

I152: ANALIZA ALGORITAMA

KOLOKVIJUM I – 7. DECEMBAR 2013.

1. Formulirati i dokazati teorem o majoraciji i ilustrovati je bar jednim primerom.
2. Odrediti par prirodnih brojeva (x, y) čiji je redni broj u Kantorovoj enumeraciji $c(x, y) = 2013$.
3. Definisati rekurzivno nabrojive skupove, a zatim dokazati sledeću teoremu:

Neprazan skup $A \subseteq \mathbb{N}$ je rekurzivno nabrojiv ako i samo ako postoji unarna prosto rekurzivna funkcija φ tako da je A njen kodomen, tj.

$$A = \{\varphi(n) : n \in \mathbb{N}\}.$$

RAD TRAJE **100** MINUTA.

SVAKI ZADATAK VREDI PO **10** POENA.

I152: ANALYSIS OF ALGORITHMS

COLLOQUIUM No.1 – DECEMBER 7, 2013

1. Provide a formulation of the Majorisation Theorem, sketch its proof, and illustrate its application with at least one example.
2. Determine the pair of natural numbers (x, y) such that $c(x, y) = 2013$, where c is the Cantor enumeration function.
3. Give the definition of recursively enumerable sets, and, subsequently, prove the following theorem:

A non-empty set $A \subseteq \mathbb{N}$ is recursively enumerable if and only if there exists a primitive recursive function φ in one variable whose image is A , that is,

$$A = \{\varphi(n) : n \in \mathbb{N}\}.$$

1H 40MIN IS ALLOWED FOR ANSWERING THE QUESTIONS.
EACH QUESTION IS WORTH **10** POINTS.