

1st Theoretical Assignment in Artificial Intelligence (SS 2005)

Issued: April 25, 2005

Due: May 2, 2005

– **Homepage AI: www.ags.uni-sb.de/~omega/teach/KI05/** –

Note: This assignment requires you to discuss your answers. Each discussion should take between 3 and 10 lines.

Exercise 1.1: **10 P**

1. Define the concept *machine*. (5 P)
2. Use this definition to discuss whether human beings can be considered as machines. (5 P)

Exercise 1.2: **20 P**

1. Do you think that a pile of stones and toilet paper can think? (4 P)
2. Briefly discuss whether computers can think. (8 P)
3. Weizenbaum (*Computer Power and Human Reason*, Chapter 2, 1976) has shown how to build a computer from stones and toilet paper. Does this change your answers to 1 and 2? Discuss your answer. (8 P)

Exercise 1.3: **10 P**

Briefly discuss the four different forms of agents illustrated in the lecture. For each type, specify **one** example from the animal kingdom. Name the abilities of the particular type and the problems it can/cannot solve. Can you imagine other forms of agents? Show advantages of this *new* form of agent.

Exercise 1.4: **10 P**

Consider the following rows of numbers.

$$R_1 : 1$$

$$R_2 : 11$$

$$R_3 : 21$$

$$R_4 : 1211$$

$$R_5 : 111221$$

Specify in natural language a single rule that allows to get from R_i to R_{i+1} . How does R_6 look like? (Hint: You do not need to apply complex mathematical operations)

Exercise 1.5:

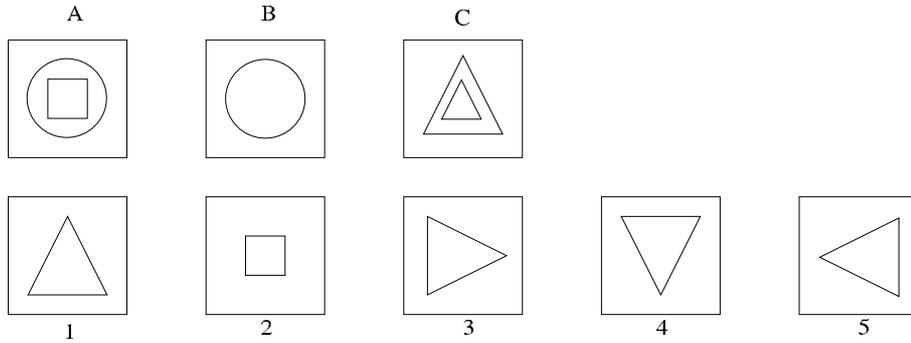
20 P

1. What is a *Turing test*? (5 P)
2. Give five questions you would ask in a Turing test. Discuss why you pick these questions. (10 P)
3. Discuss whether the Turing test is appropriate to decide if computers can think. (5 P)

Exercise 1.6:

30 P

Consider the following analogy test:



1. Give a symbolic representation for each of the figures A-C, 1-5. (10 P)
What kind of problems do you encounter when applying the technique presented in the lecture
 - (a) to specify the single objects? (5 P)
 - (b) to specify the relations? (5 P)
2. Give a symbolic specifications for each of the following transformations
 $A \rightarrow B, C \rightarrow 1, \dots, C \rightarrow 5.$ (5 P)
3. Generalise the symbolic specifications for each pair of transformation rules
 $(A \rightarrow B, C \rightarrow 1), \dots, (A \rightarrow B, C \rightarrow 5)$
Which figure do you obtain using the schema described in the lecture? Which figure would you have chosen? (5 P)