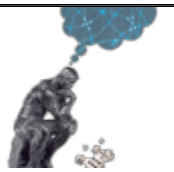
Coursera Dong-Bang T



Probabilistic Graphical Models

Home

Quizzes

Theory Problems

Assignments

Assignment Questions

Video Lectures

Discussion Forums

Course Wiki

Lecture Slides

Course Schedule

Course Logistics

Course Information

Course Staff

Octave Installation

Feedback — MAP Inference + Week 4 Review

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You achieved a score of 3.75 out of 4.00

Question 1

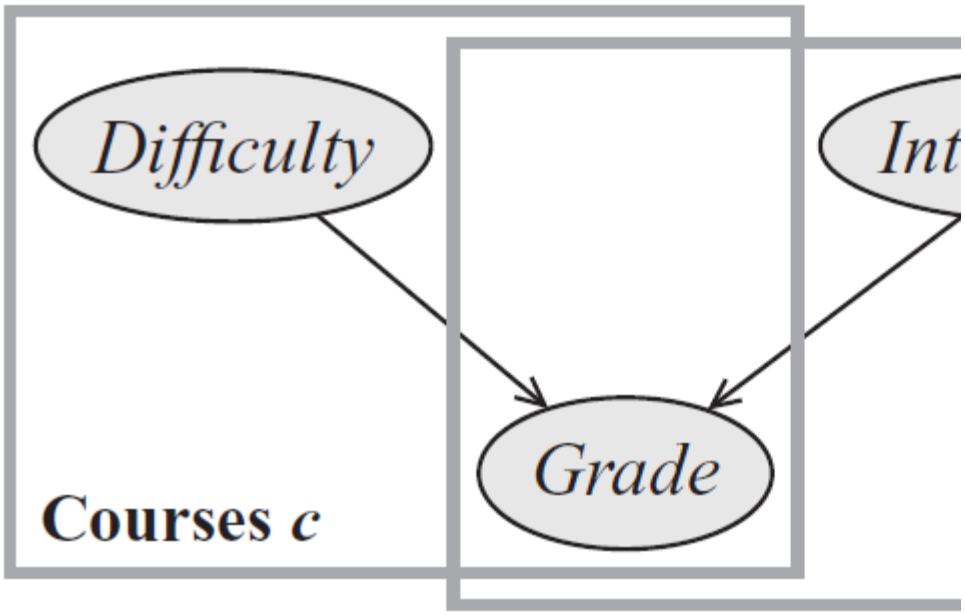
Reparameterization. Suppose we have a calibrated clique tree T and ca same Markov network, and have thrown away the original factors. Now v distribution over all the variables in the network only from the beliefs and do so from the beliefs and sepsets in T? Separately, is it possible for us t sepsets in G?

Your Answer		Score	Explanation
It is possible in both T and G	✔	1.00	Using the clique tree and cluster we can reconstruct the original d
Total		1.00	

Question 2

***Markov Network Construction.**

Consider the unrolled network for the plate model shown below, where we have n s we have observed the grade of all students in all courses. In general, what does a p minimal I-map for the conditional distribution look like? (Hint: the factors in the netwo observed grades. We are interested in modeling the conditional distribution, so we d Grade variables in this new network. Instead, we model their effect by appropriately network.)



Your Answer		Score	Explanation
A fully connected bipartite graph where instantiations of the Difficulty variables are on one side and instantiations of the Intelligence variables are on the other side.	✔	1.00	The factors, reduced by the e scopes over 2 variables: a Di course and the Intelligence va Hence, the variables naturally the instantiations of the Intelli instantiations for the Difficulty have a bipartite graph. It is a because we have a factor for assignment.
Total		1.00	

Question 3

****Clique Tree Construction.**

We now wish to perform inference in the pairwise Markov network you came up with size of a clique to be the number of variables in the clique. There exists a clique tree such that the size of the largest clique in T^* is the smallest amongst all possible cliq size of the largest sepset in T^*?

Note: if you're wondering why we would ever care about this, remember that the cor number of entries in the largest factor produced in the course of message passing, the largest clique in the network, amongst other things.

Hint: Use the relationship between sepsets and conditional independence to derive largest sepset, then construct a clique tree that achieves this bound.

Your Answer		Score	Explanation
$\min(m, n)$	✔	1.00	Given any clique tree, when you conditior sepset, the variables on one side of the s be rendered independent of the variables tree (excluding the variables in the sepse conclude that the minimum sepset size is you condition on a subset of variables sm remaining variables will still be dependent construct a clique tree that satisfies this lc
Total		1.00	

Question 4

***Dual Decomposition Slaves.** Suppose you wish to perform MAP infere an $n \times n$ grid. Which of the following decompositions of the MAP proble the dual-decomposition algorithm? You may select 1 or more options (or apply).

Your Answer		Score	Exp
☑ Slaves that are spanning trees of the grid; the trees, in combination, include all the edges in the grid.	✔	0.25	This MAI size
☐ Slaves that each consist of a single factor in the network.	✖	0.00	This
☐ Slaves that are spanning trees of the grid; the trees, in combination, do not include all the edges in the grid.	✔	0.25	You dec nee
☑ One slave for each row and column of the grid.	✔	0.25	This
Total		0.75	

If we wish to use the dual-decomposition algorithm, the slave problems solvable MAP problems, and the problems must, in combination, include network.