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Optimization

WS 2015/16

Exercises 6

1. Bin Packing

Consider the following variant of the *bin packing* problem:

- Pack n items of size $g_i, i = 1, \dots, n$, into (at most) n bins, each of capacity c .
- Put the first m items into different bins.
- Find the minimal number of bins necessary.

i) Model the problem in constraint programming (hint: cumulative constraint).

ii) Model the problem in integer linear programming.

2. Investments

Suppose that you are interested in choosing a set of investments $\{1, \dots, 7\}$. Model the following constraints:

- (a) You cannot invest in all of them.
- (b) You must choose at least one of them.
- (c) Investment 1 cannot be chosen if investment 3 is chosen.
- (d) Investment 4 can be chosen only if investment 2 is also chosen.
- (e) You must choose either both investments 1 and 5 or neither.
- (f) You must choose either at least one of the investments 1, 2, 3 or at least two investments from 2, 4, 5, 6.

i) Choose a set of investments $\{1, \dots, 7\}$ using 0–1 variables. Model the constraints as IP formulations.

ii) Choose again a set of investments $\{1, \dots, 7\}$. Model now the constraints as CP formulations.