

Stari Teorem o četiri boje u novom ruhu



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10. kongres nastavnika matematike RH
1.-2. srpnja 2024.

Teorem o četiri boje

– kroz tri faze digitalizacije škola

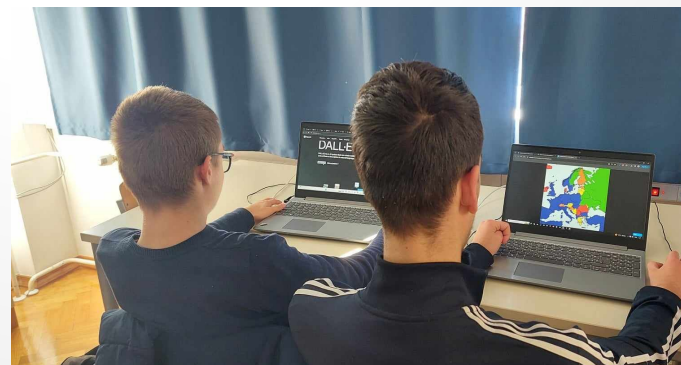
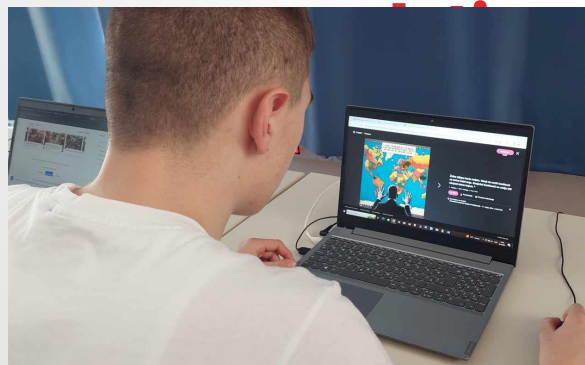
01 | Početci digitalizacije - pametna ploča



02 | Faza e-škola - niz digitalnih alata



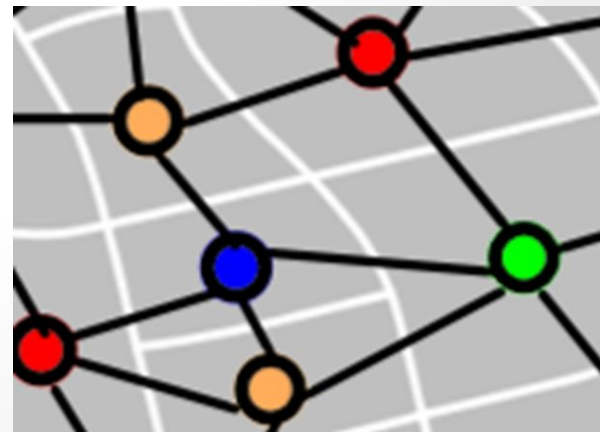
03 | AI faza - AI



Teorem o četiri boje

Svaka se karta može obojiti najviše četirima bojama tako da su susjedne države obojene različito.

Države su susjedne ako se dodiruju nekom dužinom, a ne samo u jednoj točki.



<https://www.halapa.com/odmor/pravipdf/boje4.pdf>

Veza matematike i bojanja susjednih država

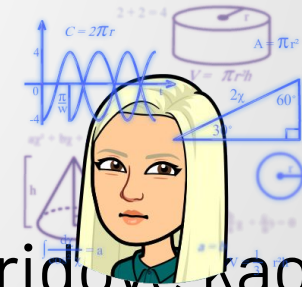
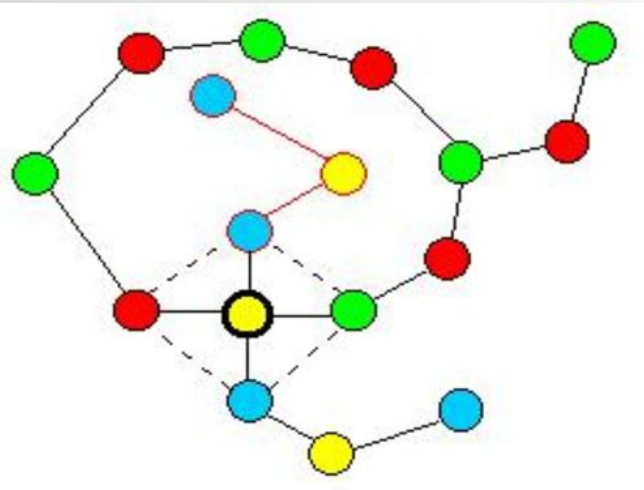
Teorem o četiri boje doprinio je razvoju teorije grafova.

Definirajmo pojmove:

- **Graf G** – uređeni par nepraznih skupova V , E i funkcije j
- **Skup V** – skup vrhova grafa
- **Skup E** – skup bridova grafa
- **Funkcija j** – svakom bridu iz skupa E pridružuje neuređeni par vrhova iz V

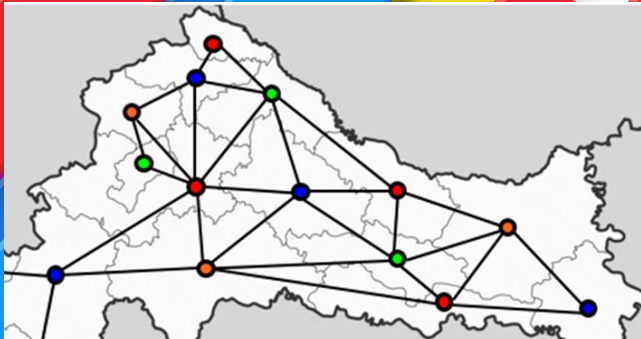
Pišemo: $G=(V(G), E(G), j)$

- Vrhove prikazujemo kao **kružice**, a bridove kao **linije** koje povezuju vrhove (kružice)

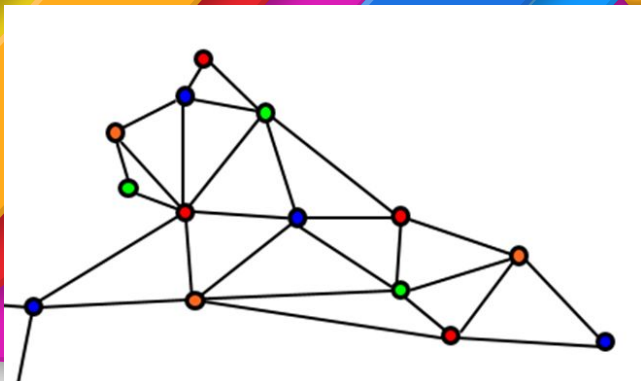


Zaključak

Iz svake se karte može konstruirati planarni graf u kojem **države** zamjenjujemo **vrhovima**, a dva vrha spajamo **bridom** ako su odgovarajuće države **susjedne**.

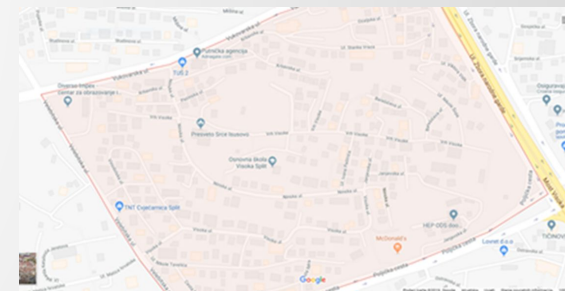


Problem bojanja država se svodi na **problem bojanja vrhova planarnog grafa** tako da niti jedan od dva povezana vrha nemaju istu boju!

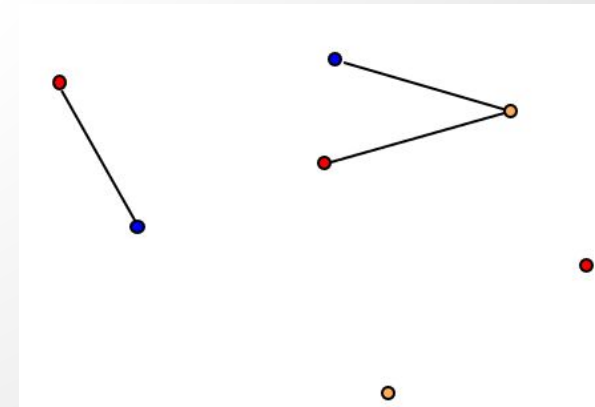
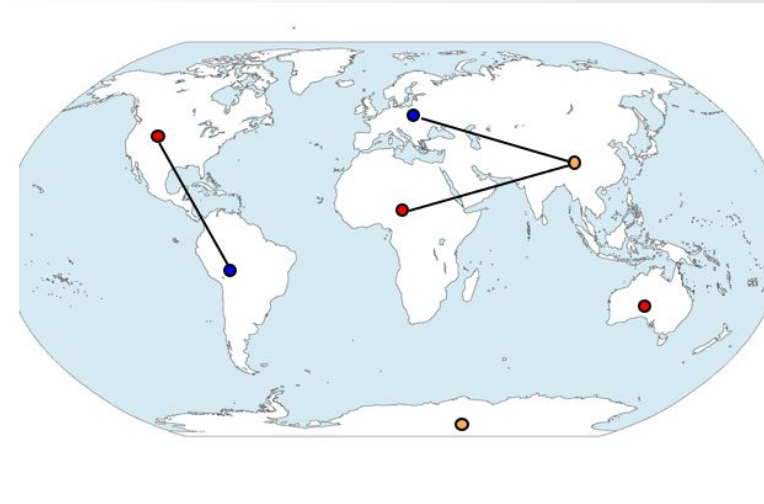
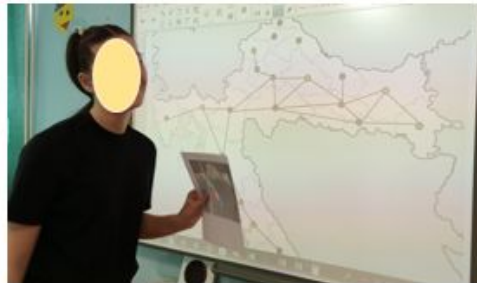
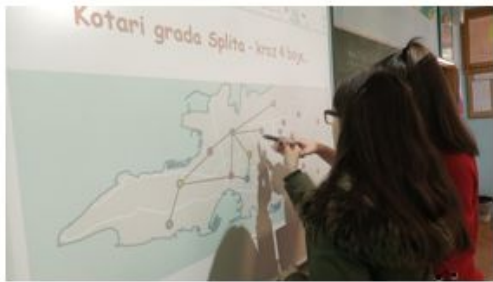


Države su susjedne ako se dodiruju nekom dužinom, a ne samo u jednoj točki.

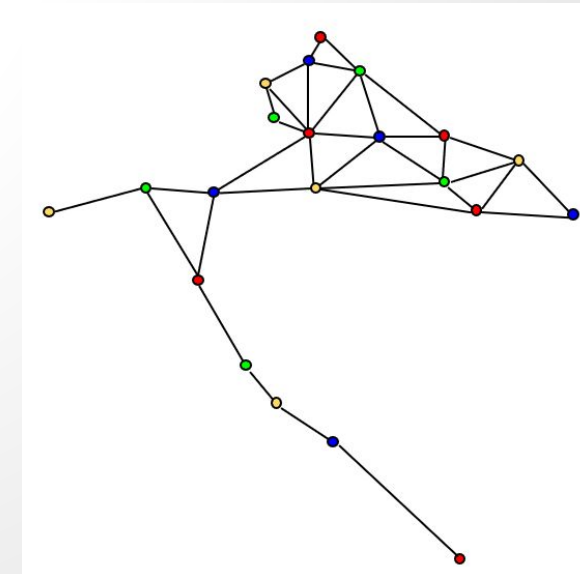
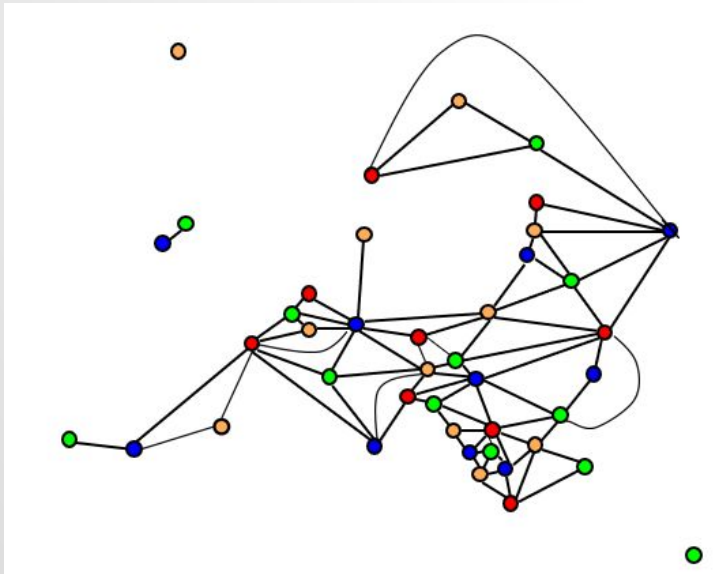
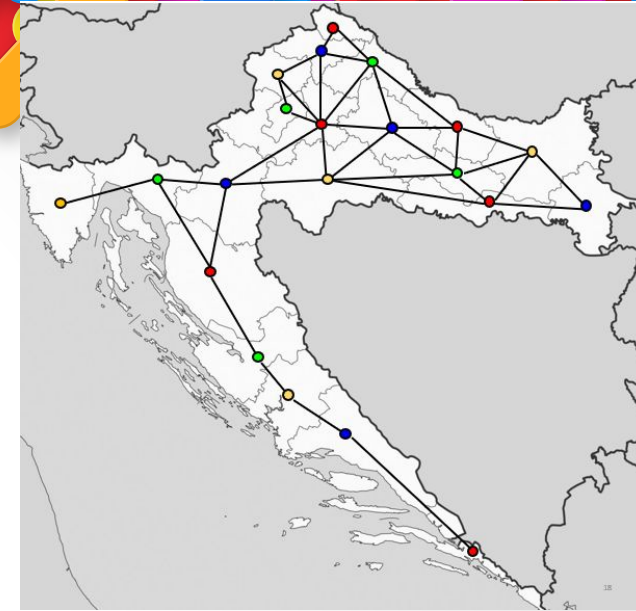
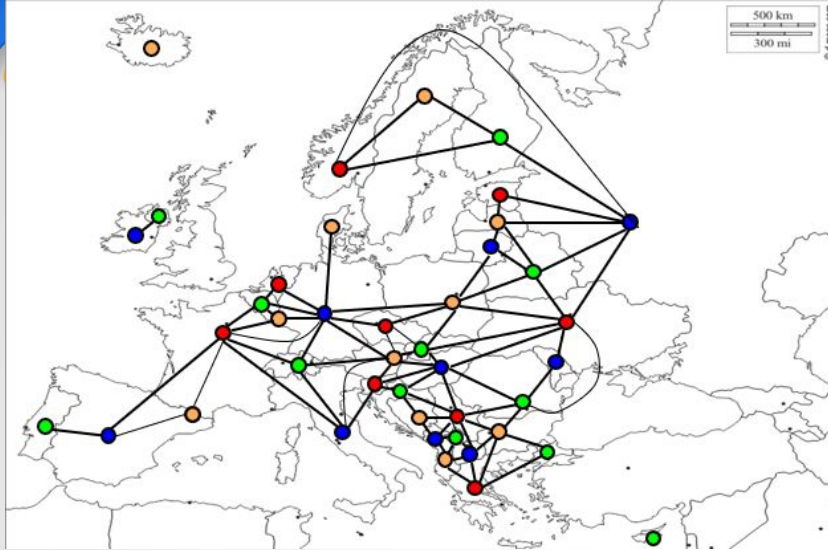
Počeci digitalizacije - pametna



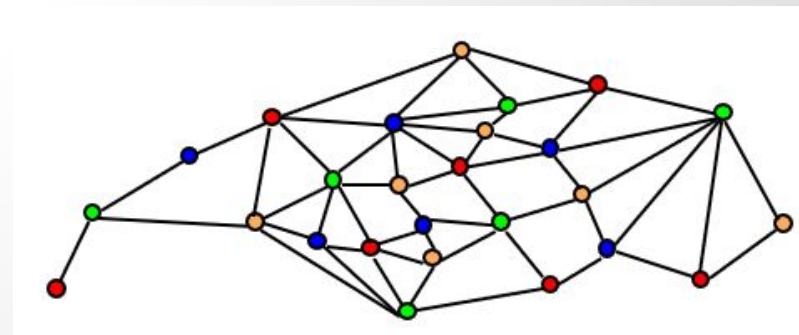
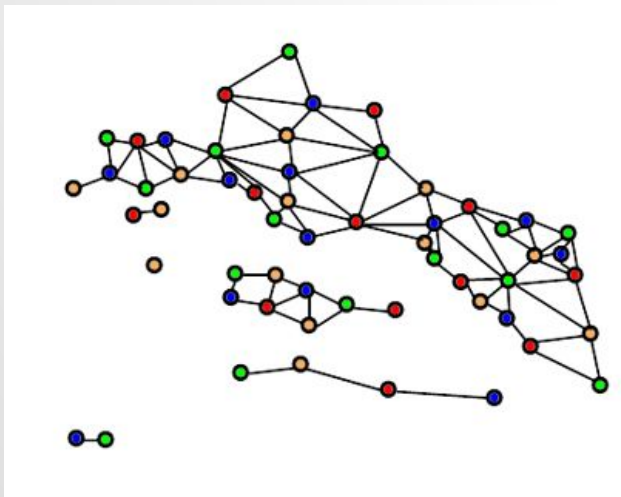
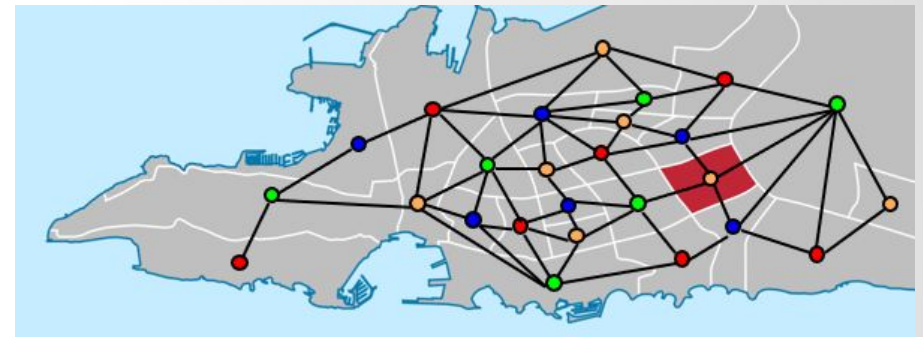
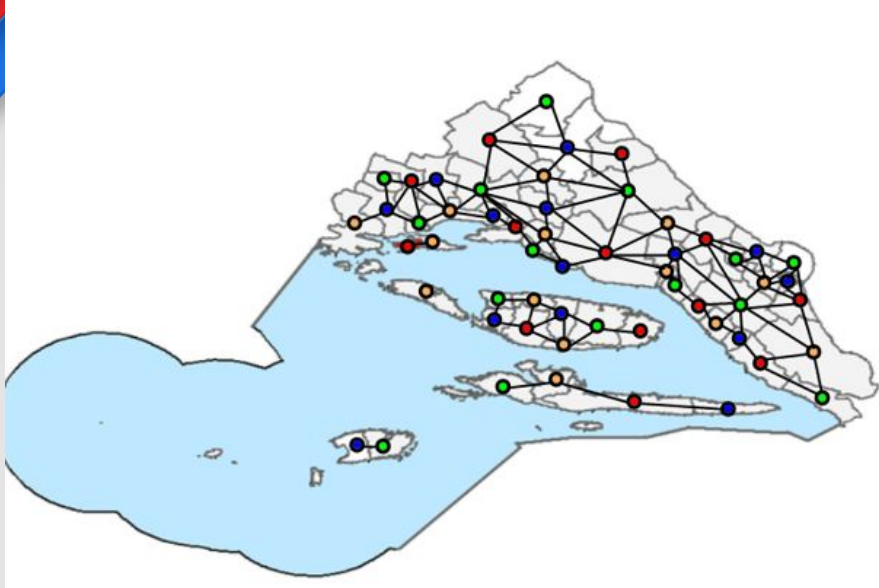
Svijet u četiri boje



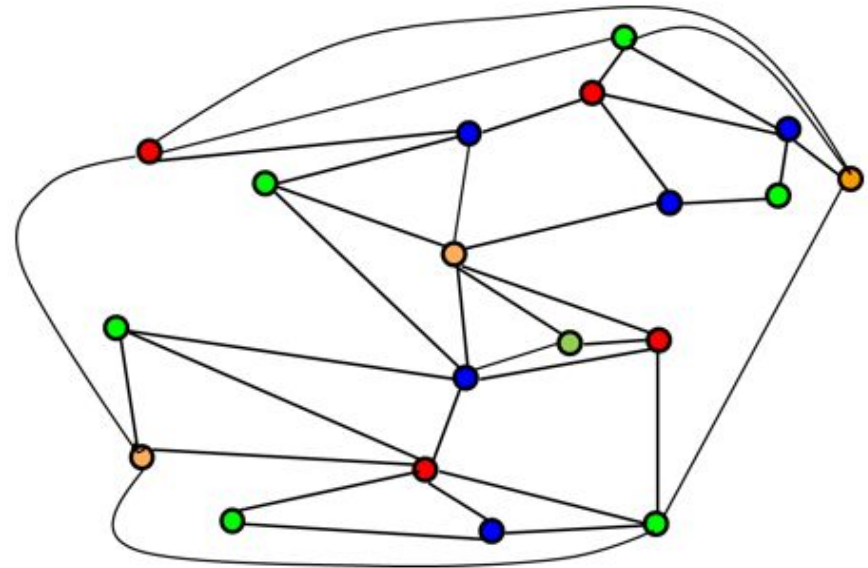
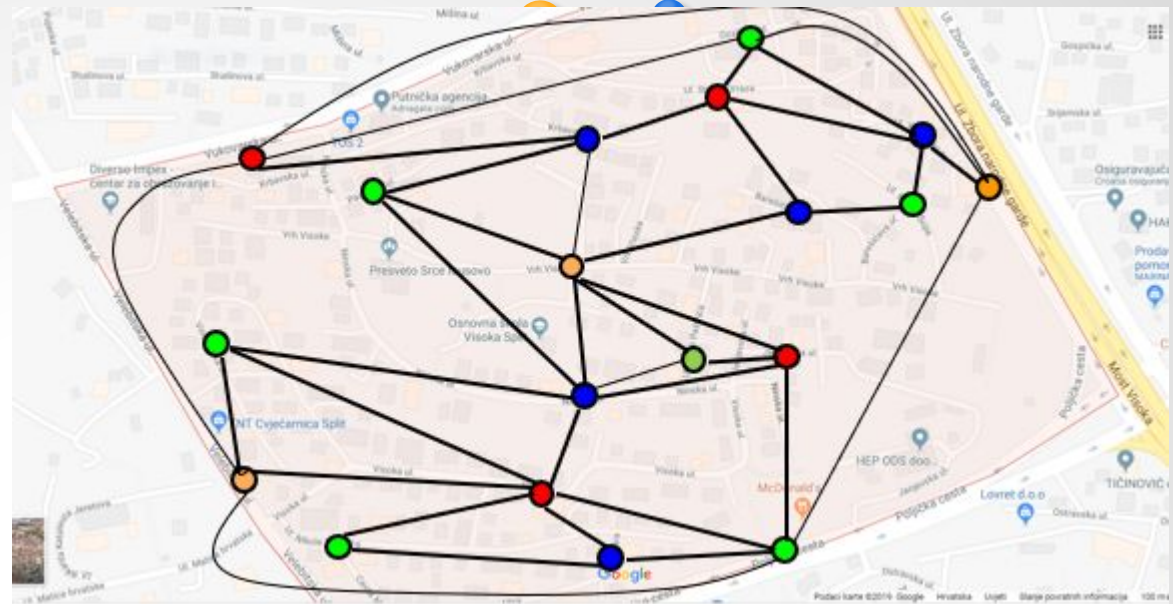
Europa i županije RH u 4 boje



Općine i kvartovi u 4 boje



Moj kvart u 4 boje!



Moj kvart u četiri boje



Nina i Nina -7.a

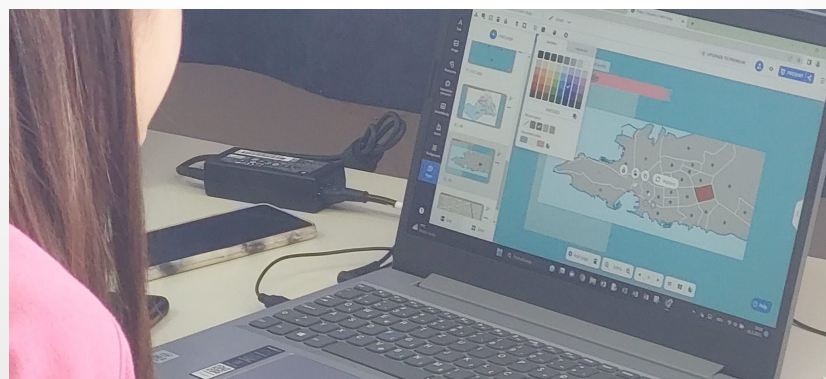
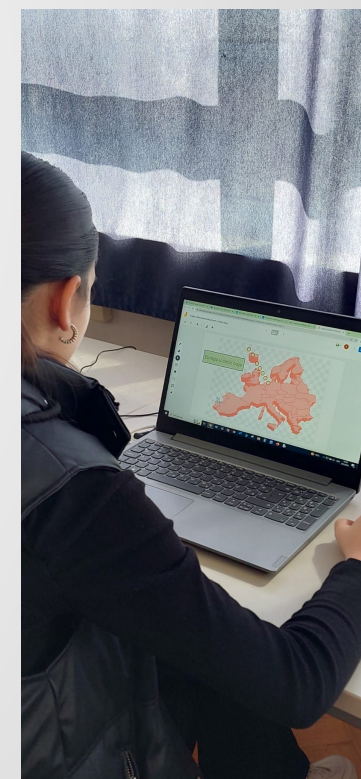
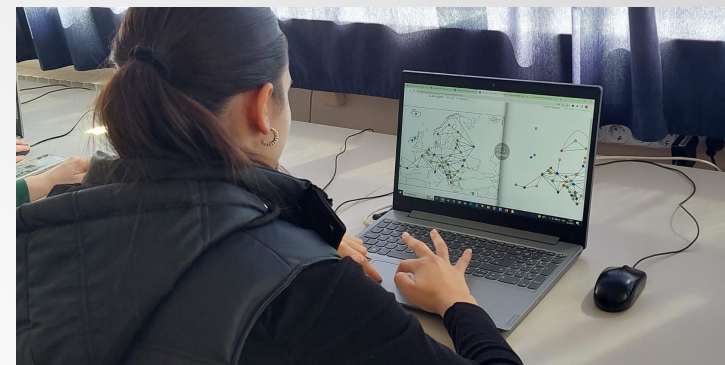
Nina, Iva, Antea, Lucija i Antonela - 7.b

Mentor: Marica Brzica



02

Faza e-škola - niz digitalnih alata

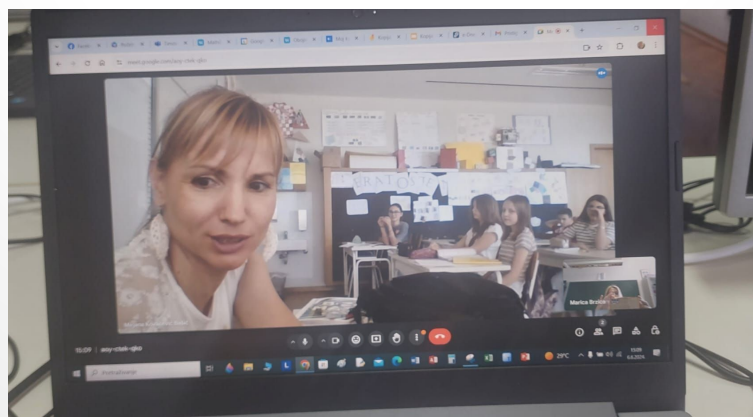
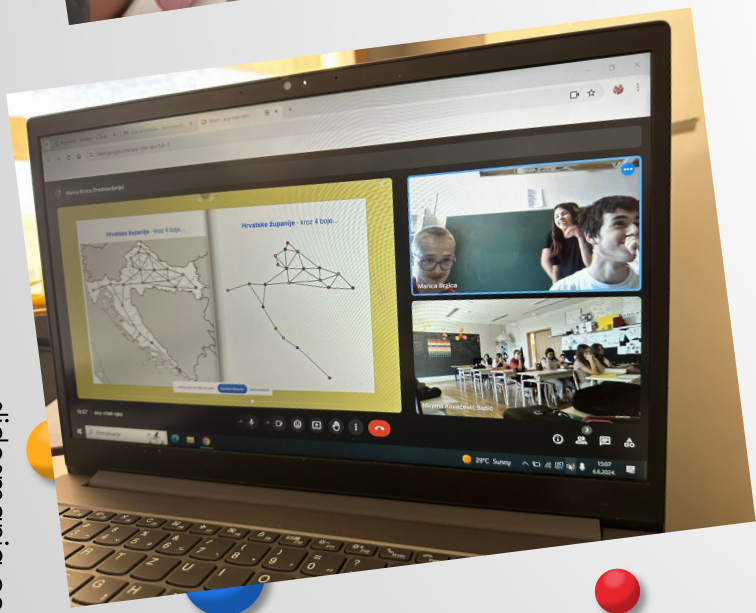
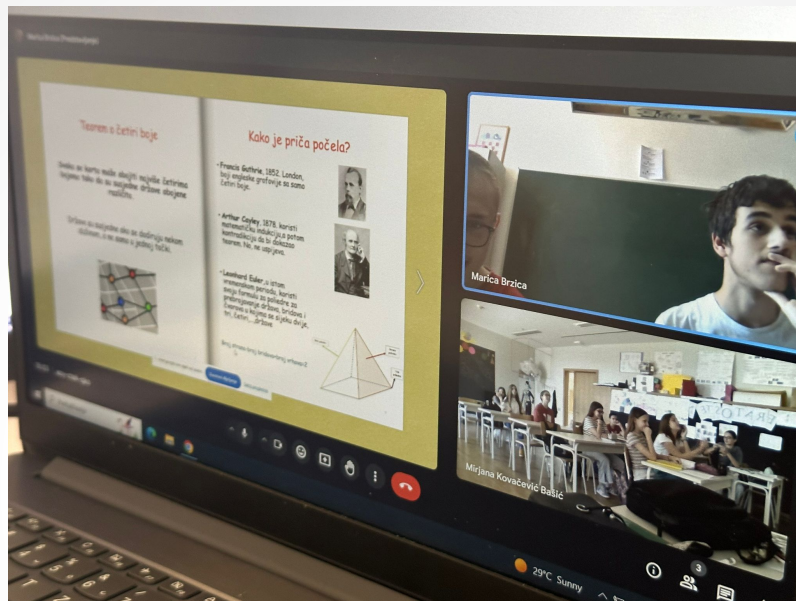




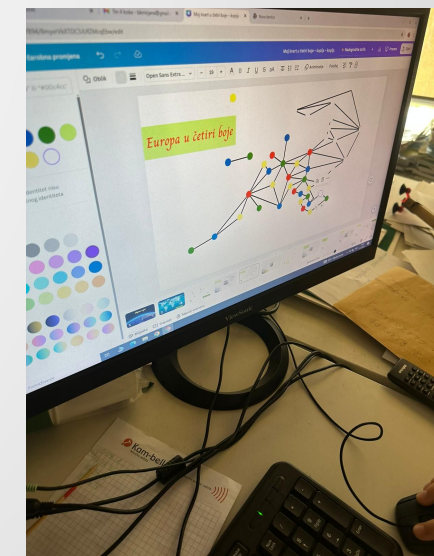
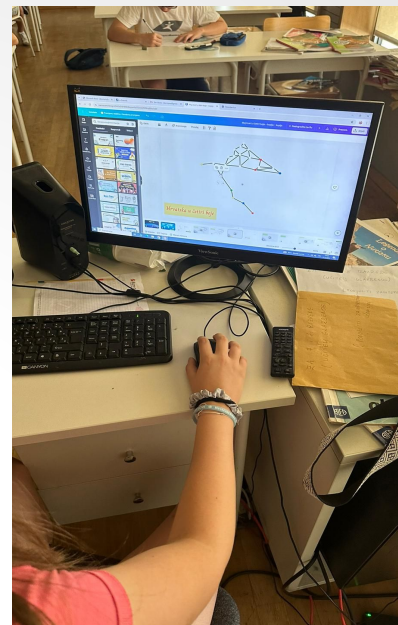
AI faza - AI alati

- ❖ **Online meeting - učenici iz OŠ Visoka educiraju učenike iz OŠ Žnjan-Pazdigrad**
- ❖ **Učenici iz OŠ Žnjan-Pazdigrad se uključuju u projekt odrađujući aktivnosti iz 1. i 2. faze**
- ❖ **3. faza projekta kroz AI alate**

Online meeting učenika



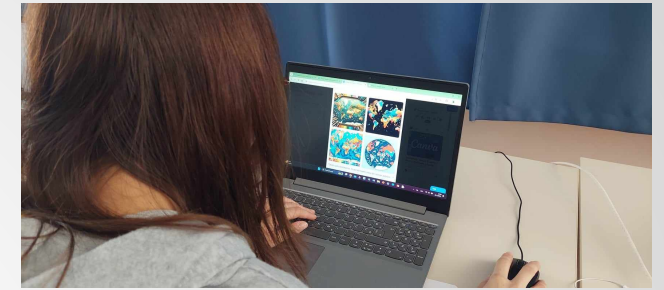
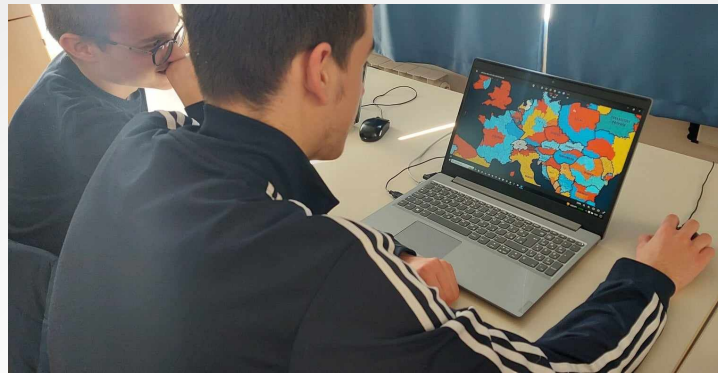
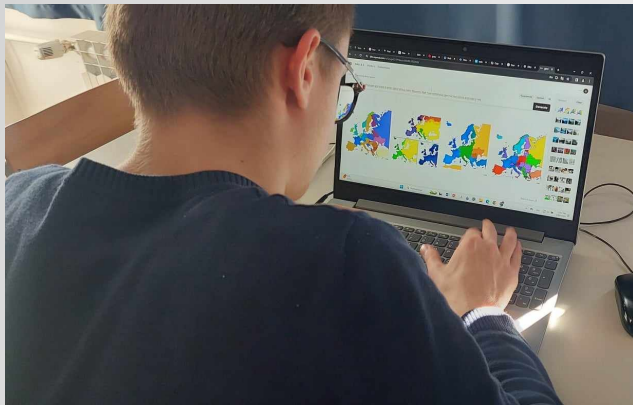
OŠ Žnjan-Pazdigrad u 1. i 2. fazi



Al alati i Teorem o četiri boje



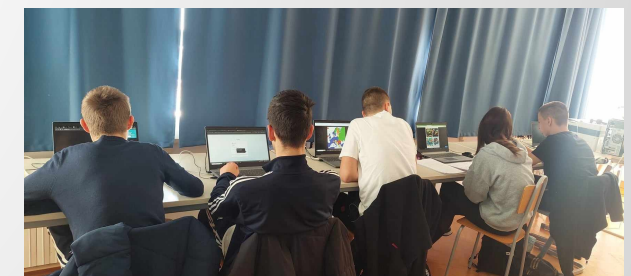
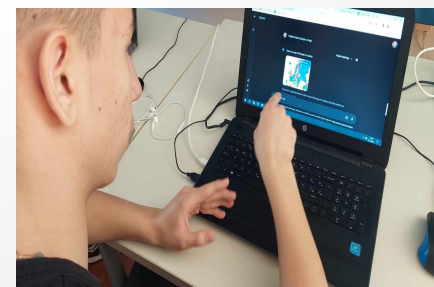
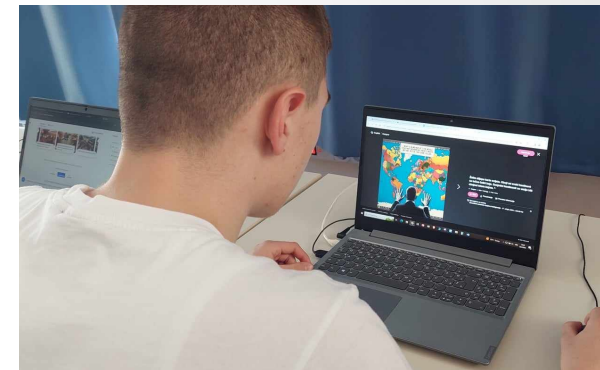
is where you section ends. Duplicate this set of slides as many times you need to go over all your sections.

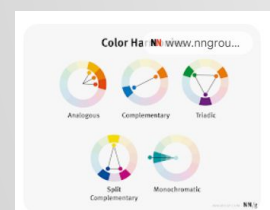
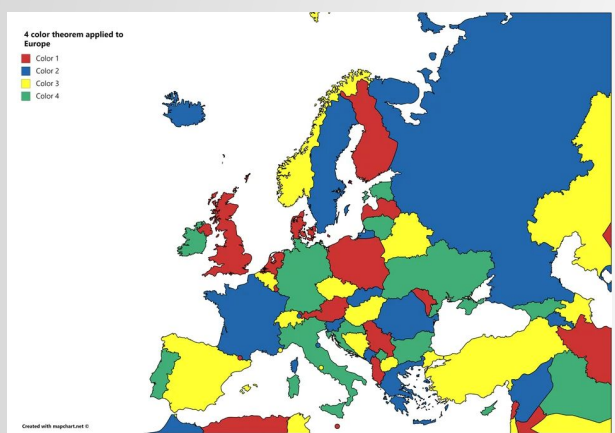
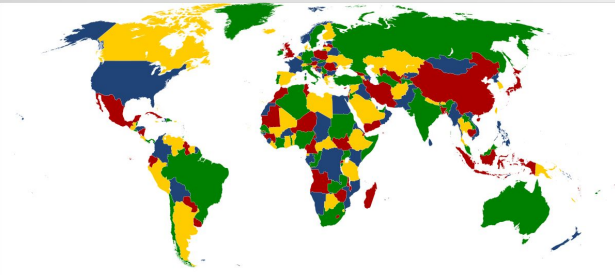


- Sjevna Amerika: Plava
- Južna Amerika: Crvena
- Afrika: Zelena
- Europa: Žuta
- Azija: Narančasta
- Australija: Ljubičasta
- Antarktika: Smeđa

Molim vas da zamislite ovu raspodjelu boja na karti. Hvala! 🌍 🗺️

🔍 🗑️ 📄 ⬇️ 🔊 ● 2 od 5

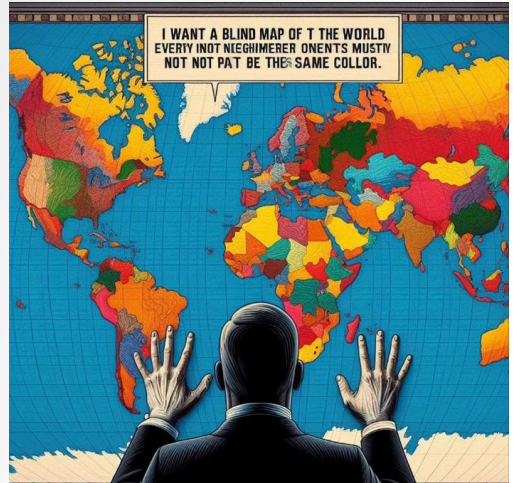




Split map colored with 4 colors

Boje su:

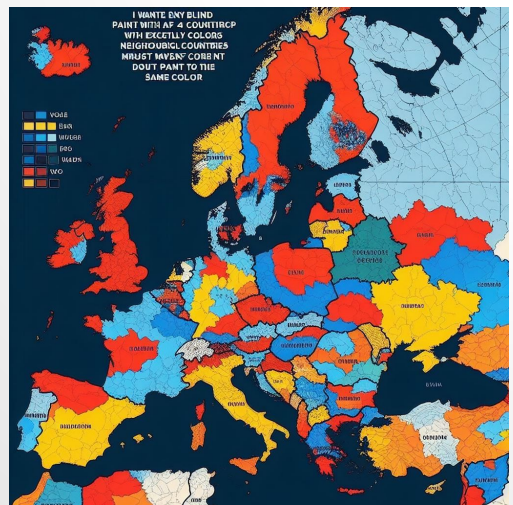
- **Crvena:** Dioklecijanova palača, Varoš, Dobri, Manuš, Lučac, Bačvice, Brodarica, Brda, Buće, Centar, Dalmatinska ulica, Gripe, Hajduk Split, Kambelovac, Kaptol, Klis, Lavica, Meje, Mertojak, Plokite, Poljud, Spinut, Sućidar, Sustipan, Trstenik, Veli Varoš, Visoka
- **Plava:** Pujanke
- **Zelena:** Fortunato, Radunica
- **Žuta:** Žrnovnica



Želim slijepu kartu svijeta. Oboji mi svaki kontinent sa točno četiri boje. Susjedni kontinenti ne smiju biti obojani istom bojom.

Designer | 1024 x 1024 jpg | Prije 6 dana

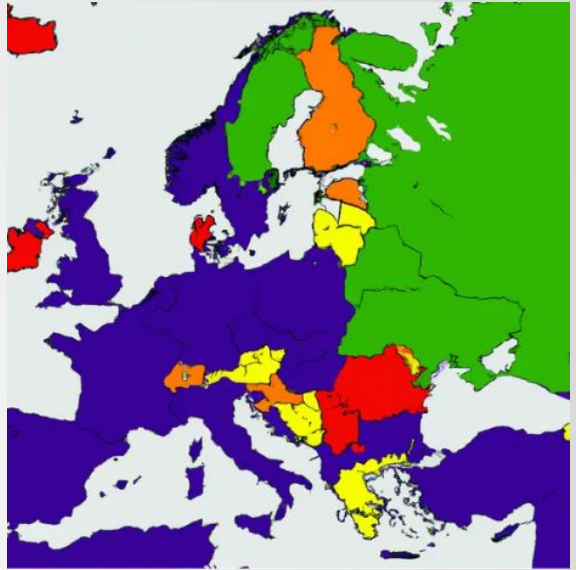
[Dijeli](#) [Preuzimanje](#) [Povratne informacije](#)



Prompt
Želim slijepu kartu Europe. Oboji mi svaku državu sa točno četiri boje. Susjedne države ne smiju biti obojane istom bojom.



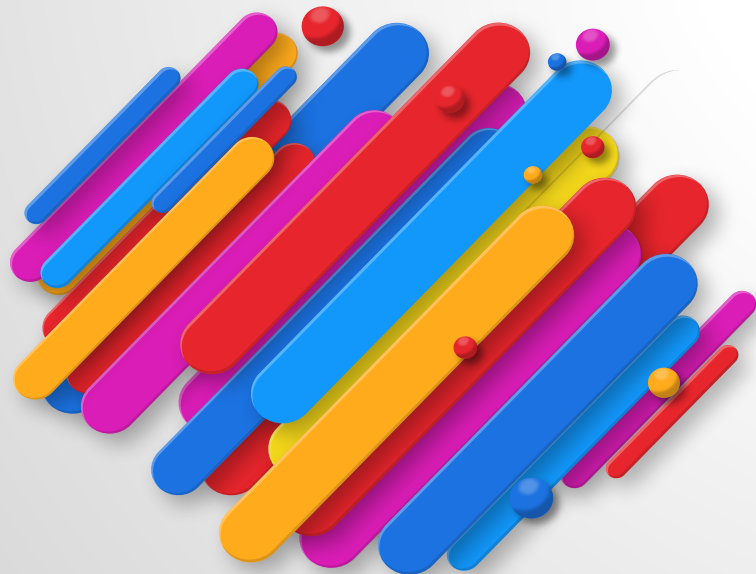
Prompt
Slijepa karta kvartova grada Splita koji se nalazi u Hrvatskoj.



Zaključak

- ❖ AI alati ne mogu zamijeniti ljudski faktor, posebno kreativnu stranu.
- ❖ Ograničeni su informacijama dostupnim na internetu.
- ❖ Mogu ubrzati rad, ali se ne smije isključivo oslanjati na njih; Važno je provjeriti i korigirati sve informacije koje generiraju.
- ❖ Projektom smo popularizirali matematiku, razvili kreativnost, inovativnost i suradnju između učenika.
- ❖ Poseban naglasak na digitalnom opismenjavanju.





<https://bit.ly/TM-4boje>



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