Technische Universität Dresden

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Formal Concept Analysis
Exercise Sheet 3, Winter Semester 2016/17

Exercise 1 (computing and drawing formal concepts)

Given the formal context in Table 1,

1. compute all formal concepts of that context,

2. draw and label the line diagram of the concept lattice, and

3. check if the diagram is correct.

Can you discover implications in that context? If yes, which? Do these implications hold in general? If not, how could they be become invalid?

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	×			×			×	

Exercise 2 (the basic theorem of formal concept analysis)

1. Show that $\underline{L} := (L, |)$ with $L := \{2^i 3^j 5^k \in \mathbb{N} \mid 0 \leq i, j \leq 2; 0 \leq k \leq 3\}$ is a complete lattice ($a|b$ is shorthand for the relation "a divides b").

2. Draw the line diagram for $\underline{L}$.

3. Which are the supremum-irreducible elements?

4. Which are the infimum-irreducible elements?

5. Give a formal context (G, M, I) such that its concept lattice is isomorphic to $\underline{L}$. Give the isomorphism explicitly.

6. How could the fact that $\underline{L}$ and $\underline{\mathfrak{B}}(G, M, I)$ are isomorphic be shown using the Basic Theorem of Formal Concept Analysis?