

Note:

- During the attendance check a sticker containing a unique code will be put on this exam.
- This code contains a unique number that associates this exam with your registration number.
- This number is printed both next to the code and to the signature field in the attendance check list.

Master EFV August 2023

Exam: IN0000 / aptitude-08-2023

Date: Tuesday 22nd August, 2023

Examiner: Prof. Dr. [REDACTED]

Time: 10:00 – 11:30

	P 1	P 2	P 3
I			

Working instructions

- This exam consists of **8 pages** with a total of **3 problems**.
Please make sure now that you received a complete copy of the exam.
- The total amount of achievable credits in this exam is 6 credits.
- Detaching pages from the exam is prohibited.
- Allowed resources:
 - one **analog dictionary** English ↔ native language
- The exam consists of Multiple-Choice questions only. Please note the following instructions:

Mark correct answers with a cross



To undo a cross, completely fill out the answer option



To re-mark an option, use a human-readable marking



- Do not write with red or green colors nor use pencils.
- Physically turn off all electronic devices, put them into your bag and close the bag.

Left room from _____ to _____ / Early submission at _____

Problem 2 Theoretical Computer Science (2 credits)

Note: an *alphabet* Σ is a finite set.

Convention: a nondeterministic finite automaton (NFA) has exactly one start state.

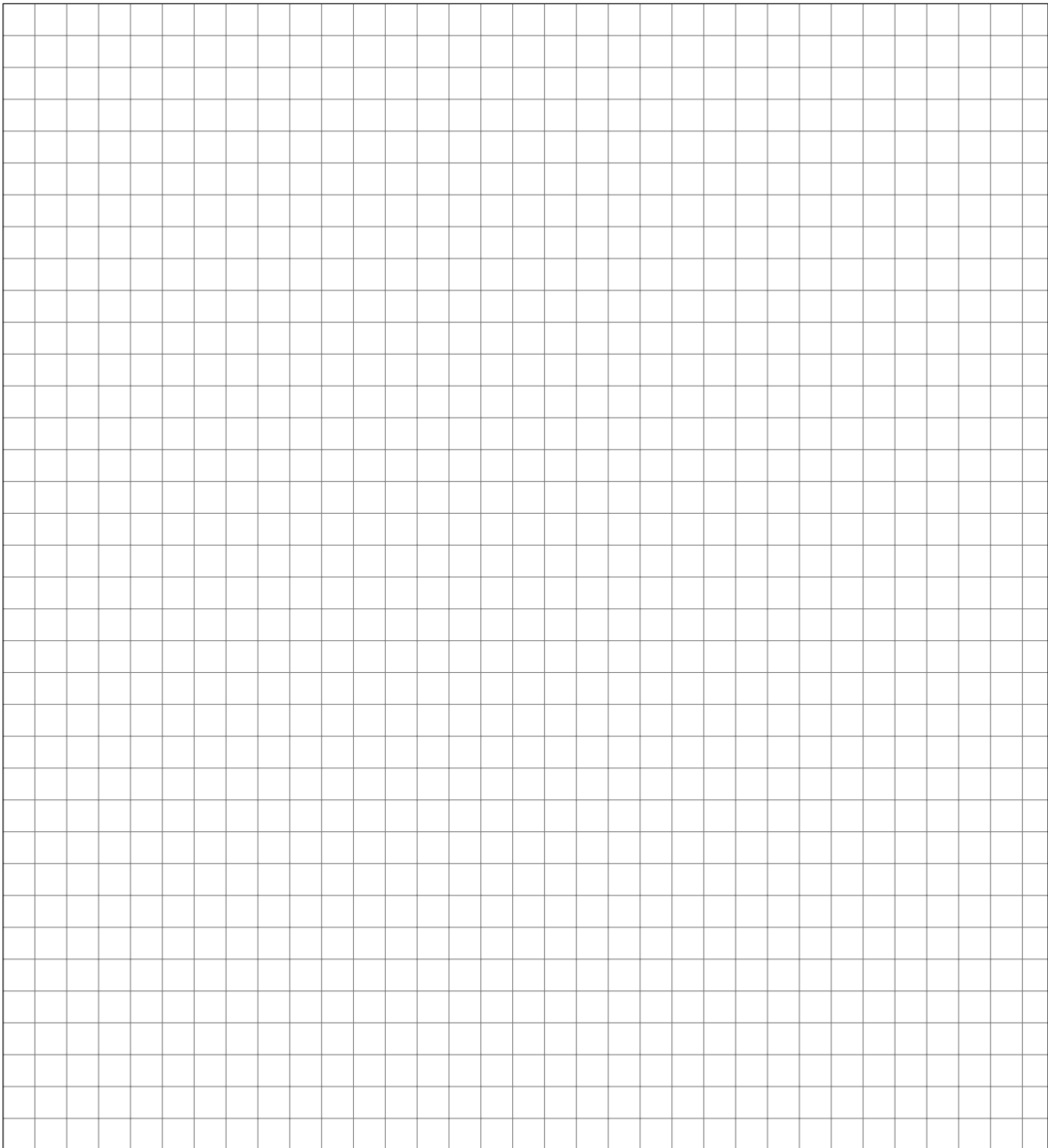
Let $A, B, C \subseteq \Sigma^*$ be languages. Which of the following statements is true?

$|A||B| \leq |AB|$

$A \cup B^*$ is countable.

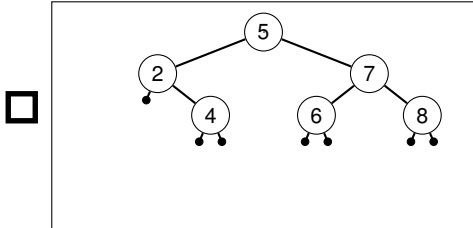
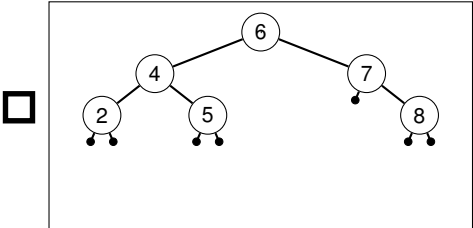
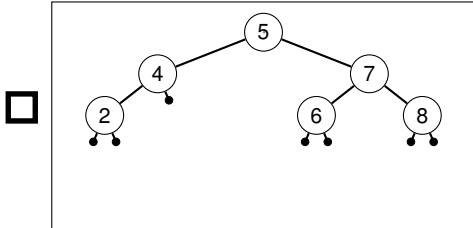
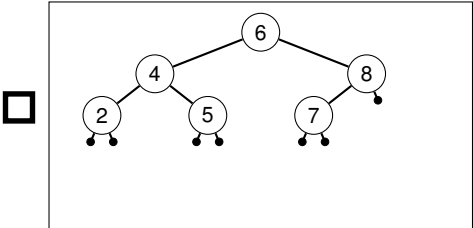
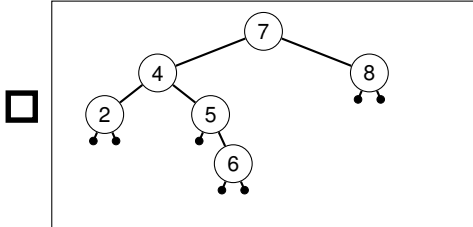
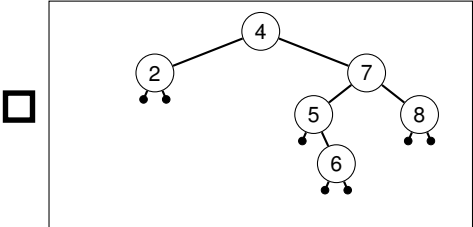
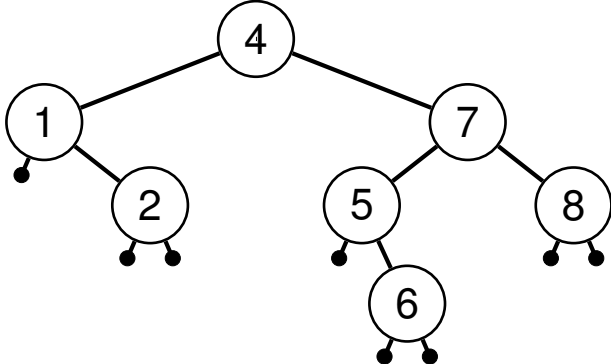
$A \neq B \Rightarrow A^* \neq B^*$

Additional area for notes. (Not considered for points)



Problem 3 AVL-Trees (2 credits)

Delete the element 1 from the following AVL-Tree. Choose the correct resulting tree from the choices below.



Additional space for solutions—clearly mark the (sub)problem your answers are related to and strike out invalid solutions.

