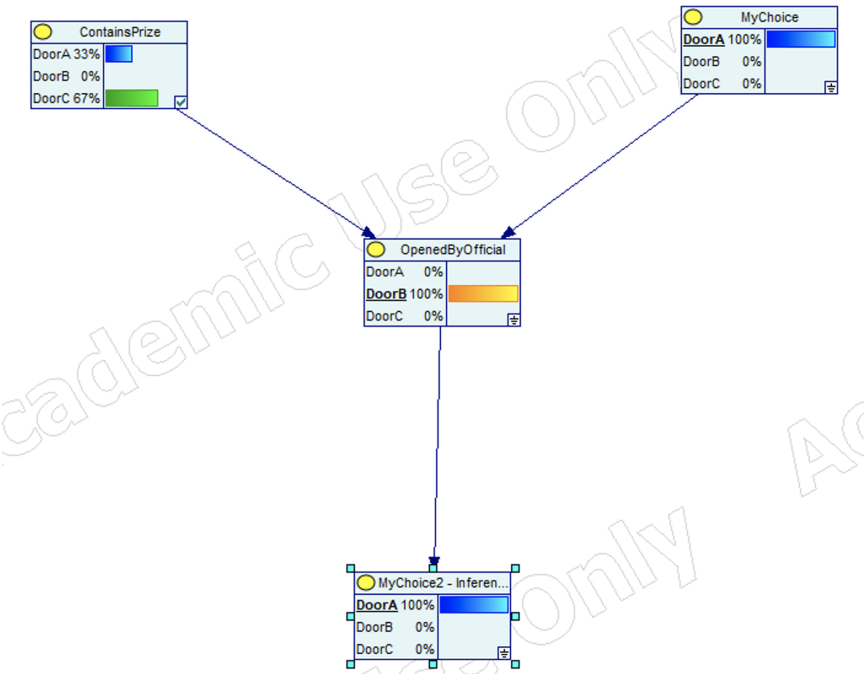

Node properties: MyChoice
General
Definition
Format
User properties
DoorA 0.334
DoorB 0.333
DoorC 0.333

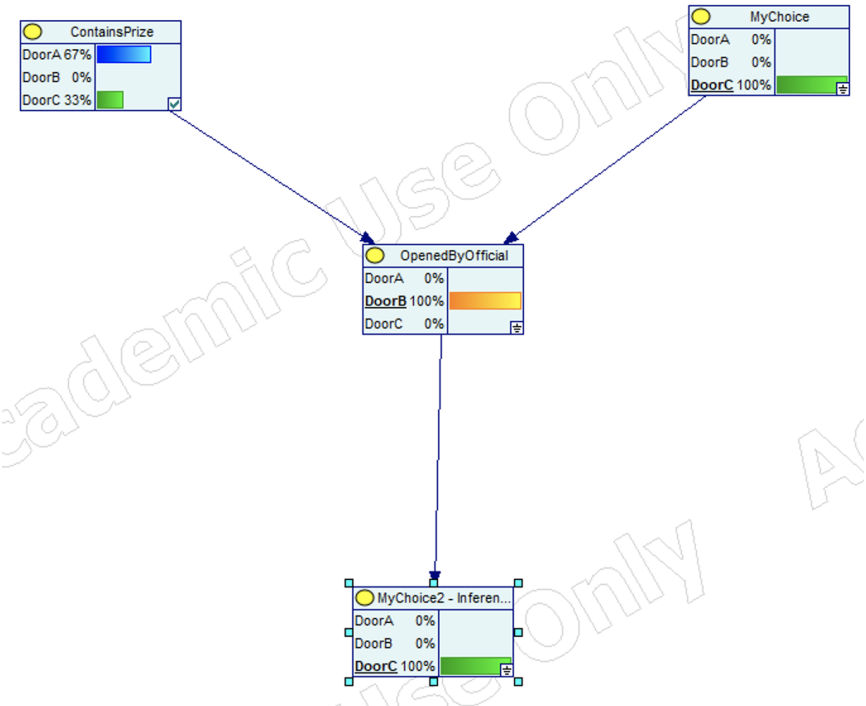


ContainsPrize	DoorA			DoorB			DoorC		
MyChoice	DoorA	DoorB	DoorC	DoorA	DoorB	DoorC	DoorA	DoorB	DoorC
DoorA	0	0	0	0	0.5	1	0	1	0.5
DoorB	0.5	0	1	0	0	0	1	0	0.5
DoorC	0.5	1	0	1	0.5	0	0	0	0



OpenedByOfficial	DoorA	DoorB	DoorC
DoorA	0	0.5	0.5
DoorB	0.5	0	0.5
DoorC	0.5	0.5	0





As seen in the last two pictures above, the probability of choosing the door with the prize behind it increases if when choose to change our pick.

$$P(ContainsPrize = A | OpenedByOfficial = B, MyChoice = A) = 1/3$$

$$P(ContainsPrize = C | OpenedByOfficial = B, MyChoice = A) = 2/3$$

Therefore I should alter my choice in the Monty Hall Problem