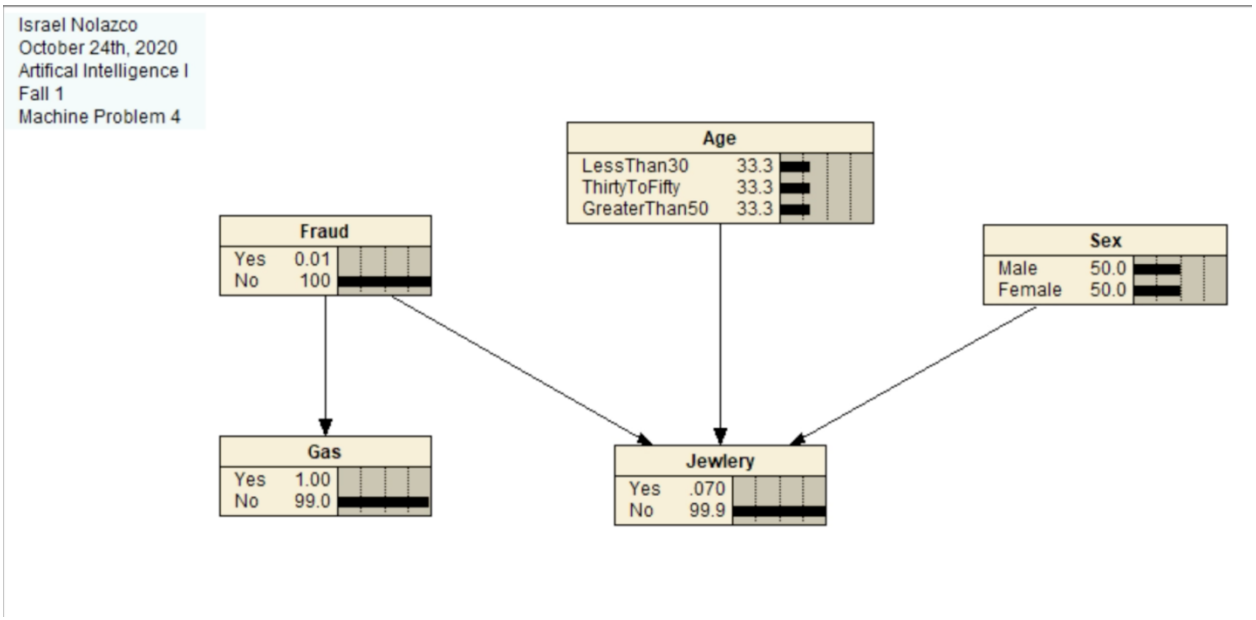
Israel Nolazco
October 24, 2020
Artificial Intelligence I
Fall 1
Machine Problem 4

A) Using Netica, make a Bayesian network that represents this situation and define the necessary CPTs. Include an image of the corresponding network file.



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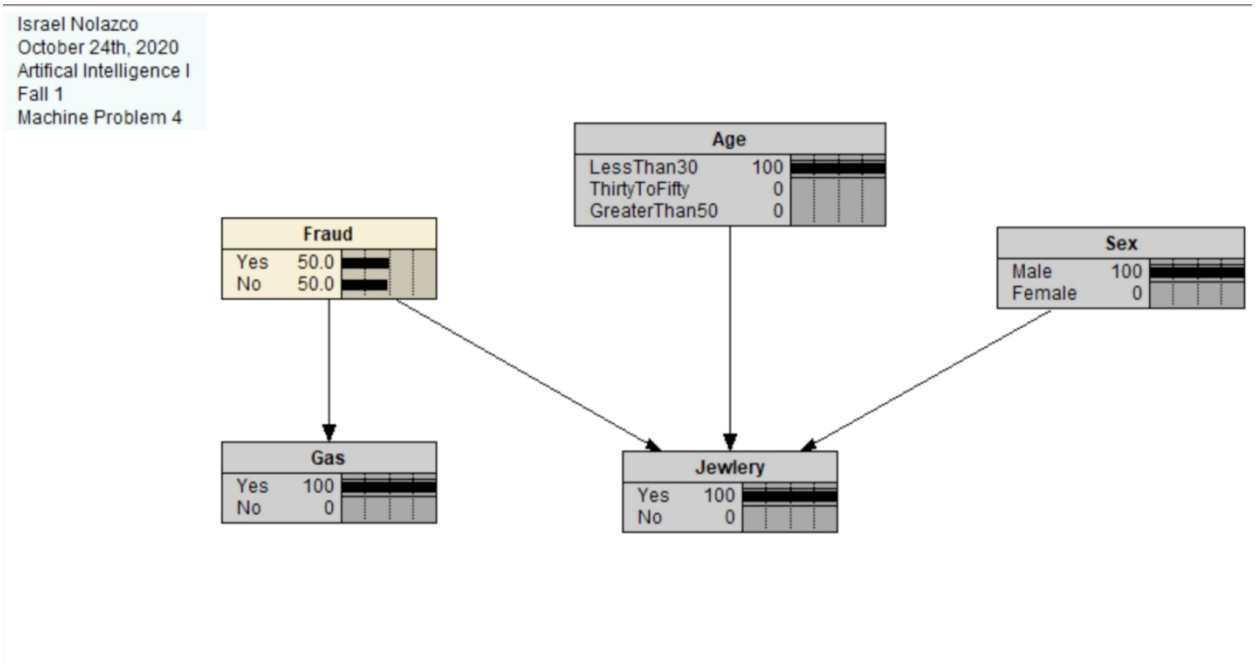
B) List the variable values maximize and minimize the probability of a fraud and list those probabilities.



The image above shows the Maximize probability of FRAUD with the following constraints. As we can see in the image above, regardless of the constraint the maximum probability of being fraud is 50%

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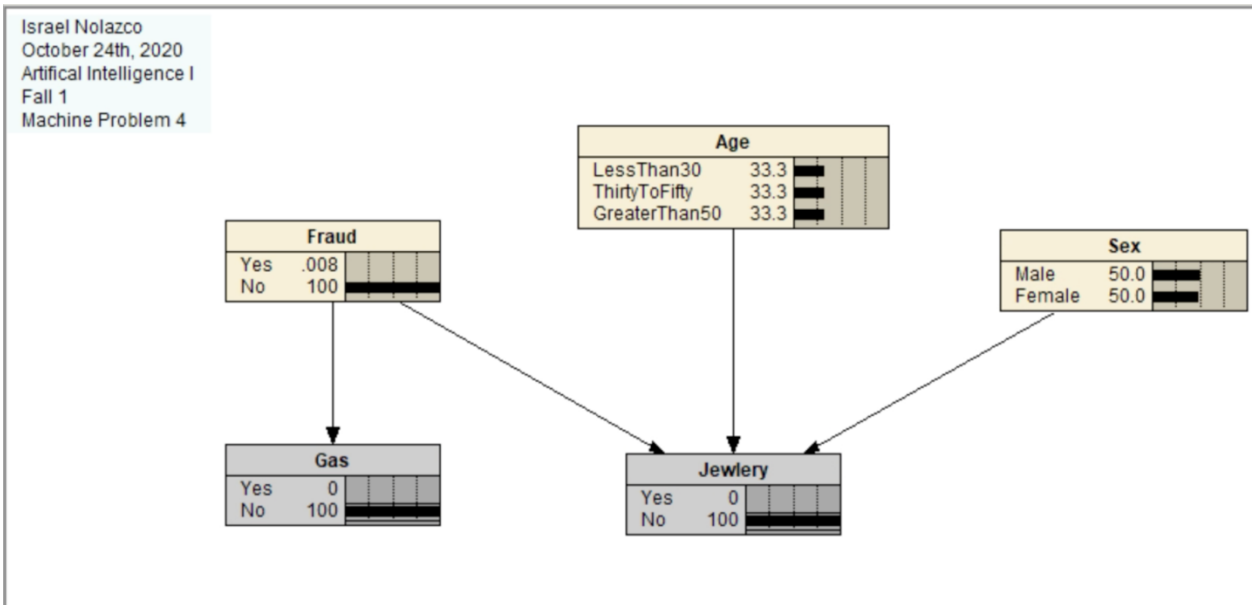

The image above shows the minimize the probability of being fraud. As we can see in the image above this can be achieve regardless of Age and Sex. Variables such as Jewelry being purchase and gas being purchase in the last 24 hours are the only ones driving the probabilities. The minimum probability of being FRAUD can only be at 0.008%.

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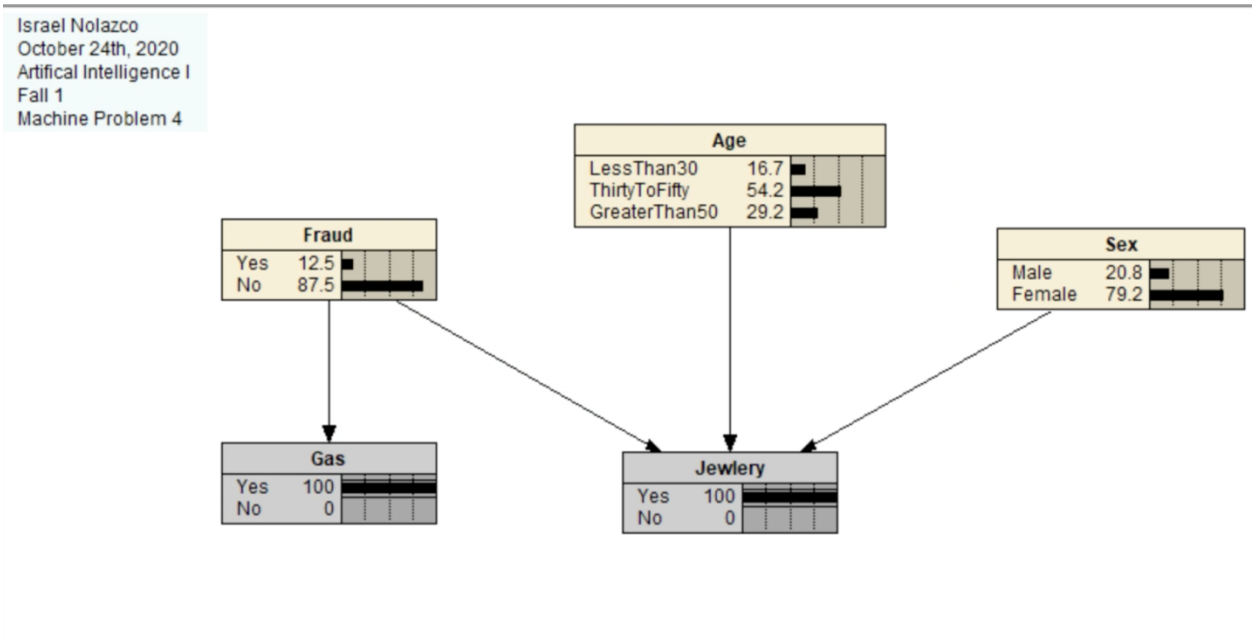
C) Compute the following probabilities using your Bayes Net:

1. P(Fraud | gasPurchased, jewelryPurchased)



P(Fraud | gasPurchased, jewelryPurchased) is < 0.125, 0.875 >

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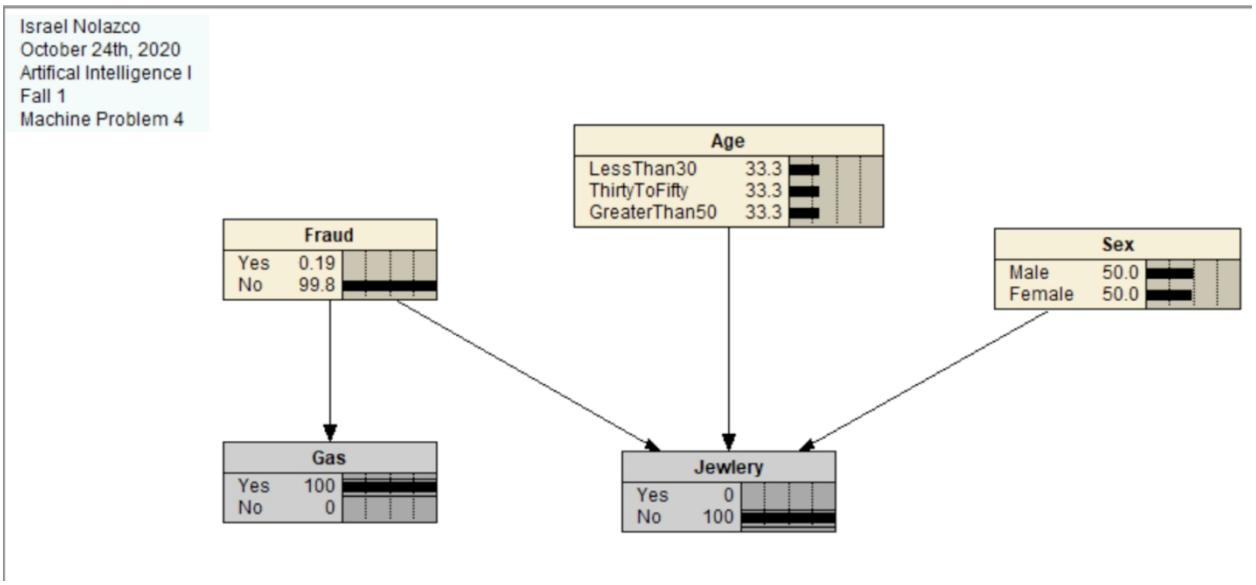
2. P(Fraud | gasPurchased, ¬jewelryPurchased)



P(Fraud | gasPurchased, ¬jewelryPurchased) is < 0.0019, 0.9981 >

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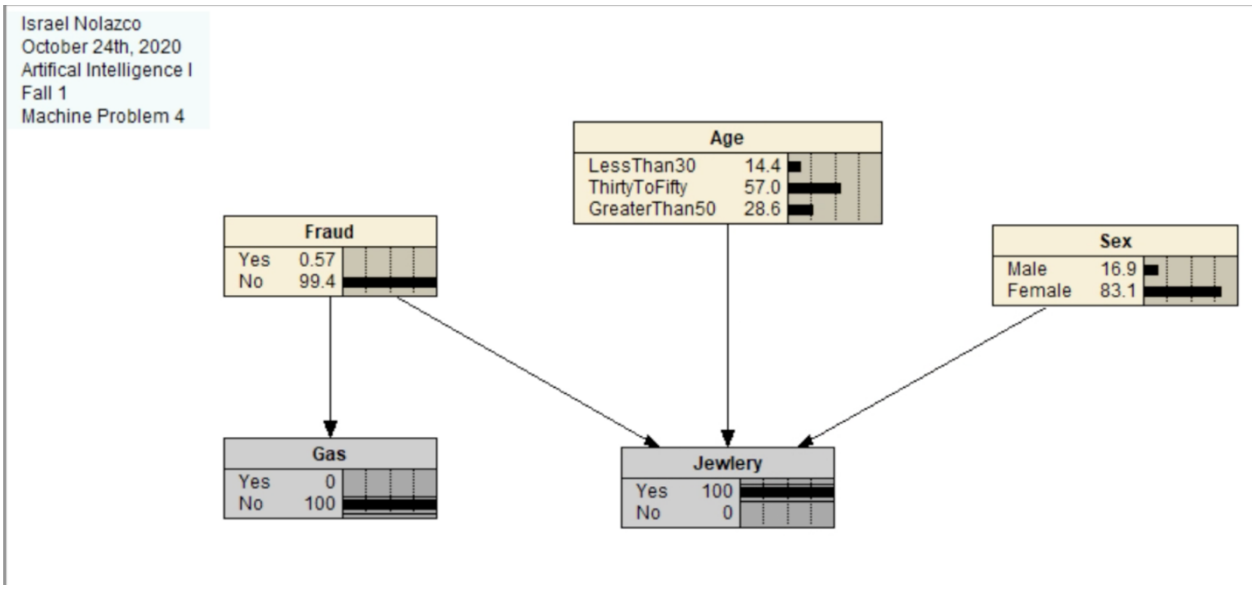
3. P(Fraud | ¬gasPurchased, jewelryPurchased)



P(Fraud | ¬gasPurchased, jewelryPurchased) is < 0.0057, 0.9943 >

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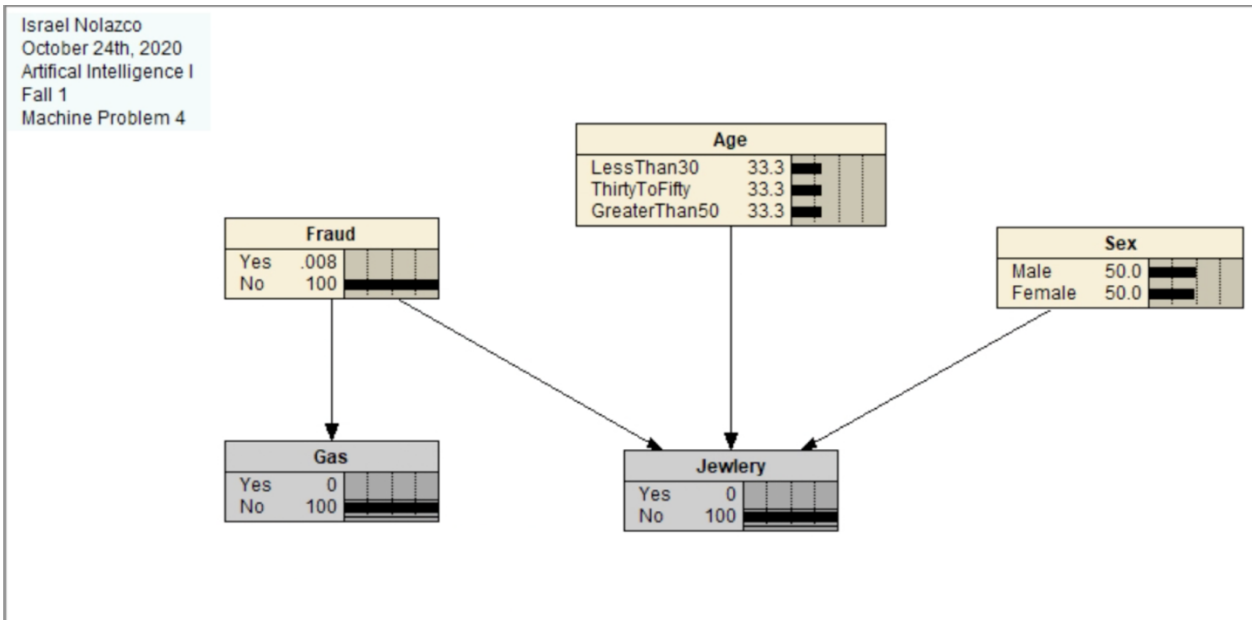
4. P(Fraud | ¬gasPurchased, ¬jewelryPurchased)



P(Fraud | ¬gasPurchased, ¬jewelryPurchased) is < 0.00008 , 0.99992 >