

Constraint Programming, Winter term 2017-2018
Practice Assignment1

Discussion: 16.9.2017-21.9.2017

Exercise 1-1 Warm-up

- a) Implement a Prolog predicate $fac(N, R)$ that holds if R is the factorial of N .
- b) Test your predicates with different queries.
- c) Implement a CLP predicate $facCLP(N, R)$ that holds if R is the factorial of N by replaing the Prolog built-in prediates is and $=$ by constraints over finite domains.

Exercise 1-2

Given the following dinner problem: We are going out to dinner taking 1-6 grandparents, 1-10 parents and/or 1-40 children Grandparents cost 3 dollars for dinner, parents 2 dollars and children 0.50 dollars. There must be 20 total people at dinner and it must cost 20 dollars. The problem to be solved is to find how many grandparents, parents and children are going to dinner. Model the problem as a constraint problem in CLPFD

Exercise 1-3

If 100 bushels of corn were distributed among 100 people in such a manner that each man received three bushels, each woman two, and each child half a bushel, how many men, women, and children were there? Dudeney added the condition that there are five times as many women as men. That way, the solution becomes unique (otherwise, there are seven solutions). Model the problem in clpfd.

Exercise 1-4

Can you find the age of Mamma according to the following dialogue?

Tommy: How old are you, mamma?

Mamma: Our three ages add up to exactly seventy years.

Tommy: And how old are you, papa?

Papa: Just six times as old as you, my son.

Shall I ever be half as old as you, papa?

Papa: Yes, Tommy; and when that happens our three ages will add up to exactly twice as much as today.

Write a CLPFD program to solve this puzzle and return the age of Tommy, Mamma and Papa today.