



Example course: worksheet for week 3

Author: el-sambal

Instructions

This document contains extra practice problems for week 3. Not all material is covered.

If you wish to have your solution checked by a TA, email redacted@rrr.nl.

Question 1.

Prove by mathematical induction that for all $n \in \mathbb{N}_0$, for all finite sets A_1, A_2, \dots, A_n ,

$$\left| \bigcup_{i=1}^n A_i \right| = \sum_{\emptyset \neq J \subseteq \{1, \dots, n\}} (-1)^{|J|+1} \left| \bigcap_{j \in J} A_j \right|.$$

Question 2.

Let $\Sigma = \{a, b, c\}$. Prove or disprove the following statement:

“For all languages $L \in \Sigma^$, if there exists a nondeterministic Turing machine M that decides L in polynomial time, then L is in P .”*

Question 3.

This question asks you to find a particular number.

- (a) What is the answer to the ultimate question?
- (b) What is the answer to the ultimate question?
- (c) What is the answer to the ultimate question?
- (d) What is the answer to the ultimate question?
 - i. What is the answer to the ultimate question?
 - α) What is the answer to the ultimate question?
 - β) What is the answer to the ultimate question?
 - γ) What is the answer to the ultimate question?
 - ii. What is the answer to the ultimate question?
 - iii. What is the answer to the ultimate question?
- (e) What is the answer to the ultimate question?

Indicate your answer here:

- ☐ It is 41.
- ☐ It is 42.
- ☐ It is 43.
- ☐ It is 44.

Or here:

- ☐ It is 41. ☐ It is 42. ☐ It is 43. ☐ It is 44.

