

CS4100/5100 - Quiz 5
10/10/2013

- If a Bayesian network consists of m binary variables, then the probability function can be represented by a table of ____ entries.
 A. m B. m^2 C. $m(m - 1)/2$ D. 2^m
- How many of these sayings about Bayesian network are **true**? ____
 I. Each node corresponds to a random variable, which should be discrete but not continuous.
 II. It represents a set of random variables and their conditional dependencies.
 III. There are a set of arrows that connect pairs of nodes. If an arrow is from X to Y, it means X has a direct influence on Y
 A. 0 B. 1 C. 2 D. 3
- Suppose a Bayesian network consists of n variables $\{x_1, \dots, x_n\}$, is the following equation correct? ____ (every two variables are conditionally independent given their parents, if not linked by an edge)

$$P(x_1, x_2, \dots, x_n) = \prod_{i=1}^n P(x_i | \text{parents}(X_i))$$

where $\text{parents}(X_i)$ means the parent nodes of X_i .

- Yes B. No
- When we do variable elimination, choosing which variable to be eliminated first makes no difference about the result. ____
 A. True B. False
- Variable elimination is an exact inference method. It eliminates the non-observed non-query variables one by one by distributing the sum over product. ____
 A. True B. False
- Rejection sampling can be used to estimate posterior probability $P(X|e)$. Which of the following is **false** about rejection sampling? ____
 A. First, it generates samples from the prior distribution $P(X)$
 B. It rejects to generate samples once there are enough situations where $X = x$ occurs
 C. It rejects all those samples that do not match the evidence e
 D. After the rejection, the estimate is obtained by counting how often $X = x$ occurs in the remaining samples
- Which of the following is **false** about Gibbs sampling? ____
 A. It's a form of approximate inference in Bayesian networks
 B. It flips one variable at a time, but keeps the evidence variables fixed
 C. It will reject samples that do not match the evidence
 D. It can be used when variables are discrete or continuous
- Which of the following is **false** about the Bayesian network? ____
 A. A and C are conditionally independent given B
 B. A and B are conditionally independent given C
 C. C and D are conditionally independent given B
 D. E and B are conditionally independent given C

