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Optimization

WS 2014/15

Exercises 6

1. **Bin Packing**

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

   - Pack n items of size $g_i, i = 1, \ldots, n$, 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. **CP Formulations**

   Suppose that you are still interested in choosing a set of investments $\{1, \ldots, 7\}$. Model the following constraints as CP-Formulations:

   (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 $\{1, \ldots, 7\}$ using $0-1$ variables. Model the constraints as IP formulations.

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