

A high-angle, top-down photograph of a person's hands typing on a silver laptop keyboard. The person is wearing a light-colored, vertically striped button-down shirt. The desk is white and holds several items: a black office calculator with a small screen, a silver flip phone, a white cup of coffee with a latte art design, a black folder or tablet, and a small notepad with two pens. A large, semi-transparent orange rectangle is overlaid on the bottom right of the image, containing the title text in white. The background is a plain white wall.

2D Rectangle Packing Problem u kreiranju atlasa

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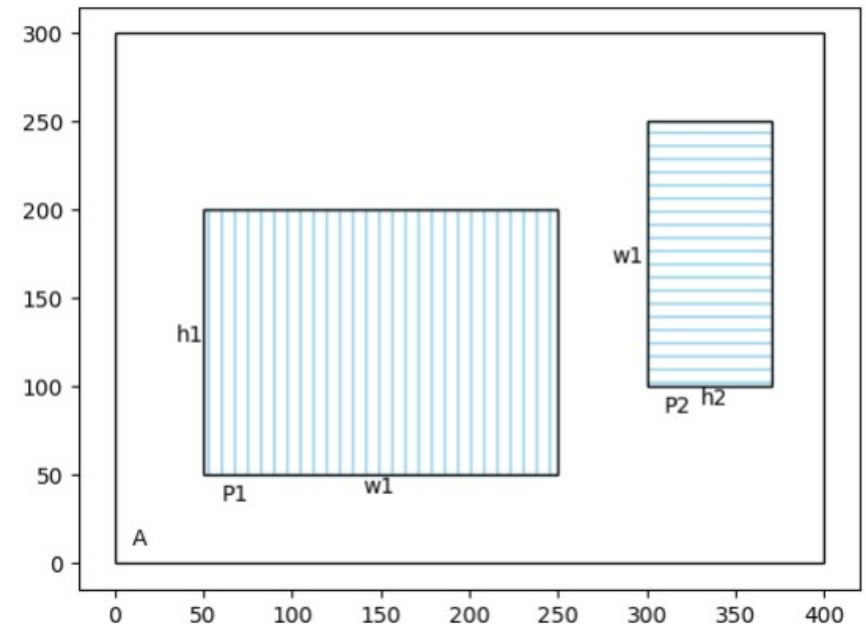
Uvod

- Kreiranje atlasa
- 2D Rectangle packing problem
- Heuristike i meta-heuristike
- Bottom-left i genetski algoritam



Definicija problema

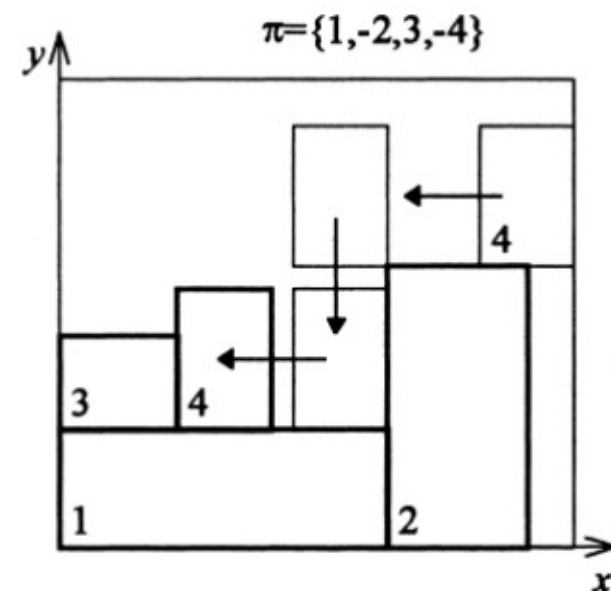
- Set $S = \{P1, P2, \dots, Pn\}$
- Formirati sliku A poštujući uslove:
 1. Nikoje dve slike se ne preklapaju
 2. Ukupne dimenzije ne prelaze granice
 3. Slike se mogu rotirati za 90





Unapredjeni Buttom Left algoritam

- Slika se stavlja u gornji desni ugao
- Pomera se maksimalno po Y osi
- Pomera se maksimalno po X osi
- Ako imamo barijeru ispod pomeramo preko nje
- Ponavljamo postupak dok ima napredka





Iscrpni algoritam

- Generišemo sve permutacije
- Za svaku permutaciju sve orijentacije
- Primenimo IBL algoritam na tako uredjen set slika
- Merimo popunjenost atlasa
- Nalazimo maksimum

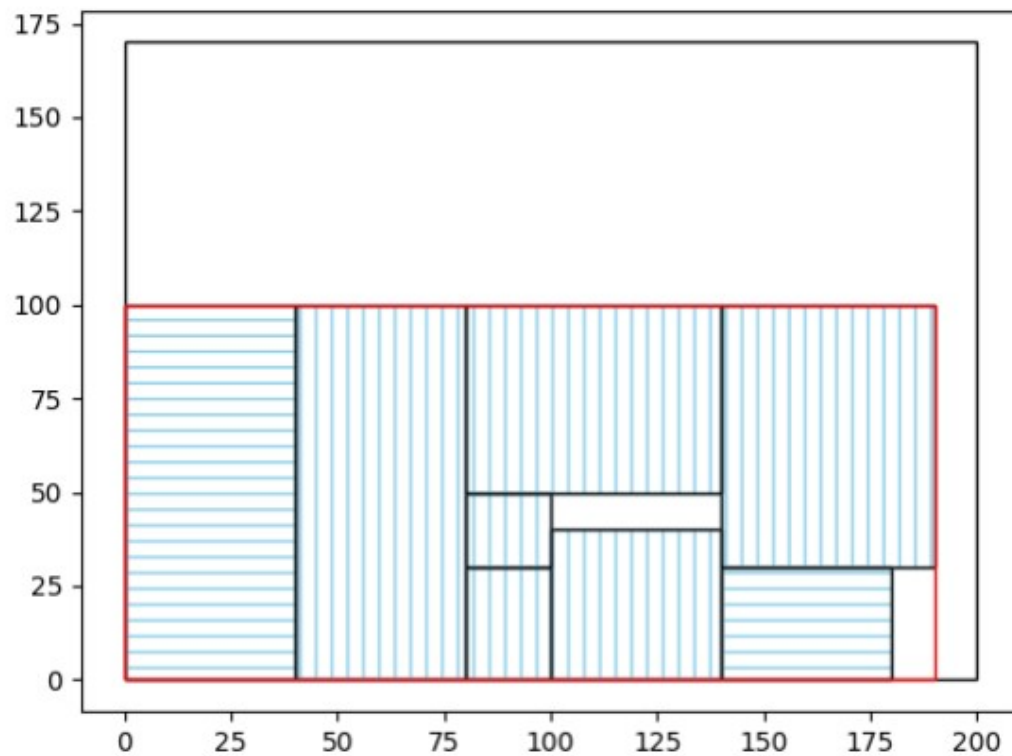


Genetski algoritam

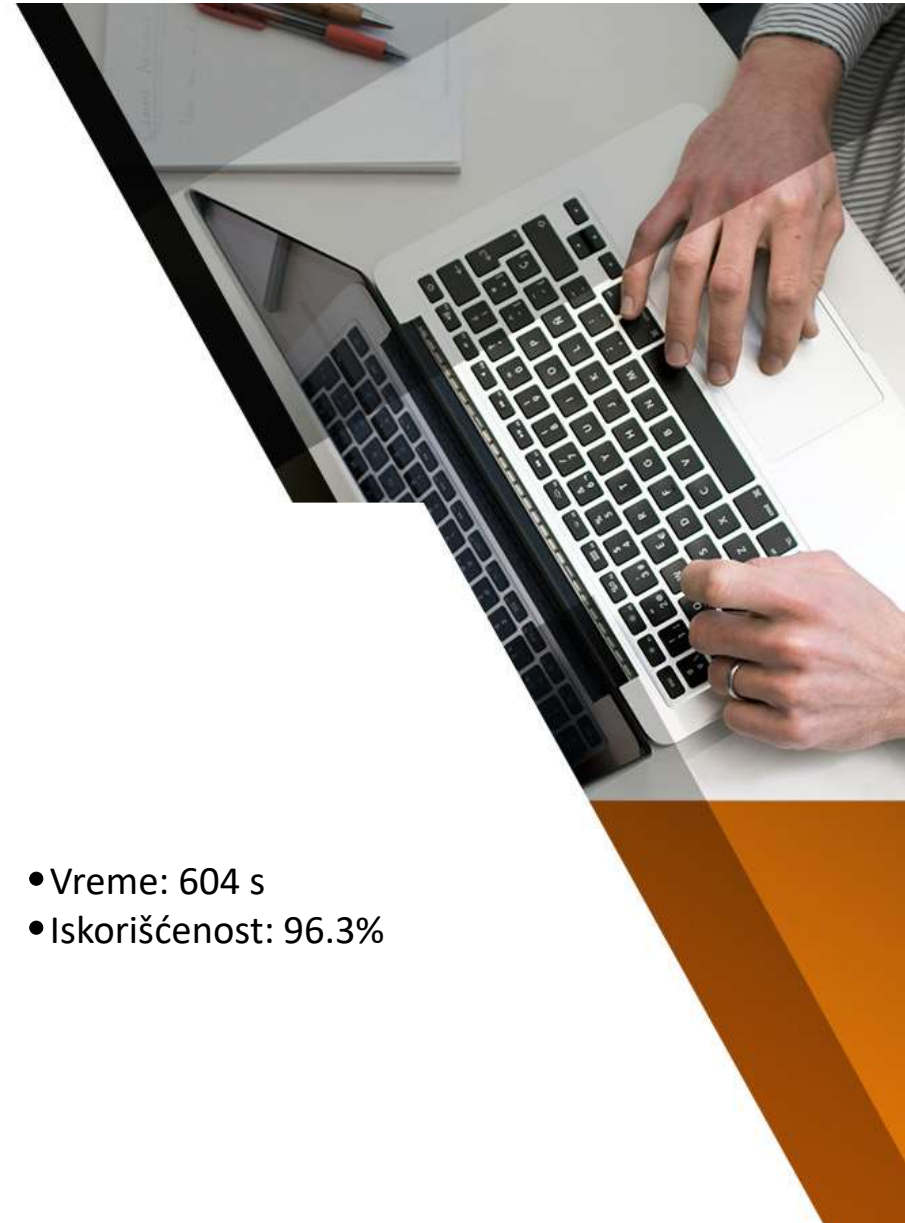
- Kombinovana jedinka $\{N1, \dots, Nn, O1, \dots, On\}$
- Fitness funkcija procenat ispunjenosti atlasa
- Turnirska selekcija
- Mutacija oba segmenta jedinke
- Elitizam u kreiranju novih generacija

1: popSize = 75
2: numGenerations = 150
3: mutationProb = 0.1
4: tourSize = 40
5: elitismSize = 20

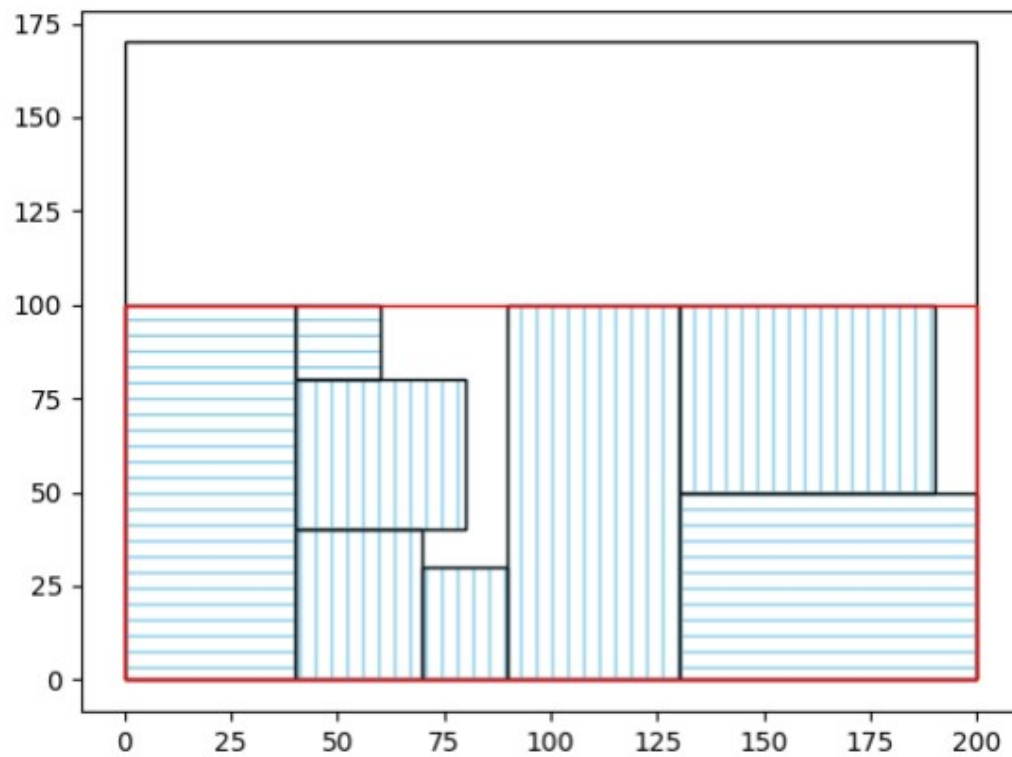
Iscrpni algoritam sa 8 slika



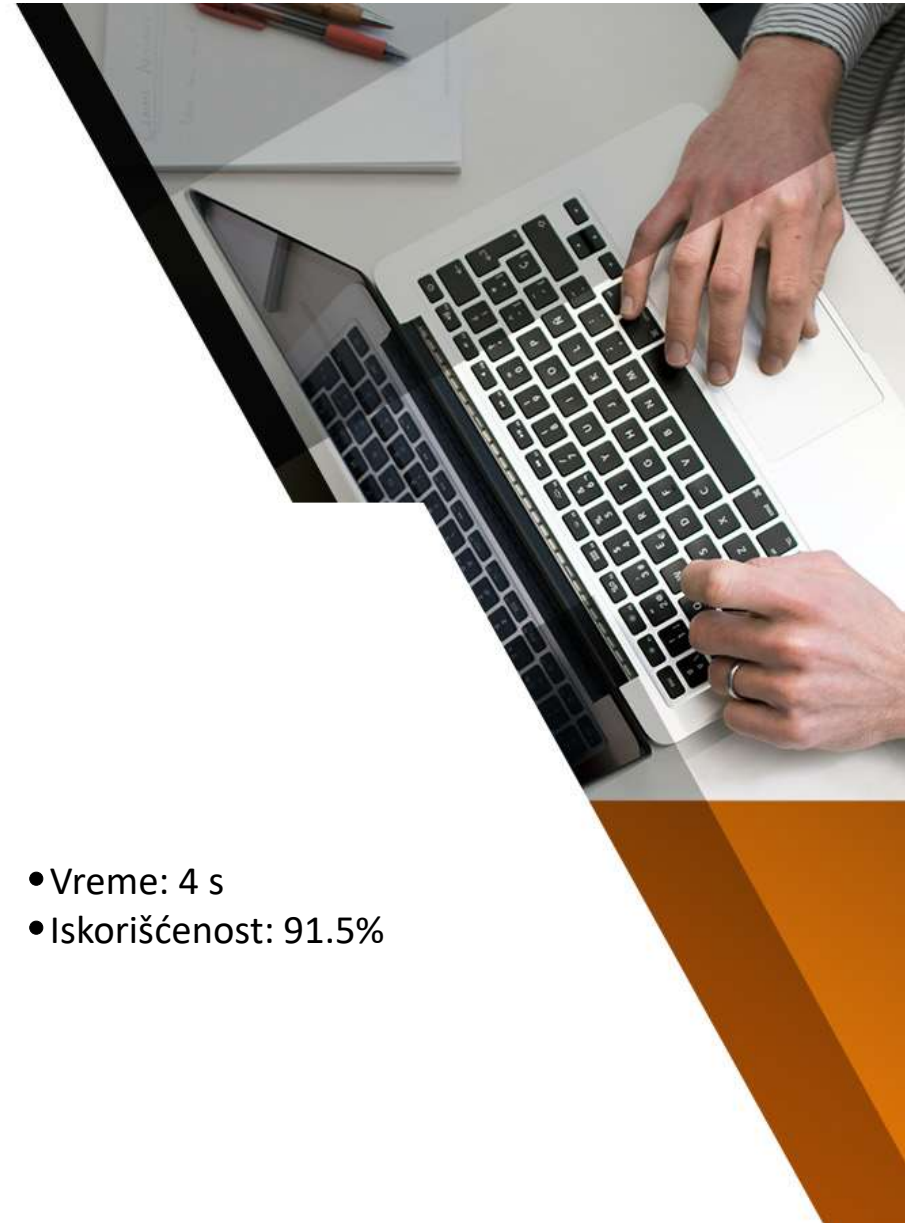
- Vreme: 604 s
- Iskorišćenost: 96.3%



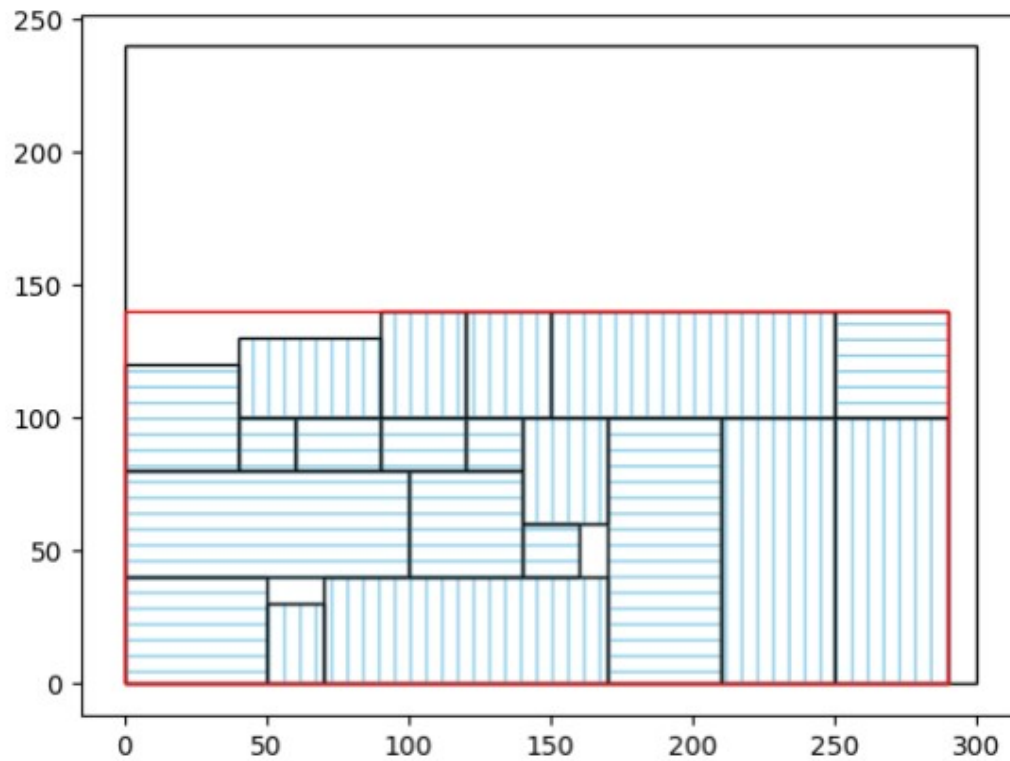
Genetski algoritam sa 8 slika



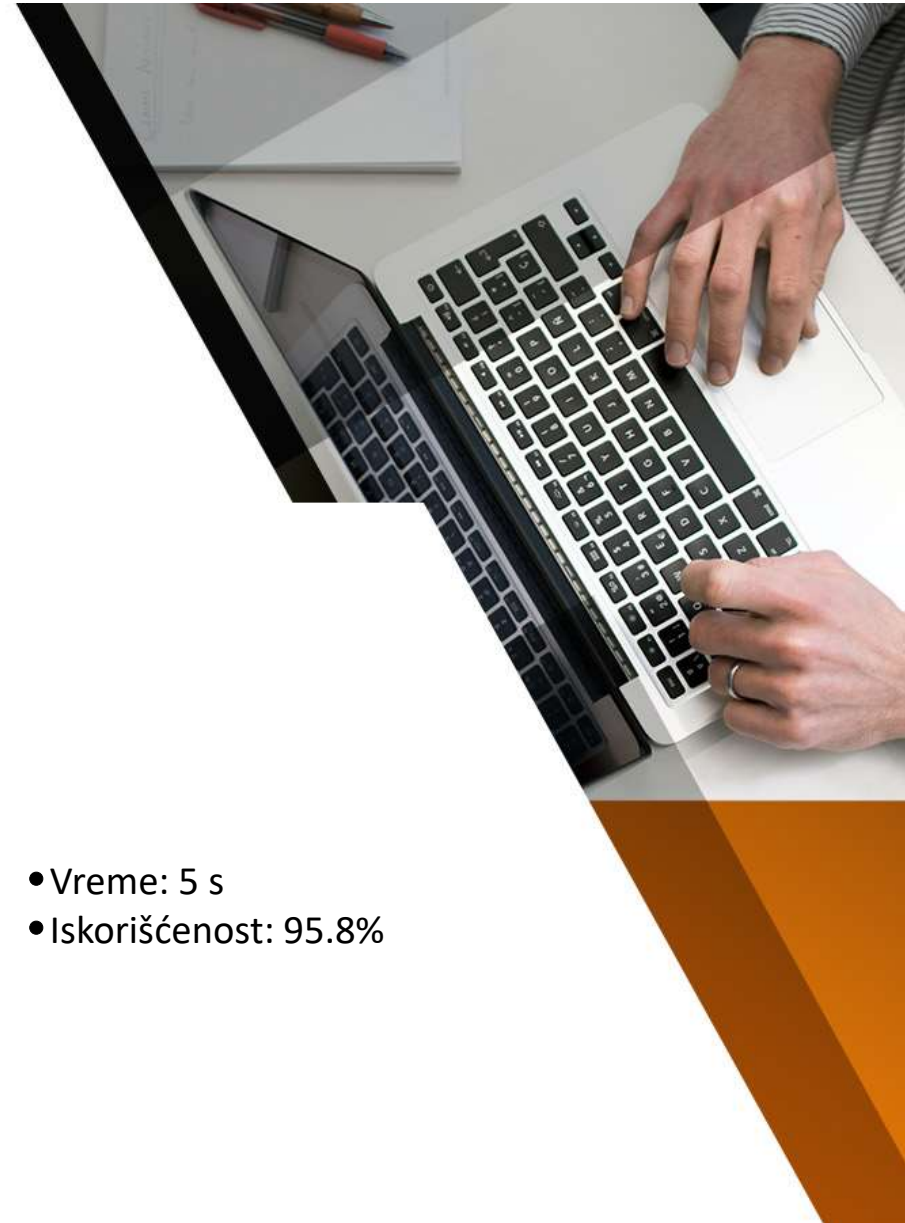
- Vreme: 4 s
- Iskorišćenost: 91.5%



Genetski algoritam sa 20 slika



- Vreme: 5 s
- Iskorišćenost: 95.8%





Hvala na pažnji!

Predrag Mitić 116 / 2017