

Introduction to Formal Concept Analysis

Exercise Sheet 5, Winter Semester 2017/18

Exercise 1 (drawing line diagrams)

Given the formal context in Table 1, draw an additive line diagram of its concept lattice using the mapping

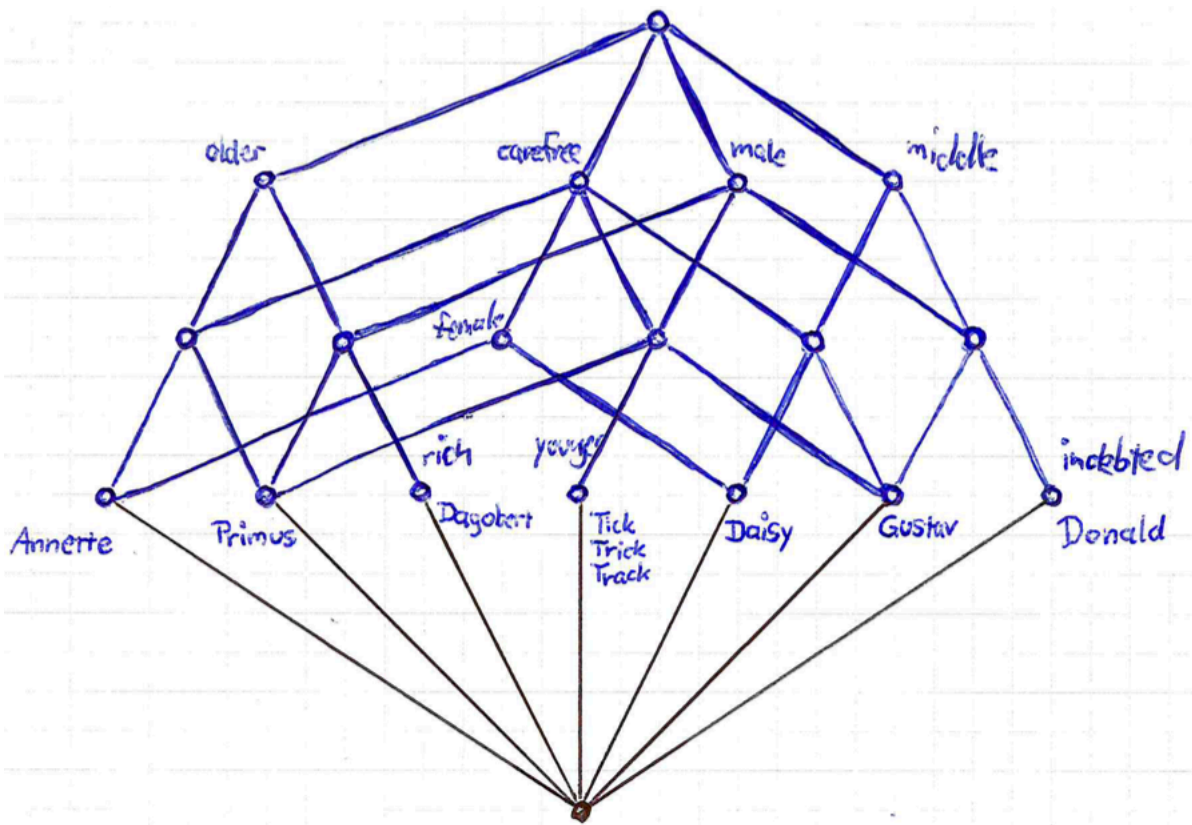
$$vec : \left\{ \begin{array}{l} \text{older} \mapsto (-5, -2) \\ \text{middle} \mapsto (3, -2) \\ \text{younger} \mapsto (-1, -2) \\ \text{male} \mapsto (1, -2) \\ \text{female} \mapsto (-1, -2) \\ \text{rich} \mapsto (1, -2) \\ \text{carefree} \mapsto (-1, -2) \\ \text{indebted} \mapsto (1, -2) \end{array} \right.$$

You may adjust the position of the lattice's bottom element.

Tabelle 1: Grobian Gans: *Die Ducks. Psychogramm einer Sippe.* Rowohlt, Reinbek bei Hamburg 1972, ISBN 3-499-11481-X

	generation			sex		financial status		
	older	middle	younger	male	female	rich	carefree	indebted
Tick			×	×			×	
Trick			×	×			×	
Track			×	×			×	
Donald		×		×				×
Daisy		×			×		×	
Gustav		×		×			×	
Dagobert	×			×		×		
Annette	×				×		×	
Primus v. Quack	×			×			×	

Solution:



Exercise 2 (drawing nested line diagrams)

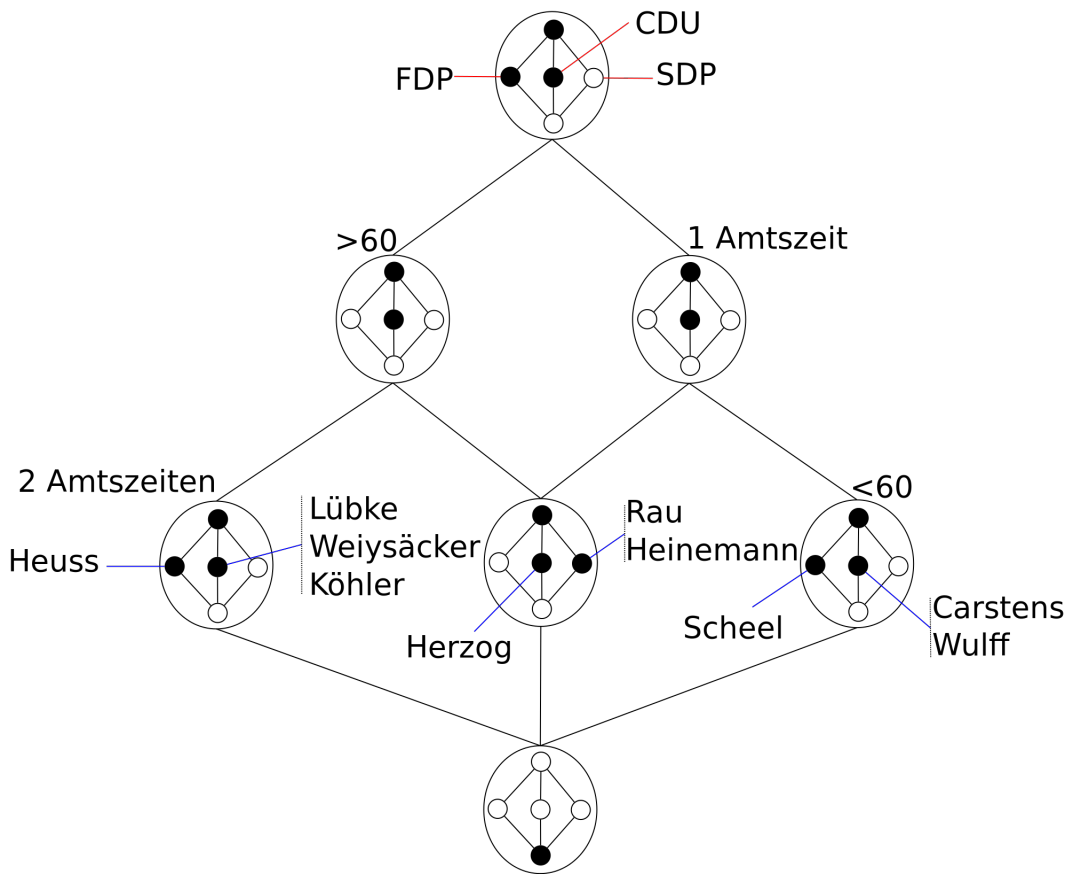
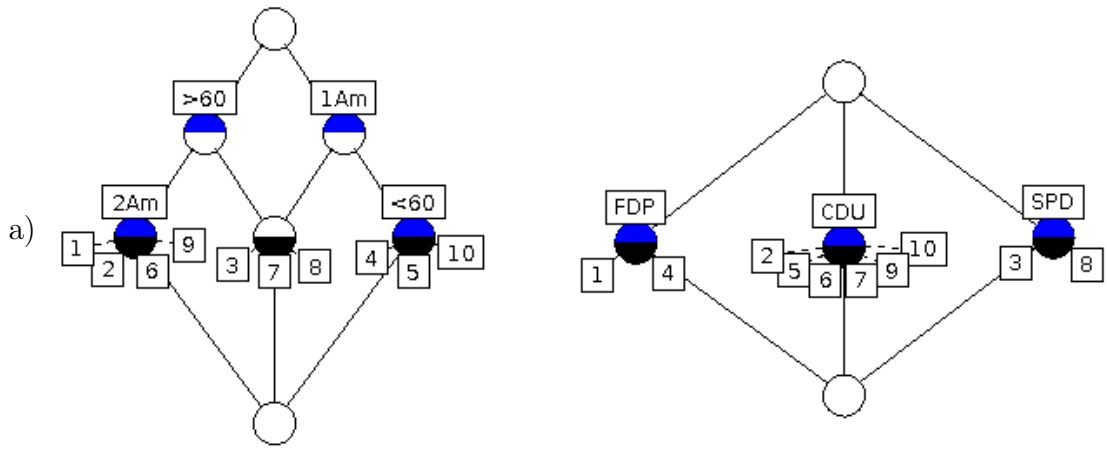
Given the following formal context $\mathbb{K} = (G, M, I)$.

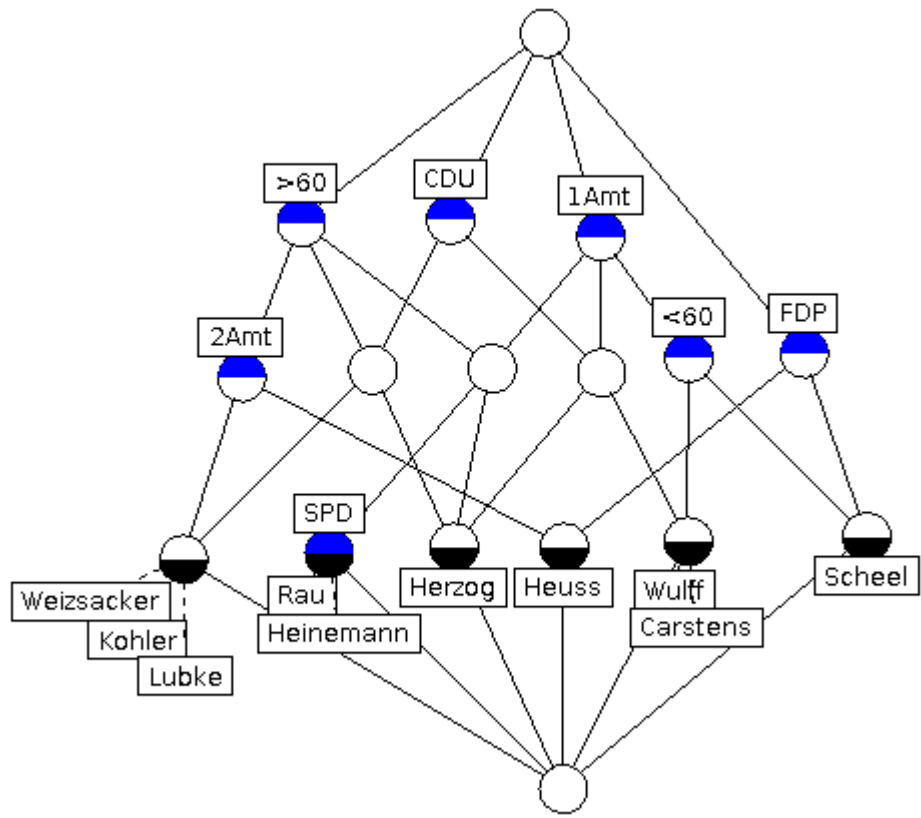
	< 60	≥ 60	one term	two terms	CDU	SPD	FDP
Heuss		×		×			×
Lübke		×		×	×		
Heinemann		×	×			×	
Scheel	×		×				×
Carstens	×		×		×		
Weizsäcker		×		×	×		
Herzog		×	×		×		
Rau		×	×			×	
Köhler		×		×	×		
Wulff	×		×		×		

- a) Draw a nested line diagram of the concept lattice for the attribute sets $M_1 := \{< 60, \geq 60, \text{one term}, \text{two terms}\}$ and $M_2 := \{\text{CDU}, \text{SPD}, \text{FDP}\}$.
- b) Draw a regular line diagram of the concept lattice $\mathfrak{B}(G, M, I)$.

Solution:

1. The objects {Heuss, Lubke, Heinemann, Scheel, Carstens, Weizsacker, Herzog, Rau, Kohler, Wulff} are represented by numbers {1, 2, 3, 4, 5, 6, 7, 8, 9, 10 } in that order for simplicity.





b)