Computer Science & DA

Machine Learning & Artificial Intelligence

Doubt Session

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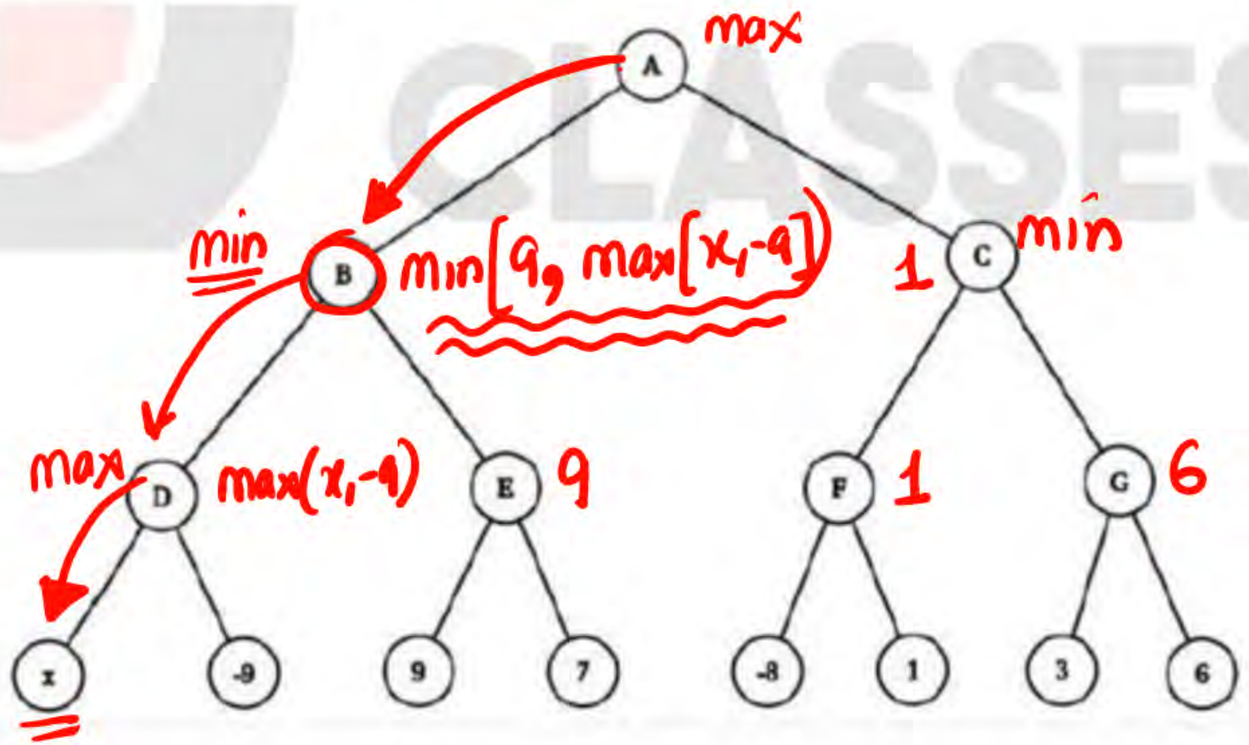
Consider the following game tree.

Player 1 (max node) chooses the left action for which of the following value(s) of x.
Assume optimal play and Player 1 's turn at Node A.



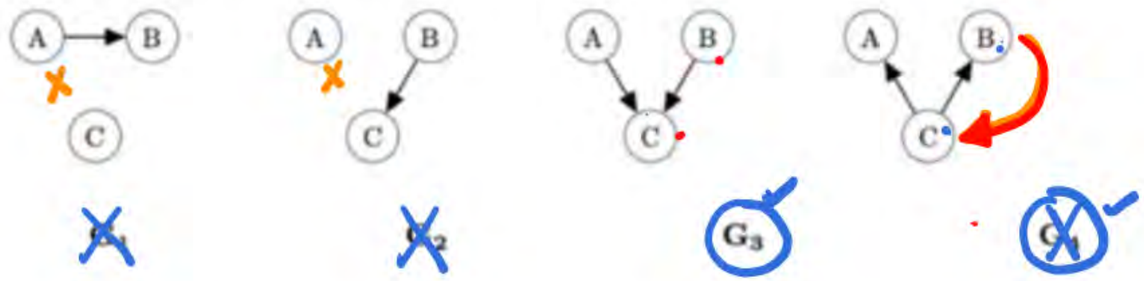
A. 2
B. −7
C. 4
D. −1

$\min(9, \max(\overline{x}, -9)) > 1$

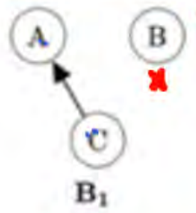
2
-7
-1

• lecture → group →

Assume we are given the following four Bayes' nets, labeled $\mathbf{G_1}$ to $\mathbf{G_4}$:



Assume we know that a joint distribution $\mathbf{d_1}$ (over $\mathbf{A, B, C}$) can be represented by Bayes' net $\mathbf{B_1}$. Mark all of the following Bayes nets that are guaranteed to be able to represent $\mathbf{d_1}$.



• B is independent of A, C
• A depend on C

A. G_1
B. G_2
C. G_3 ✓
D. G_4

G1 → B depend on A, C is independent of A, B
G2 → C " " B, A " " B, C
G3 → C " " A, B
G4 → A depend on C, B depend on C

• To check whether any Bayesian n/w Can represent any distribution then we check the independencies, there shd no additional dependency.

Q.13	A decision tree classifier learned from a fixed training set achieves 100% accuracy. Which of the following models trained using the same training set will also achieve 100% accuracy? i) Logistic regressor. ✗ ii) A polynomial of degree one kernel SVM. ✗ iii) A linear discriminant function. ✗ iv) Naïve Bayes classifier. ✗
(A)	i
(B)	i and ii
(C)	all of the above
(D)	none of the above ✔

100%:
- SVM with RBF ✓
- DT ✓
- MLP ✓
- * KNN@k=1 ✓

Suppose we have a boolean variable X. To complete describe the distribution $P(X)$, we need to specify one value: $\mathrm{P}(\mathrm{X}=0)$ (since $\mathrm{P}(\mathrm{X}=1)$ is simply 1- $\mathrm{P}(\mathrm{X}=0)$) Thus, we say, this distribution can be characterized with

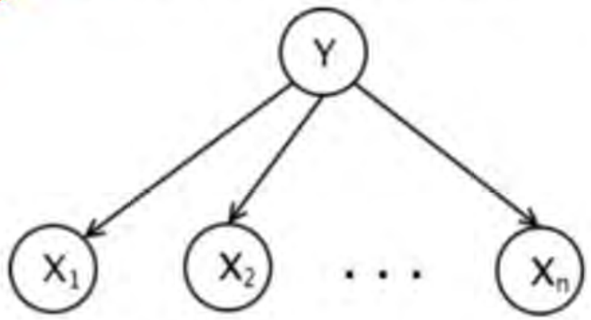
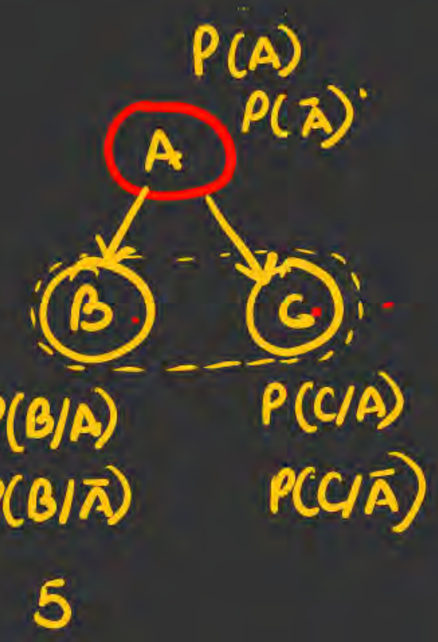


Figure 1: Bayesian network for Problem

one parameter. Now, consider $\mathrm{N}+1$ binary random variables $X_1 \ldots X_N, Y$ that factorize according to Fig. 1 Now, suppose you were to utilize the fact the joint distribution factorizes accoording to the Bayes Network. How many parameters will you need to completely describe the distribution if you use the Bayesian Network representation? In other words, how many parameters will you need to fully specify the values of all the conditional probability tables in this Bayesian Network.

A. $2^{N+1}-1$
B. 2N
C. $2\mathrm{N}+1$
D. $\mathrm{N}+1$

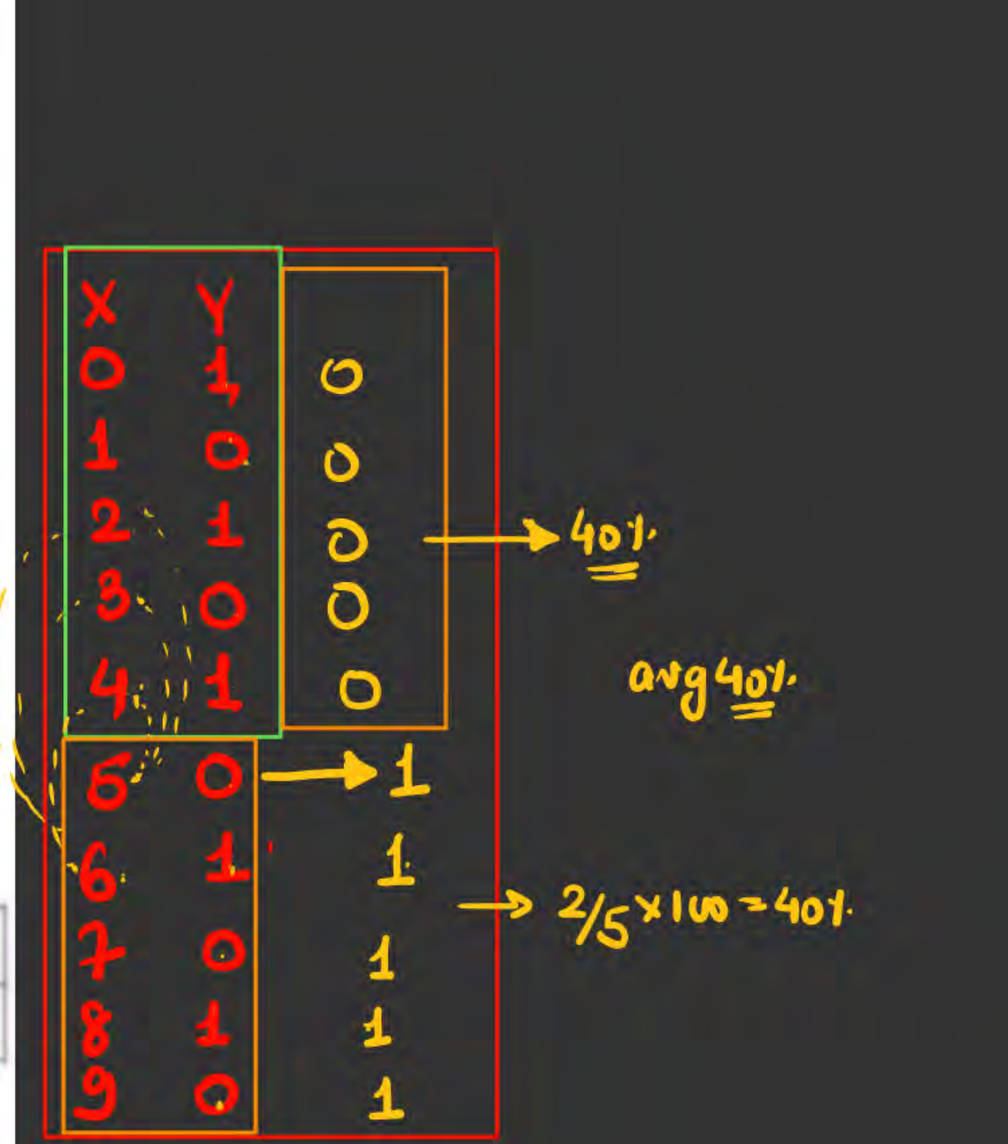
$2 \rightarrow 5 \rightarrow 2^2+1$
$3 \rightarrow 7 \rightarrow 2\times2+1$
$4 \rightarrow \quad 2\times4+1$



The table below shows a training set with 10 examples that is used for training a 3-nearest-neighbors classifier that uses Manhattan distance, i.e., the distance between two points at coordinates p and q is $|p - q|$. The only attribute, X, is realvalued, and the label Y has two possible classes, 0 and 1. What is the 2 -fold cross validation accuracy (percentage correct classification)? The first fold contains the first 5 examples, and the second fold contains that last 5 examples. In case of ties in distance, use the example with smallest X value as the neighbor.

X	0	1	2	3	4	5	6	7	8	9
Y	1	0	1	0	1	0	1	0	1	0

A. 0 percent
B. 20 percent
C. 40 percent
D. 60 percent



THANK - YOU