Kennissystemen Exam
June 9, 2008
18:30 – 21:15

This exam consists of 3 assignments on 2 pages and one attachment.

Credits:

1a	1b	1c	1d	1e	2a	2b	2c	2d	2e	2f	3a	3b	3c	3d
8	8	4	4	5	5	10	5	5	4	5	6	3	3	4

Total credits = 79

Read all questions carefully and make sure that you answer all elements of the questions (for example, do not forget to give an explanation or an example if asked for it). Good luck!

Assignment 1: Assistance for the courts

The courts would like to have a system that helps people to estimate what kind of decision the judge will take in a specific case. Suppose that they will build such a system.

a) List four prerequisites for using knowledge-based systems and discuss whether they are met in this situation.
b) When building a knowledge-based system four phases are distinguished. Give the names of these phases and explains what happens in each of them.

The system will get a description of a specific situation as input and produces the type of conflict as output. In addition, the system will return some decisions of the judge in comparable cases.

c) Which standard task is recognizable in this system? Explain your answer.

Both uncertainty and vagueness play an important role in this domain.

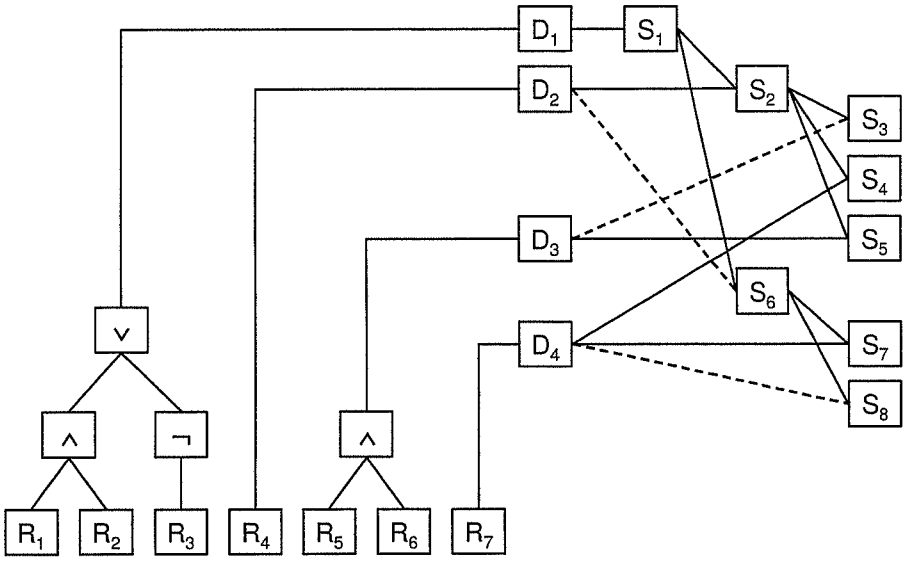
d) Explain the difference between uncertainty and vagueness and give an example of both in this domain.

A knowledge-based system can be studied at two different levels.

e) What is the name of the level on which question 1c) is relevant? Also describe what this level is about.

Assignment 2: Bicycle theft

Each year many bicycles are stolen in Amsterdam. The Amsterdam police try to reduce the number of thefts and to return as many stolen bikes as possible to their owners. For this, they could use a knowledge-based system. One of the tasks of this system is to classify the bikes into different types, such as "racing bike", "ladies bicycle", "mountain bike" etc. Suppose that we have the following schematic representation of this classification task. In this scheme, raw data (R's) is combined via logical operators ($\wedge$ and, $\vee$ or, $\neg$ not) into abstract data (D's) and then classified into solution classes (S's). Solution classes with a common parent are *mutual exclusive*.



a) Give an example of R_5, R_6 and D_3 for the classification of bicycles.
b) For each of the following vectors, describe which solutions are *consistent*, which solutions *match* and which solutions are *inconsistent*.
   1. R = (? 1 0 1 1 ? ?)
   2. R = (1 0 1 0 1 1 0)
c) Explain which standard classification method is the most obvious choice when using this model. Describe this method.

A next task for the system is searching for registered bicycle thefts in the neighborhood of the location where a bike is found.
d) Describe the *nearest first* algorithm for efficiently finding points that are close to another point.

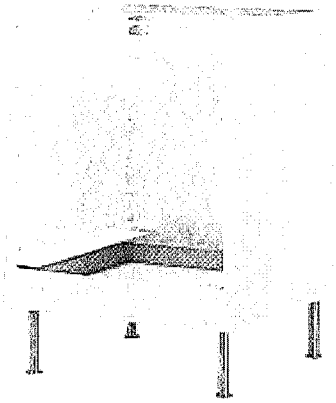
A problem with the use of this algorithm is that the number of bicycle thefts in the center is much larger than the number of thefts in neighborhoods further away from the center.
e) Explain why this is a problem for efficient searching.
f) Give the name of the representation of space that solves this problem and explain this representation.

Assignment 3: Building a kitchen

Building a kitchen is a classical example of a configuration task. Configuration requires, among other things, knowledge about part and their relations.
a) List three types of knowledge about (relations between) parts that are possible relevant for describing a configuration task.

In the appendix you find a copy of a webpage about a kitchen cabinet from IKEA.
b) Use the IKEA description to give one example of knowledge about relations between parts.
c) Also give one example of other knowledge in the description that is relevant for configuration. Explain why this knowledge is relevant.
d) Finally, give one example of knowledge about sharing that can be found in the description and explain what type of sharing it is.

End of exam.



enlarge image

front
Ärlig white

check stock availability at your local store

Base cabinet for oven
FAKTUM
£33.00
(price reflects selected options)

- Adapted for built-in oven.
- Convenient drawer for storing baking sheets, pot lids, cookery books etc.
- Can be pulled out entirely for easy access and overview.
- Sturdy frame construction, 18 mm thick.
- The doors are covered with melamine, which provides a scratch-resistant surface.

designer: IKEA of Sweden

care instructions

Wipe clean with a cloth damped in water or a non-abrasive detergent.
Wipe dry with a clean cloth.

good to know

Different wall materials require different types of fixing devices. Use fixing devices suitable for the walls in your home.
Legs are sold separately.
To be completed with a knob or a handle, sold separately.

environment

Fascia panel:
Renewable raw material (chips).
The material in this product may be recyclable. Please check the recycling rules in your community and if recycling facilities exist in your area.
Cabinet for built-in oven/hob:
Renewable raw material (chips).
Renewable raw material (wood fibres).
The material in this product may be recyclable. Please check the recycling rules in your community and if recycling facilities exist in your area.

product description & measurements

Fascia panel:
Basematerial: Particleboard
Front side/ Backside: Melamine foil
Edge: ABS plastic

Cabinet for built-in oven/hob:
Basematerial/ Back rail: Particleboard, Melamine foil
Front rail: Steel, Pigmented epoxy/polyester powder coating
Supporting rail: Steel, Galvanized
Back: Fibreboard, Acrylic paint

Drawer under oven:
Drawer: Steel, Anti-corrosive phosphate coating, Pigmented epoxy/polyester powder coating
Drawer bottom: Particleboard, Melamine foil
Plastic parts: ABS plastic, Polyamide plastic, Reinforced polyamide plastic, Acetal plastic, Synthetic rubber
Drawer rail: Galvanized steel
Front fixing: Zinc

Width: 60 cm
Depth: 60 cm
Height: 86 cm

this product requires assembly

article number(s), package measurements & weight