	Homework VII
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(6)	
	A graph with and like in a kind D. Map
8.1	
	True.
	of graph is said to be U-Mas of a avertunian of and
	sauged by distribution is reflected on the graph,
2/1=2/	of course graph with no links will reflect ung
	A graph is said to be D-Map of a distribution if all CI satisfied by distribution is reflected on the graph, of course graph with no links will reflect any conditional independency.
	VI O) CO
9.2.	A A A A A A A A A A A A A A A A A A A
a-	A conditionally independent of D give \{B, C\} - True. E marginally independent of F - No Delete edgel to make A independent of C. A -> C.
b-	- E marginally independent of F - No
C-	Delete edgel to make A independent of C.
	$A \rightarrow C$.
160 10	2 9 + (1=7) 9 + (0=2) 1=2 19 + (0 (0=1) + P(0=1) + P(0=1)
8.3.	Tables for p(a), p(c/a) p(b/c) by marginalizing and
	Tables for $p(a)$, $p(c a)$, $p(b c)$ by marginalizing and conditioning the joint distribution from the given table -
	July July July July July -
	0 0.6 0 0.4 0 0.8
9,000	0110.2
The second	0 06 0.4
	11 0.4 0.6
3 1	the Mariable of the Mariable of
8 = b	Multiplying the three distribution together we secoves the
	point autribution p(a,b,c) given in the table if
	joint distribution $p(a,b,c)$ given in the table, thereby allowing us to visity the validity of the decomposition $p(a,b,c) = p(a) * p(b a) * p(b c)$
	p(a,b,c) = p(a) * p(b a) * p(b c).
	We can express the district.
	We can express the distribution using the graph.
	a - a -
	(b)

Given graphical model with 4 binary variables 8.4 a) P(S=1|V=1) is P(S=1,V=1). P(V=1). $= \frac{1}{P(V=1)} \sum_{R=0}^{\infty} \frac{1}{G=0} P(V=1) * P(G) * P(R|V=1, G) * P(S=1|G)$ $= \sum_{RG} P(G) * P(R|V=1, G) * P(S=1|G)$ $= \sum_{G} P(G) * P(S=1|G) \sum_{R} P(R|V=1,G)$ = $\leq P(G) * P(S=1|G) * 1$ = P(G=0) * P(S=1|G=0) + P(G=1) * P(S=1|G=1) $= \chi'(1-\gamma) + (1-\lambda) * (1-\beta)$ $= \lambda - \lambda \gamma + 1 + \lambda \beta + \lambda - \beta$ $= 1 - \lambda \gamma + \lambda \beta - \beta$ P(S=1|V=1) and P(S=1|V=0) are same because they are independent of V. B=0 and y=1. Vand Sare independent given G Vand Sare independent given G Vand Sare independent given R&G Vand Sare dependent given R&G

The CPDs for modes 1,2,3 have I free parameter each (since they are Bernoulli). p(H|XI:3) has 8 parameters 0.5 one per conditioning case.

one per conditioning case.

one p(X; | H) for i = 4:6 are 2 * 2 tables, but due

to the sum of one constraint, only have 2 free

narameters. paraméliss.

So total of 3×1+8+3×2=17. for the graph on the right, the (PDs for nodes 1,2,3 have I free parameter each (stince they are Bernoulli). P(X4 | XP:3) has 8 parameters, one per conditioning (ase. p(X5 | X1:4) has 16 parameters.

P(X6 | X1:5) has 32 parameters.

In total, 3+8+16+32 = 59 parameters. The functions after instantiating enidence variable are P(B|A), P(C|A,B), P(DIC) and function of D. The induced graph along the ordering ABCD is shown below. The no of Children for A,B, C & Q.6. Dose 2, 1, 1 and 0 resp., so -the width of the tree is 2. The complexity of the variable climitation algorithm is 0 (n exp(w+1)), richere w is no . I non-evidence variables and w is the width of the ordering Therefore the complexity is 0(4 exp(3)).

O.7 The functions after instantialing evidence variable are P(B/A), P(CIB), P(DIC), P(A) and function & D.

The induced graph along the ordering BCDA is

strough below. The number of (heldren for B, C, Dand A are 2, 2, 1 and O respectively so the tree-width is 2.

The complexity of the variable climination algorithm is $O(n \exp(w+i))$, where n is no of non-evidence variables and w is the width of the ordering.

Thus, the complexity is $O(1 \exp(3))$. (anc. p(X= XIV)) had be par (8) is of Xel XIs) has 32-paramy Try to od, 3+8+ 16+32 = 5(3) chase meters The tendions after instantation withence wandle one P(BIA). P(CIA, B) P(DIC) as in showinglelow of the way (helders tot A) one 2, 1, 1 and O weap, 500 = 1he width of the complement of the variable climination algorithm is in the one with which is reclused in a rider enridence variables and w is the wich endering Therefore the complexing is 0/4, or