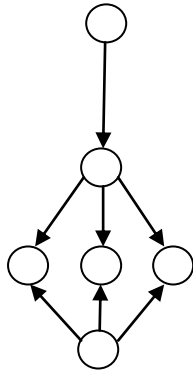


## Tutorial 8

Solutions should be given till 17th December 2007, 16:00

### Exercise 1 DAG Pattern (7 points)



[7 pts.] Construct the DAG-Pattern for this graph!

### Exercise 2 Inference: variable elimination (30 points)

Suppose, we are given the following facts:

*If a person got cold (C), she/he drinks tee (T) with a certainty of 0.8.*

*If a person did not got cold (C), she/he drinks tee (T) with a certainty of 0.3.*

*If a person got cold (C), she/he drinks orange juice (J) with a certainty of 0.75.*

*If a person did not got cold (C), she/he orange juice (J) with a certainty of 0.25.*

*If a person got cold (C), she/he has fever (F) with a certainty of 0.5.*

*If a person did not got cold (C), she/he has fever (F) with a certainty of 0.1.*

*If a person has fever (F), she/he contacts the doctor (D) with a certainty of 0.8.*

*If a person does not has fever (F), she/he contacts the doctor (D) with a certainty of 0.2.*

*If a person drinks both tee and orange juice, she/he spends "lot of" money (M) in MyShop with certainty of 0.5.*

*If a person only drinks tee, she/he spends "lot of" money in MyShop (M) with certainty of 0.3.*

*If a person only drinks orange juice, she/he spends "lot of" money in MyShop (M) with cert. of 0.4.*

*If a person drinks neither tee nor orange juice, she/he spends "lot of" money in MyShop (M) with certainty of 0.2.*

- [5 pts.] Figure these implications in a directed graph!
- [5 pts.] Construct (several) conditional probability tables between the given variables based on these facts!
- [5 pts.] Suppose, that the prior probability of the fact, that someone got cold is 0.3. Do we need any other additional assumptions so that we can use the graph constructed in the steps (a) and (b) as a Bayesian network?
- [15 pts.] Suppose Peter has spent a "lot of" money in MyShop! What is the probability, that he will contact the doctor? Please answer this question by reconstructing the marginal probability table of D using the variable elimination algorithm.