Discrete Algebraic Structures

WiSe 2025/2026

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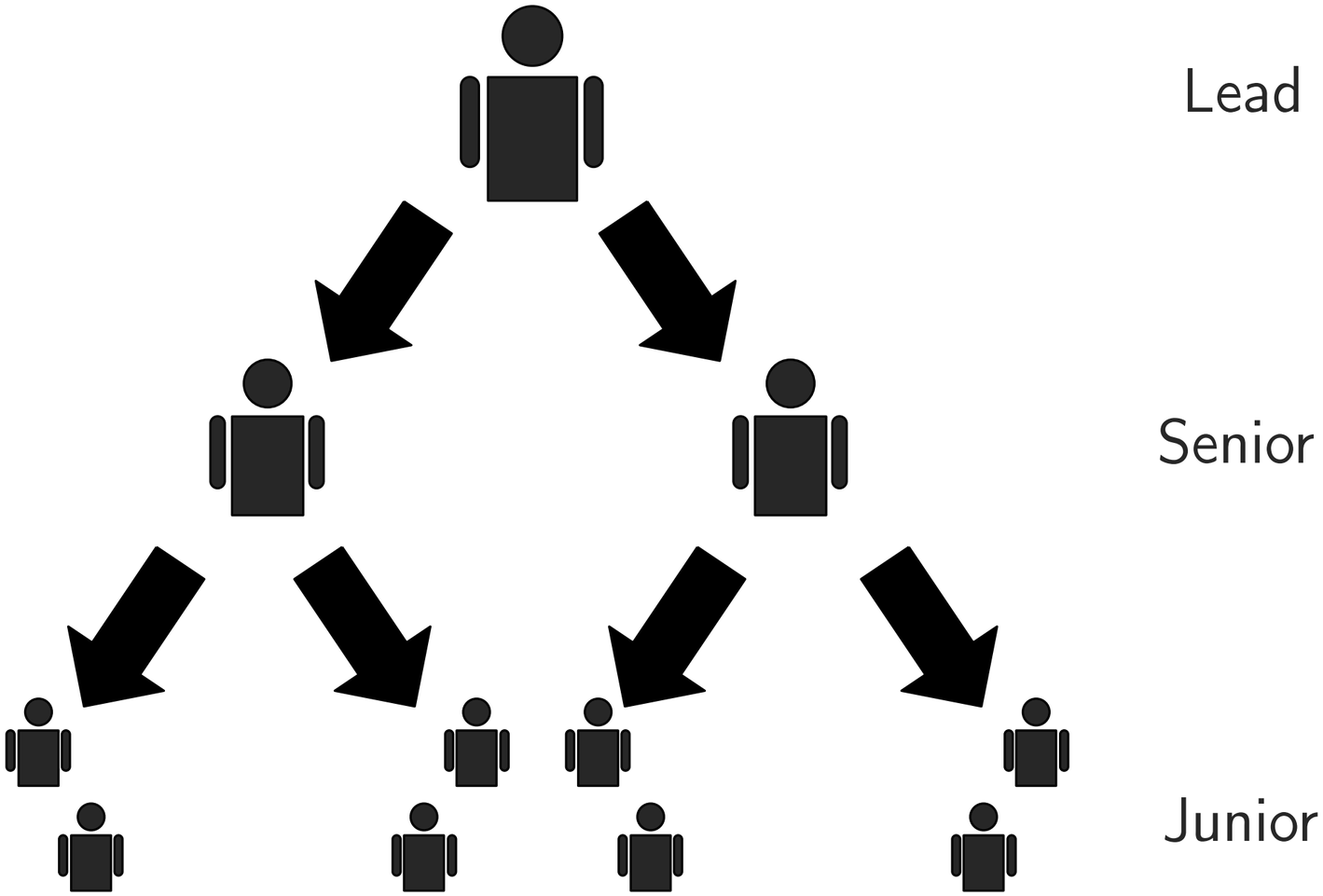
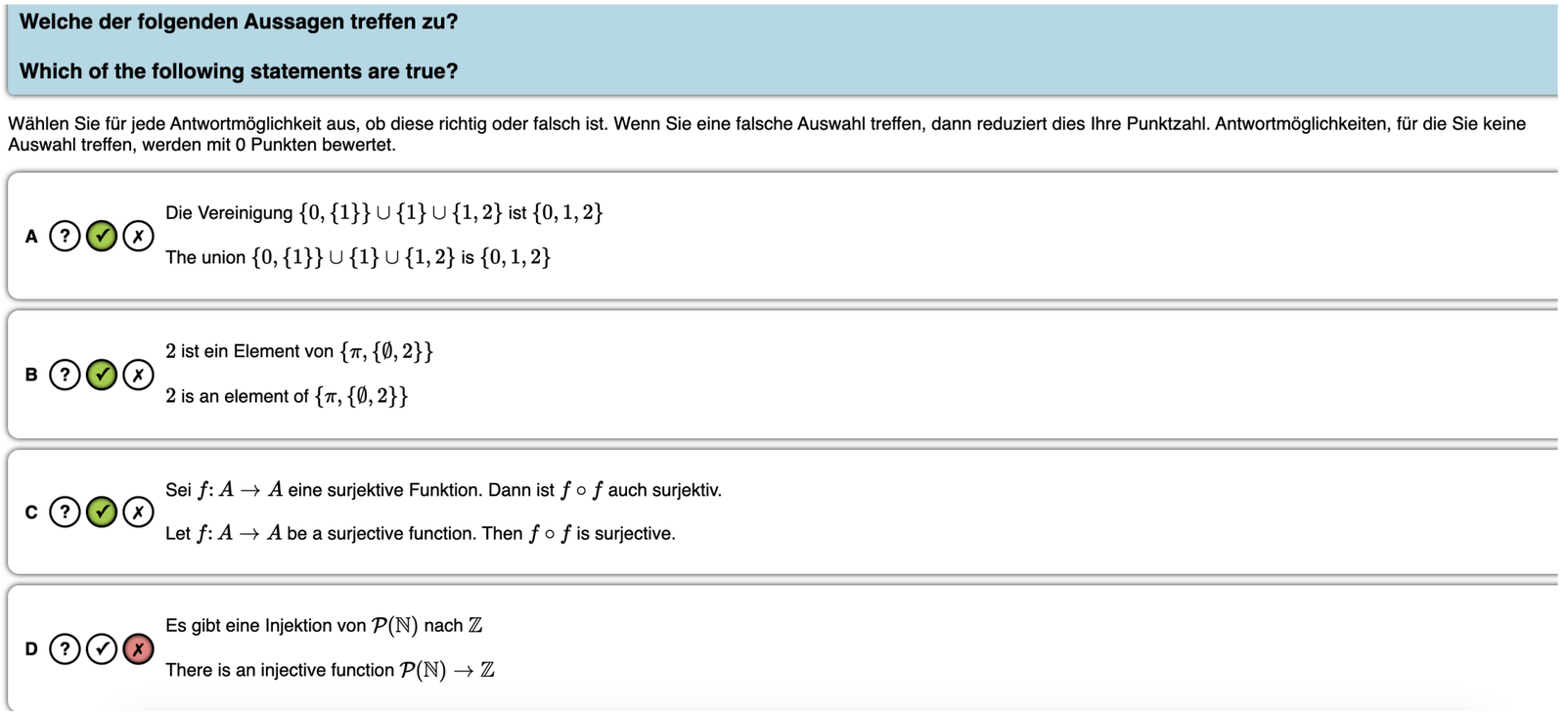
- Mathematics necessary for advanced topics in CS
- Advanced topics necessary for your future
- Long career ahead of you: only knowledge that will stick is math
- Need skills beyond prompting LLMs



- Room D2.022
- 4 groups: A-Fe (8:30–10:30), Ff-L (11:00–13:00), M-R (13:30–15:30), S-Z (16:00–18:00)
- one 2-sided A4 **handwritten** set of notes allowed, black/blue pen
- Tools to perform additions/multiplications with numbers are provided when needed
- Must have with you: login/password, identification with picture
- Due to complaints: Bonus points only count if your grade is enough to pass

For each question in blue:

- Minimum is 0 points
- Correct answers give $+x$
- Incorrect answers give $-x$
- "?" gives 0



Bad strategy

Guess

Good strategy

- Prove
- Check your answer

You need to know the following:

- check basic properties and answer multiple choice questions correctly:
  - sets: union/intersection/difference/symmetric difference/products,
  - functions: injectivity/surjectivity/bijectivity,
  - relations: (antI)reflexivity/(anti)symmetry/transitivity,
  - logic: logical equivalence/satisfiability/negation of a formula,
  - composition laws: associativity/commutativity/neutral element/inverse/distributivity
- compute
  - union, intersection
  - composition/inverse of functions,
  - transitive/reflexive/symmetric closure,
  - truth table
  - polynomial addition/multiplication/division,
  - GCD for numbers/polynomials,
  - Bézout coefficients,
  - modular inverses for numbers.
- write proofs concerning elementary concepts (sets, relations, functions, counting)