Artificial Intelligence 2.6.2005

1. In 8-game

```
a1 a2 a3              b1 b2 b3
a4 a5 a6      =>      b4 b5 b6
a7 a8 a9              b7 b8 b9
```

   heuristic function is the sum $c_1+c_2+c_3+c_4+c_5+c_6+c_7+c_8+c_9$, where (a) $c_i=|a_i-b_i|$, or (b) $c_i=0$ if $a_i=b_i$ else $c_i=1$. As usual, the empty place is marked by 0. Do these heuristics guarantee finding the optimal solution? Use the better (in your opinion) heuristics to solve the game

```
1 2 3                 2 8 3
8 0 4       =>        1 6 4
7 6 5                 7 0 5
```

2. How do problem solving models GPS and STRIPS work? What is common and what is different?

3. Using SLD-resolution, reason from database

   $(\forall u)Last(cons(u, nil), u)$
   $(\forall x)(\forall y)(\forall z)(Last(y, z) \rightarrow Last(cons(x, y), z))$

   the solution for the query

   $(\exists v)Last(cons(1, cons(2, nil)), v)$.

4. (a) What do mean the soundness and the completeness of resolution?
   (b) Prove that $C_1, C_2 \models C$, if C is a resolvent of clauses C_1 and C_2.

5. Explain briefly what do the following mean?

   (a) Turing test
   (b) expert system
   (c) morphological analysis
   (d) backpropagation

Huom! Käännä kääntääksesi!