

## Concepts and Algorithms of Optimization – Series 8

[www.math.uni-magdeburg.de/institute/imo/teaching/wise19/cao/](http://www.math.uni-magdeburg.de/institute/imo/teaching/wise19/cao/)

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### Exercise 1

Consider the production planning problem of the *H<sub>2</sub>O Chemicals Corp.* described in Exercise 1 of Series 5.

- (a) Formulate a mathematical program in AMPL, which is able to answer the question of the shop floor manager for the maximum number of simultaneously executable tasks. Solve the corresponding problem.

### Exercise 2

*SofTech Inc.* has now 8 employees. Lately there have been a lot of graph-based problems, so you decided to set up a special new work group of maximal 3 people. All of the conflicts from the last time have been resolved. But new problems have emerged: Amy, Daniel, Emily and Hanna are annoyed by Carl since he always takes their yogurts from the fridge. Daniel and Gina argue all the time about football. Berry and Freddy only drink coffee when they are together – so you want to avoid this pairing. Furthermore, since Amy, Gunter and Freddy have the same specialization, they should not be in the same group. The same holds for Berry, Daniel and Emily. The table below shows how many years of experience they have working with graph problems.

years	
1	Amy and Daniel
2	Berry and Freddy
3	Hanna and Emily
4	Gina and Carl

Your goal is to build the most experienced team.

- (a) Give a graph-based problem formulation.  
(b) Formulate a mathematical program of (a) and implement it in AMPL.