## Algorithms in Comparative Genomics

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https://gi.cebitec.uni-bielefeld.de/teaching/2025summer/cg

Exercise sheet 8, discussion: 20.06.2025

## Exercise 1 (Capped multi-relational graph)

Given two balanced genomes  $\mathbb{A} = \{[12], (31\overline{1}4)\}$  and  $\mathbb{B} = \{[13\overline{1}], [241]\}$ , draw the capped multirelational graph and all possible capped relational graphs for all possible pairs of (matched) canonical genomes. Which of them is optimal, i.e. has the smallest DCJ distance?

## Exercise 2 (ILP formulation)

Consider an arts museum with guards taking care of the rooms according the following rules:

- Each guard stands at a door between rooms, taking care of two rooms at once.
- Each room must be taken care by at least one guard.

Here is an example floor plan for illustration:



Formulate an ILP to find the minimum number of guards for taking care of a museum according to the above rules.