

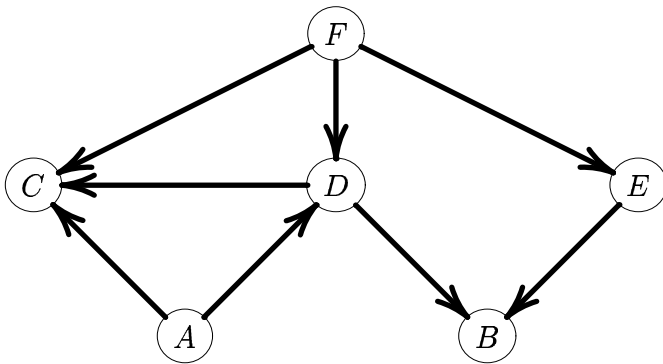
Advanced AI Techniques (WS04)

Excercise sheet 5

Deadline: 30.11.04

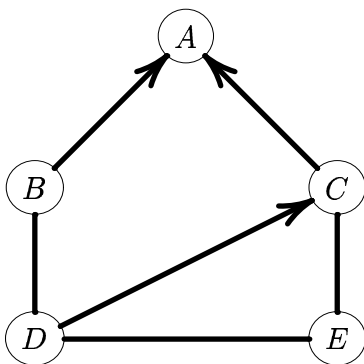
Excercise 1 (4 points)

1. Consider the following DAG G :



Give the DAG pattern representing the equivalence class of G (w.r.t markov equivalence).

2. The following DAG pattern represents an equivalence class of markov-equivalent DAGs:



Enumerate all members of this equivalence class.

Excercise 2 (8 points)

Apply the PC algorithm to generate a Bayesian Network from the following set of data over the variables A, B, C :

	A	B	C
1	0	0	0
2	0	0	1
3	0	0	0
4	0	0	0
5	0	1	1
6	1	0	0
7	1	0	1
8	1	0	1
9	1	1	1
10	1	0	1

1. For the learn-structure-pc step, use the χ^2 test to determine the independence relations. Use a significance level of 25%, i.e. you should reject the null hypothesis of independency whenever the value of χ^2 is higher than the critical value of 1.3233.¹
What is the number of degrees of freedom (and why)?
2. Determine the V structure graph.
3. Which are the four rules that you have to check for the saturate step?

¹You find critical values e.g. under <http://www.statsoft.com/textbook/sttable.html#chi>