A. DIAGRAMS AND CPT'S

Diagram of the network:
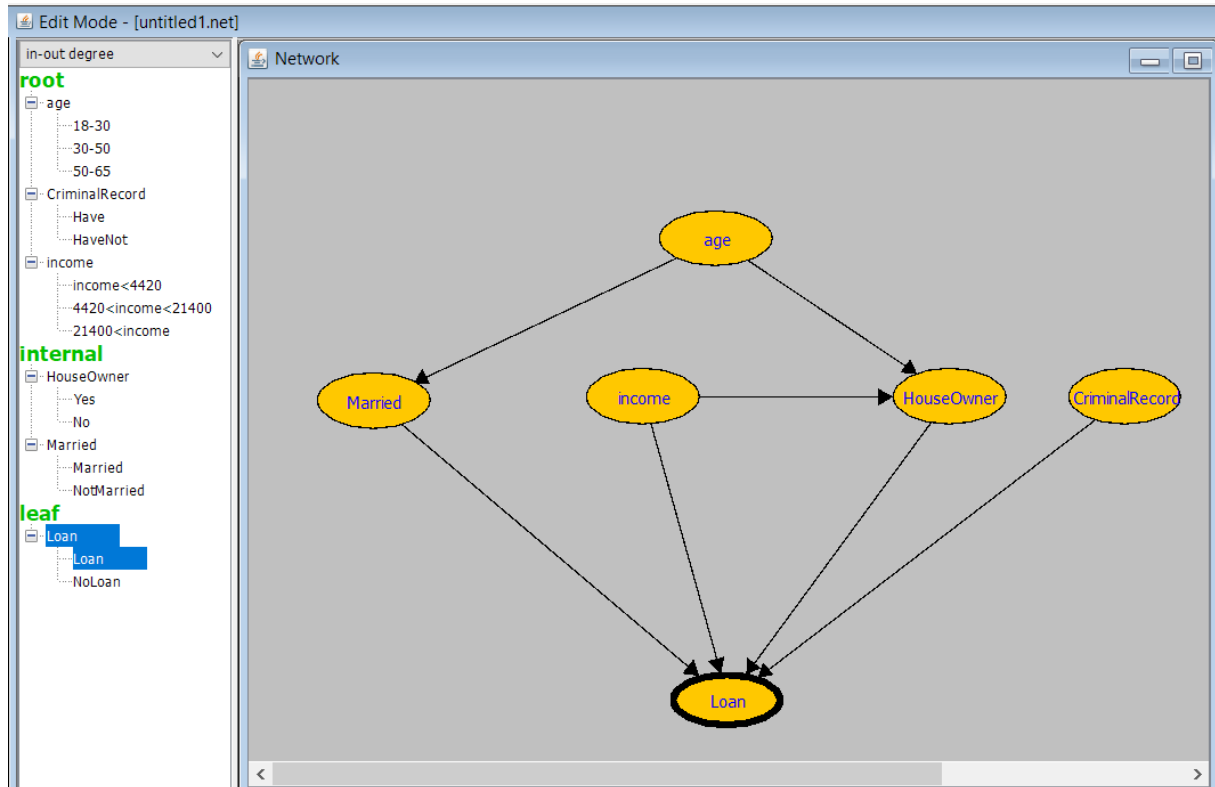
Married CPT:

age	18-30	30-50	50-65
Married	0,4	0,7	0,67
NotMarried	0,6	0,3	0,33

HouseOwner CPT:

income	income<4420			4420<income<21400			21400<income		
age	18-30	30-50	50-65	18-30	30-50	50-65	18-30	30-50	50-65
Yes	0,12	0,24	0,36	0,32	0,5	0,76	0,65	0,72	0,9
No	0,88	0,76	0,64	0,68	0,5	0,24	0,35	0,28	0,1

Loan CPT:

CriminalRec...	Have											
HouseOwner	Yes						No					
Married	Married			NotMarried			Married			NotMarried		
income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income
Loan	0,32	0,55	0,76	0,3	0,46	0,68	0,12	0,26	0,42	0,08	0,22	0,36
NoLoan	0,68	0,45	0,24	0,7	0,54	0,32	0,88	0,74	0,58	0,92	0,78	0,64
CriminalRec...	HaveNot											
HouseOwner	Yes						No					
Married	Married			NotMarried			Married			NotMarried		
income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income	income<4420	4420<incom...	21400<income
Loan	0,54	0,74	0,93	0,5	0,7	0,9	0,35	0,56	0,78	0,3	0,52	0,76
NoLoan	0,46	0,26	0,07	0,5	0,3	0,1	0,65	0,44	0,22	0,7	0,48	0,24

B. DESCRIPTON OF NETWORK AND DOMAIN

This network is designed to calculate credit score of a specific person and to determine whether this person is eligible for taking credit or not.

-While defining the types of variables, I assumed that citizenship ID is used to 'evidentially' learn about person-

1- Age: Data is retrieved from TUIK (2020). It can take 3 values: 18-30, 30-50, 50-65+. It is an evidence variable, since it can be observed by ID card of the citizen. It represents the age group of the person to determine marriage and house ownership situation. It is used to examine house ownership probability of applicant.

2- Married: It can take 2 values: Yes or No. It is a query variable, since it is an information that bank side want to retrieve. It represents whether applicant is married or not. According to several researches, married people are more risk averse (not spending money on risky options) than not married ones. Thus, that variable is used to determine credit eligibility.

3- Income: It can take 3 values: <4400, 4400<x<21400 and 21400<. The data is retrieved from a website. It is an evidence variable that we want to observe from documents of the applicant whether this credit is repayable by them. It represents the income group of the person. It is both directly and indirectly (in house ownership) in credit eligibility, due to repayment opportunity (low income leads low repayment opportunity).

4- HouseOwner: It can take 2 values: Yes or No. Again, it is a query variable that bank wants to examine from income and age. It represents the house ownership of applicant whether there is a high-valued estate that can be used as 'mortgage'. It depends on age, since more age means more years on working, therefore more years of saving. It also depends on income, because more income leads faster saving.

5- CriminalRecord: It can take 2 values: Have (negative) or NotHave (positive, clear). It is an evidence variable that we can observe from applicants' documents. It represents the negative criminal background of the applicant and is used to calculate 'trustability' of applicant.

6- Loan: It is neither a query variable nor an evidence variable. That variable is the output that we want to finally derive. It can take Loan or NotLoan values. It represents the eligibility of specific applicant for the credit.
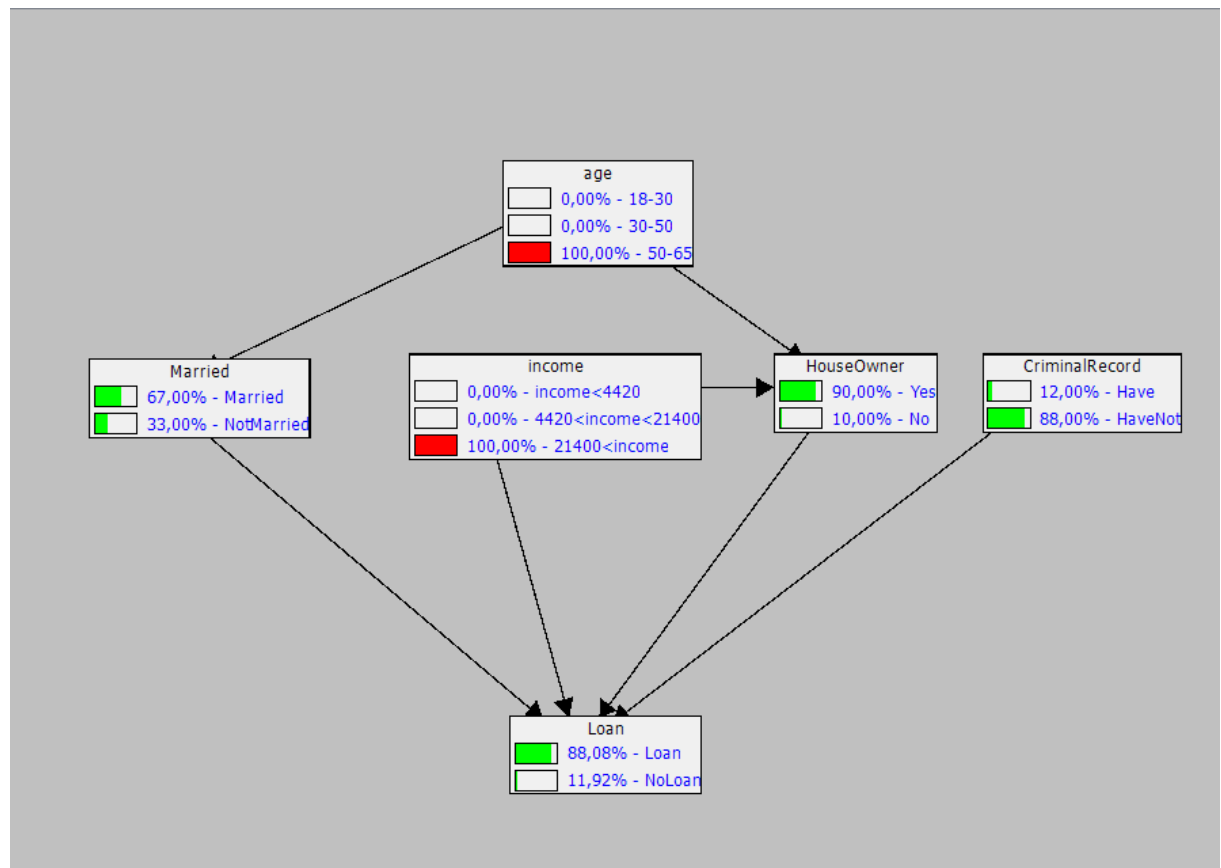
C. TEST CASES AND EXPLANATIONS
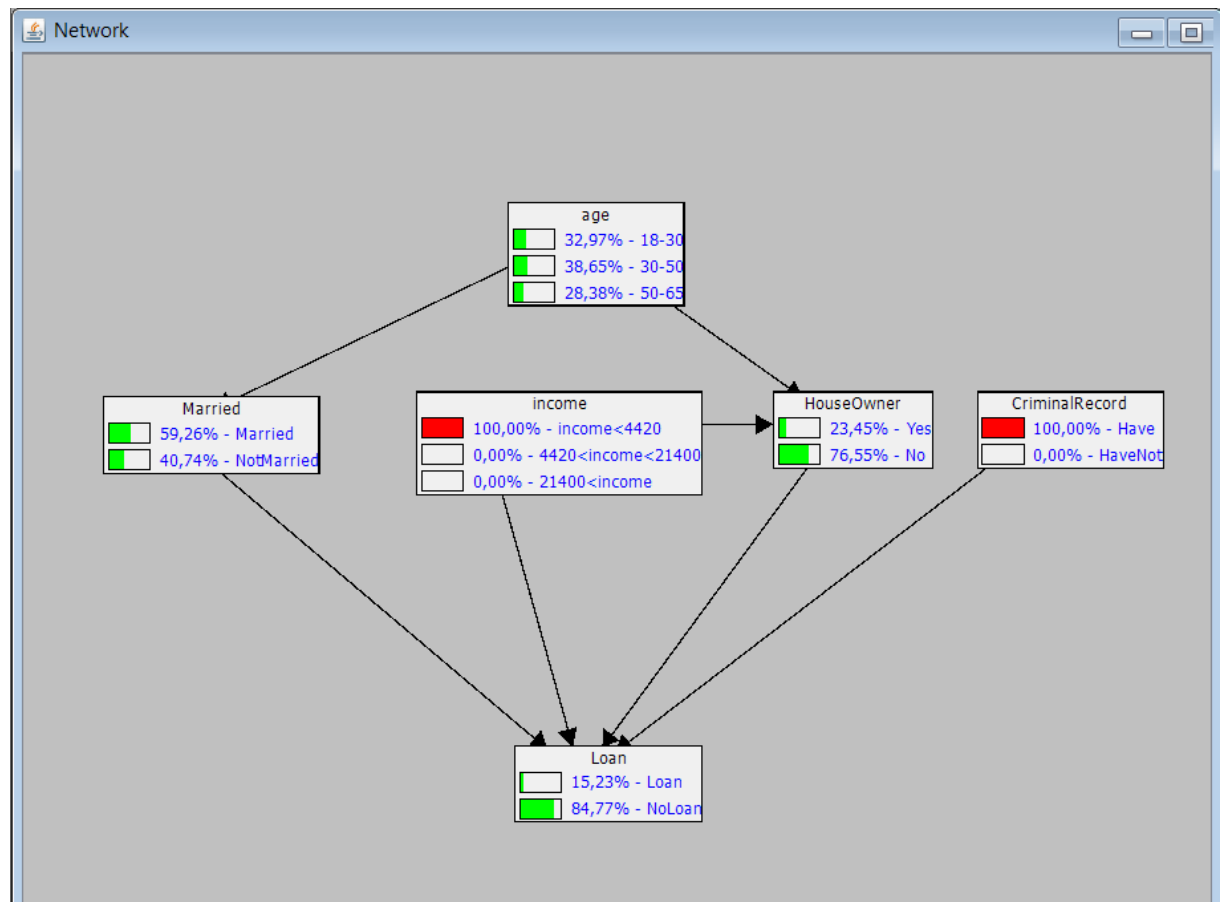
Test Case 1: Low income, and have criminal record

Posterior probability of Loan is %15.23, as shown in the figure.

As expected, when income is low and criminal record is negative, it is very hard to get loan from the bank. Because you have not a 'trustable' background and income which is the only way that bank can collect repayment from you is low.

Test Case 2: high income and senior person

Posterior probability of Loan is %88.08, as shown in the figure.

As expected, having a high income makes repayment easier, therefore bank have trust on the applicant. In addition to that, higher age has more tendency to have a home due to saving mentality and more years on employment. Finally, having home provides a guarantee (mortgage) for applicant to pay loan even in the bad scenario -seizure might be applied.