

1 Assignment 2

1.1 Problem 1

Margaret has divided her books into two groups, those she likes and those she doesn't. The five (5) books that Margaret likes contain (only) the following words:

animal (7 times), mineral (8 times), vegetable (5 times), see (3 times)

The ten (10) books that Margaret does not like contain (only) the following words:

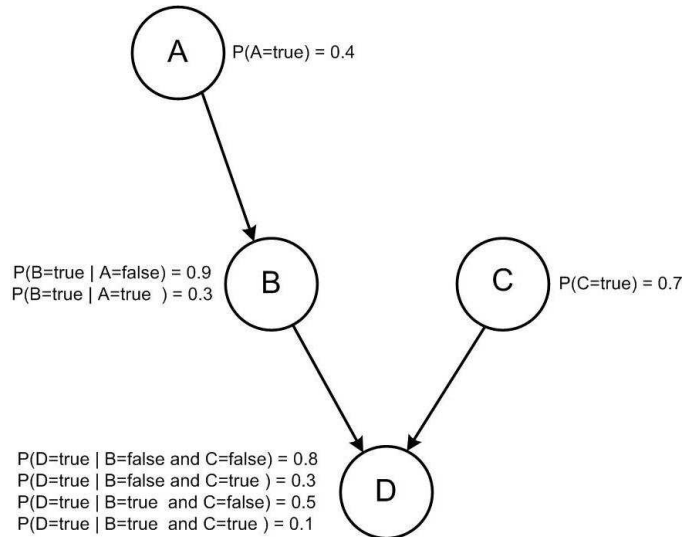
animal (4 times), mineral (1 times), vegetable (6 times), spot (2 time), run (9 times)

Using the Naive Bayes assumption, determine whether it is more probable that Margaret likes the following book than that she dislikes it. Again, be sure to show and explain your work.

see spot spot animal run // These words are the entire contents of this new book.

1.2 Problem 2

Consider the Bayesian network drawn below



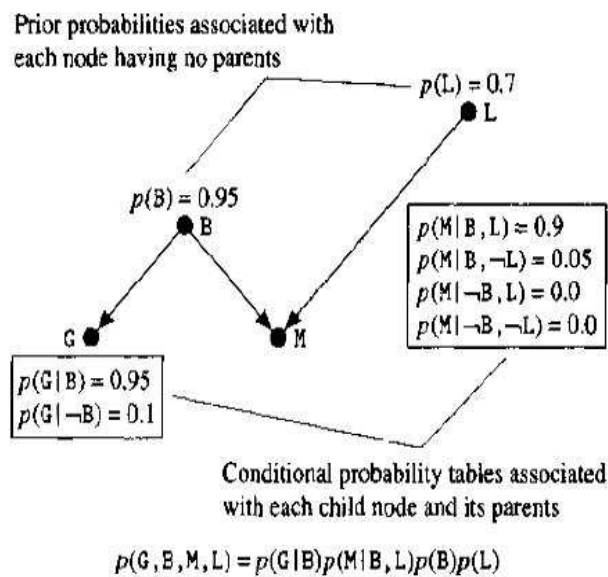
Show your work for the following calculations.

- Compute $P(A = \text{true} \text{ and } B = \text{false} \text{ and } C = \text{true} \text{ and } D = \text{false})$.

- Compute $P(D = \text{true} \mid A = \text{false} \text{ and } B = \text{true} \text{ and } C = \text{false})$.
- Compute $P(A = \text{true} \mid B = \text{false} \text{ and } C = \text{true} \text{ and } D = \text{false})$.
- Compute $P(B = \text{false} \mid A = \text{true} \text{ and } C = \text{false})$.
- Compute $P(B = \text{false})$.

1.3 Problem 3

Consider the following Bayesian network:



Do the following inferences:

- $P(M|L)$
- $P(\sim L | \sim M)$
- $P(\sim L | \sim B, \sim M)$

1.4 Problem 4

For the following Bayesian network compute $P(Q|U)$.

