

ICS 275, Assignment 1

Read chapters 1 and 2 in book and answer the following questions:

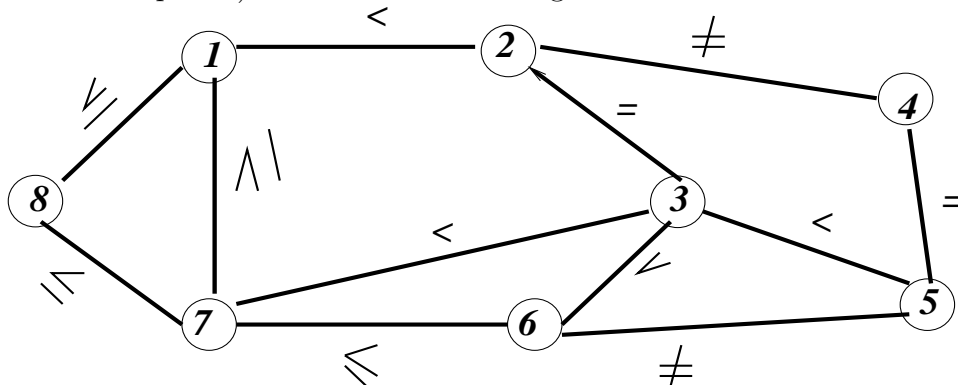
1. Question 1 in chapter 1.
2. Question 4, chapter 2.
3. Question 5 chapter 2.
4. question 6 chapter 2, but do only one choice for this question.
5. Ten cells numbered 0,...,9 inscribe a 10-digit numbers such that each cell, say i , indicates the total number of occurrences of the digit i in this number. Find this number.
For your information the answer is: 6210001000. Formulate this problem as a CSP.
6. (Question 11 chapter 2) Find the minimal network of the crossword puzzle (Figure 1.1) when the problem is modeled as a binary set of constraints.
7. Consider the following relation ρ on variables x, y, z, t .

$$\rho(x, y, z, t) = \{(a, a, a, a)(a, b, b, b)(b, b, a, c)\}$$

- (a) Find the projection network $P(\rho)$. Is ρ representable by a network of binary constraints? Justify you answer.

The next question is part of homework set 2 and chapter 3 (To be turned in next week)

1. (Question 1 chapter 3) Consider the following network.



Assume that each variable has a domain of $\{1, 2, 3, 4\}$.

- a. Find an equivalent arc and path-consistent network. Is the path-consistent network minimal? Is it backtrack-free?

- b. Apply distributed arc-consistency to the dual graph: show two iteration in a schedule of your choice (each node should send messages to all its neighbors, twice).
- c. Analyze the complexity of distributed arc-consistency.