Bayesian Network

c)

For conditional probabilities, we can use *conditional* $R_Y(\theta)$ gate which rotates the state around Y-axis θ degrees depending on control state. Rotating state around Y-axis provides a probability split on the target state resulting desired probability of conditional probability.
Since we have only 2 conditional probabilities, we can achieve conditional probability with just 2 states such that one is control and the other is for the probabilities depending on control qubit.

d)

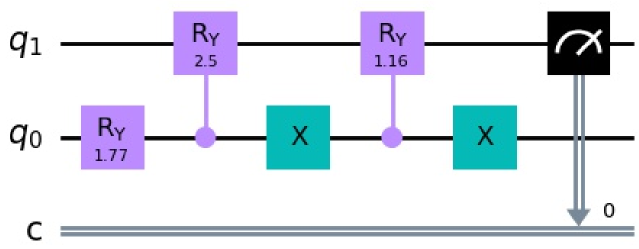
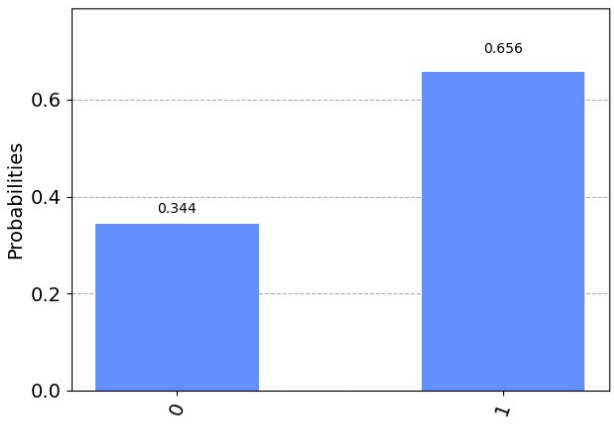


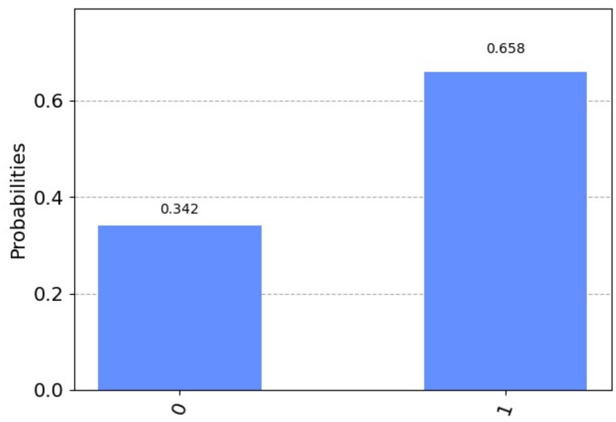
Figure 1: Quantum circuit implementation of given Bayesian Network

e)

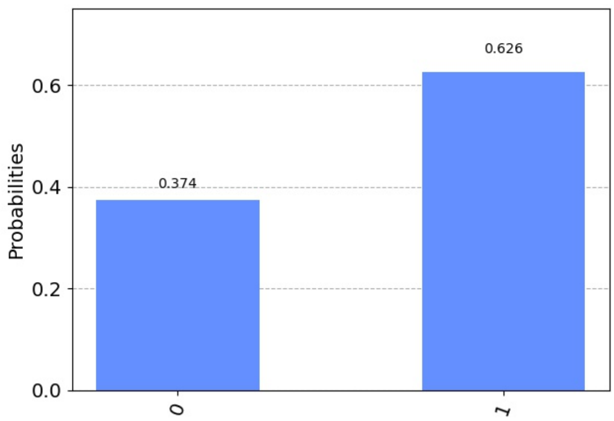
Notice that histograms of with and without noise cases seems close due to the modelled error sources. In real qubit histogram on the other hand, we observe slight difference compared to simulated ones. In case of no noise, we observe the difference between real and ideal cases. In case of modelled noise, we still see difference due to the fact that our modelled error source and the actual noise the qubits experience are different.



(a) Without noise



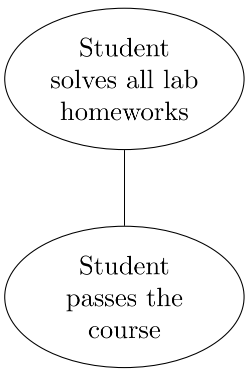
(b) In a simulator with noise



(c) Using a real qubit

Bonus

In this question, given problem contains two conditional probabilities resulting 2 nodes and 1 edge. We represent the nodes with circles and edges by arrows since nodes are conditions and edges are the relations between conditions. This can be generalized to all problems containing conditions depending on others and so on.



Student solves all lab homeworks	passes course	fails
T	0.9	0.1
F	0.3	0.7