Assignment 3 - AAI

1) Consider the constraint system in slide AAI3-11 and define the search tree a little different from the way we did this in the lecture example:

Each search tree contains the variables $x_0 . x_1, x_2, x_3$ and $y_0 . y_1, y_2, y_3$ where $x = x_0 . x_1 x_2 x_3$ and $y = y_0 . y_1 y_2 y_3$ and x_i and y_i are the respective decimal digits (0 to 9).

Each search node assigns either the same number of x digits as y digits with values (type 1) or one y digit more than x digits (type 2). A successor of type 1 is a node of type 2 with the same values as the predecessor plus one more value for a y digit. A successor of type 2 is a node of type 1 with the same values as the predecessor plus one more value for a y digit.

The initial node assigns $x_0=2$, $y_0=4$. All other digits are unbounded.

Your task:

a) Expand the initial node and the successors such that you come to the optimal solution (x=2.176, y=4.825) rather fast.
Remark: Occasionally, you may work with nodes not complying with all constraints. For example, the initial node is of this kind.

b) Discuss whether this complies with breadth-first search or not, respectively depth-first search or not. Is it best-first search?

Assignment 3 - AAI

2) Consider the following transportation graph:

The destination is I.
Each node is marked with the estaimated distance heuristic to I.

a) Compare the algorithms of Dijkstra and A* for a start in F.

b) Investigate the same for a start in B.