CS 480 Homework 7

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1

$P(X_2) * P(X_3) * P(X_4) * P(X_5|X_2, X_3) * P(X_6|X_4, X_3) * P(X_8|X_5, X_6) * P(X_9|X_7, X_8) * P(X_7|X_5)$

2

1. Using the answers from last homework, the number of independent parameters needed to represent $P(X_2, X_3, ..., X_n)$ is $n! - 1$ when the domain of X_i is i for all i in $\{2, 3, ..., n\}$. Therefore, the number of independent parameters needed for this graph is $9! - 1$ or 362879.

2. Using the factored equation from question 1, the number of independent parameters needed for the network is: $1 + 2 + 3 + 4 * 2 * 3 + 5 * 4 * 3 + 7 * 5 * 6 + 8 * 7 * 8 + 6 * 5 = 778$.

   - The number of independent parameters for $P(X_n) = n - 1$
   - The number of independent parameters for $P(X_a|X_b, X_c, ...) = (a - 1) * b * c * ...$
   - Add each factors independent parameters to get the total independent parameters.

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1. True

2. False

3. True

4. False

5. True