Kennissystemen Exam
March 24, 2004
13:30 – 16:30

This exam consists of 5 questions on 2 pages.

Credits:

1a	1b	2a	2b	3a	3b	4a	4b	5a	5b
5	5	10	10	5	10	15	10	10	10

Grade = (points + 10) / 10

Good luck!

Question 1: Basic principles

a) What does the *physical symbol hypothesis* say and why is this hypothesis relevant for knowledge systems?
b) What is the basic structure of a knowledge system and what are the advantages of this structure?

Question 2: Time and space

a) Give 4 (or as much as possible if you don't know) choices that you have to make when modeling time and illustrate each of those choices with two examples.
b) What is the advantage of a *quad-tree* representation of space? Describe this representation.

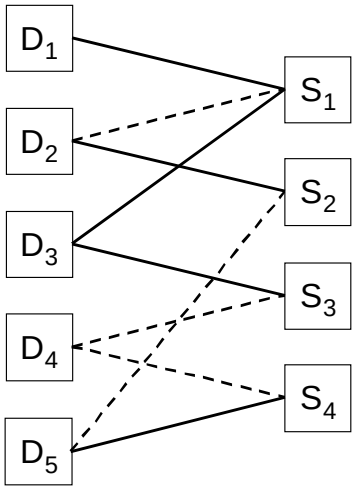
Question 3: Bayes

a) Why is Bayes' rule often useful?
b) Suppose we know that the change of having fever is 1%. We also know that 90% of the people with fever has red spots. We assume these probabilities are equal for persons working on an examination and persons not working on an examination. Further, we know that 50% of the people working on an examination have red spots, while only 5% of people not working on an examination have red spots.

   During the examination, you look at your neighbor and you see that he has red spots. What is the probability that he has fever? Show your calculation.
   You're in a bus and you see somebody witj red spots. What is the probability that he has fever? Show your calculation.

zie ommezijde!

Question 4: Classification



a) Use the classification model that is shown at the right. Answer the following questions:
   - Give a data vector for which there are *no* solutions (without using unknown values "?").
   - Give a data vector that leads to a composite solution.
   - For the data vector <1,1,?,1,0>, list all consistent, inconsistent and matching solutions.

b) Explain the difference between classification method MC4 (*data-driven hierarchical classification*) and method MC3 (*solution-driven hierarchical classification*). Say more than the fact that one is *data-driven* and the other *solution-driven* ;-)

Question 5: Configuration

a) Describe briefly what the *threshold effect* is that can occur when performing configuration, and give an example. What is a common solution for this problem?

b) Explain what the *key-component approach* is.

End of exam.