

IAIP Excercises Week 8

October 31, 2005

1 Constraint Propagation

1. Dechter, p.80, (*) 3.10.1 - modified
Consider a network having eight variables named $1, 2, \dots, 8$, each having domains $\{1, 2, 3, 4\}$, whose constraints and graph are in Figure 3.19 on page 81. Find an equivalent arc-consistent and 3-consistent network. Is the 3-consistent network minimal? Is it globally consistent?
2. Dechter, p.82, 3.10.8
3. Dechter, p.82, 3.10.17 - modified (*Note: you would need to briefly introduce yourself to subchapter 3.6.1*) Generate an arc-consistent and 3-consistent network equivalent to the network given by: $D_x : x \in [1, 10], D_y : y \in [5, 15], R_{xy} : x + y = 10, D_z : z \in [-10, 10], R_{yz} : y + z \leq 3$.

2 Directional Consistency

1. Dechter, p.112, 4.7.2
2. Dechter, p.112, (*) 4.10.a)
3. Dechter, p.112, (*) 4.11 - modified
Consider the graph-coloring problem given in Figure 4.21 on page 114. The constraints are not-equal constraints and the domains are indicated inside the nodes in the graph.
 - a) Generate a directional strong 3-consistent network for this problem.
 - b) Generate a backtrack-free problem using adaptive consistency. (*Choose ADC1 (p105) or ADC (p106) algorithm. In each execution step, write down the parent set S , and the added constraint R_S .*)
 - c) Find a solution to a problem.