

# GeoGebra in geography classes

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# GeoGebra in Teaching

- Used mainly in mathematics and geometry...  
...but it can be used in all subjects!
- We use it in Geography:
  - with the pupils of the “Jovan Jovanović Zmaj” secondary school, Novi Sad
  - with the students of Geography at the Department of Mathematics and Computer Science, University of Novi Sad
- We prepared interactive drawings to illustrate some methods, procedures and natural phenomena: e.g. orientation, map reading, measuring lengths of rivers.

# Orientation in a city

MapaNS.ggb

Datoteka Uređivanje Prikaz Perspektive Opcije Alati Prozor Pomoć

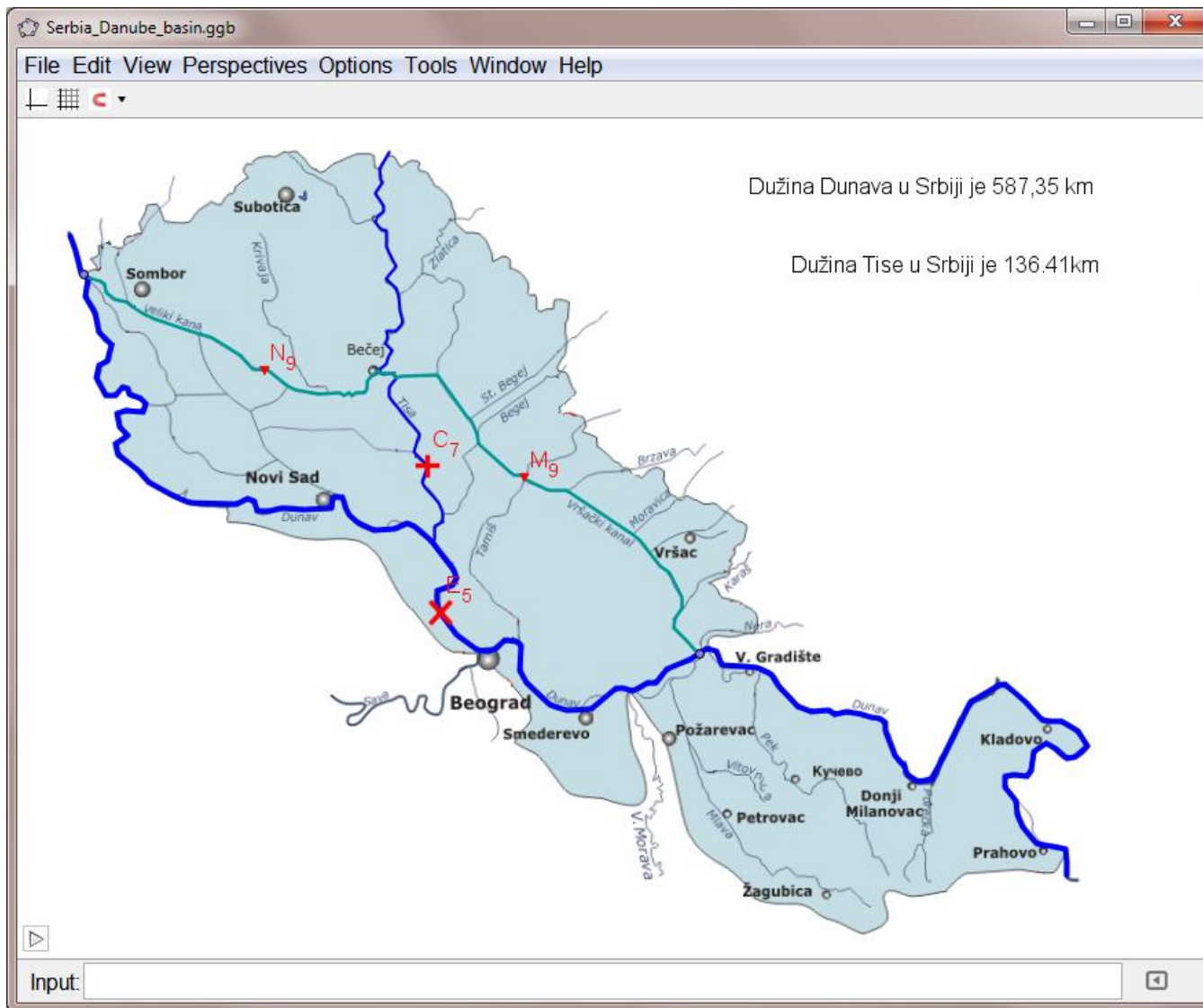
Pomeranje  
Premestite ili izaberite objekte (Esc)

Постави циљ  Прикажи решење

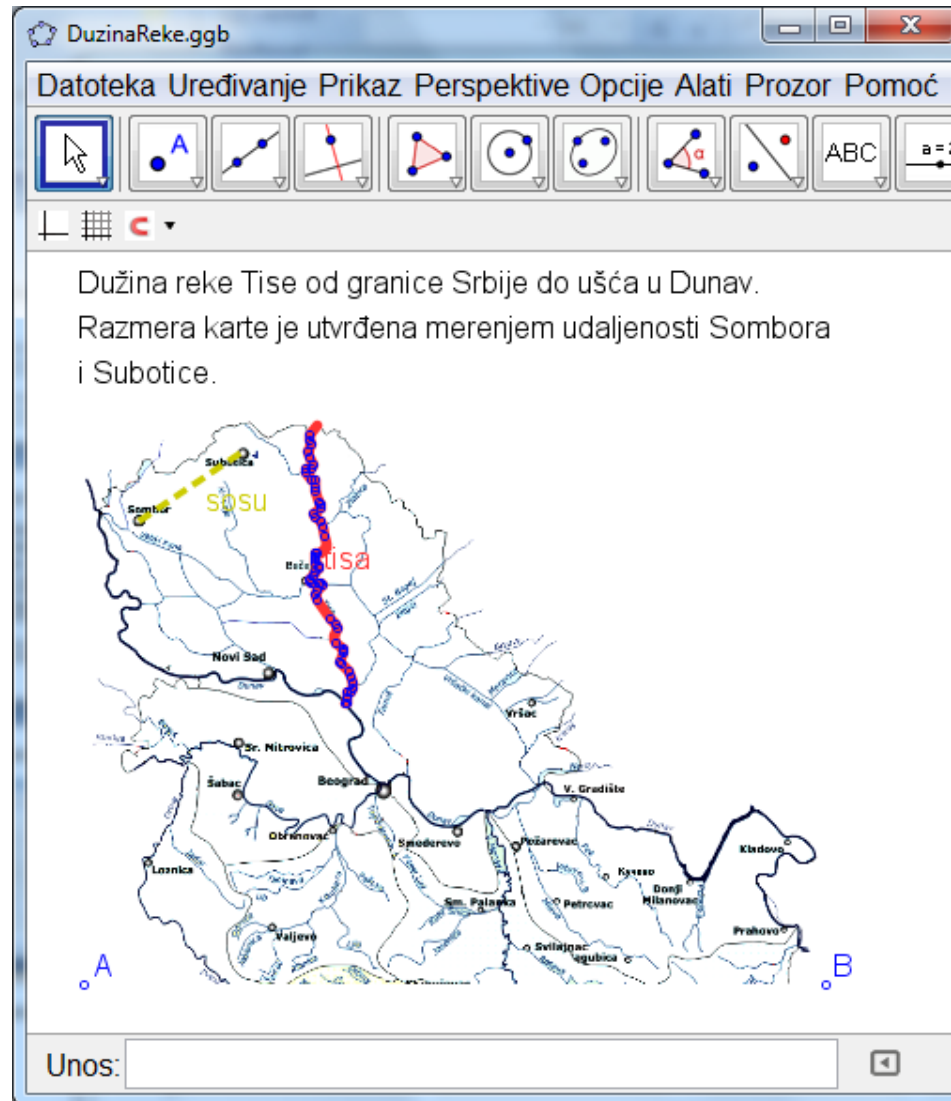
$\beta = 147^\circ$

Померањем тачке означене са  $D$  на десној страни контролишите за колико посматрач треба да се окрене да би гледао право у циљ (плави троугао)

# The length of rivers



# The length of a river - Demo



# Point at cities

1.8. Gradovi.ggb

Datoteka Uređivanje Prikaz Perspektive Opcije Alati Prozor Pomoć

**Pomeranje**  
Premestite ili izaberite objekte (Esc)

(14.38, 46.36)

Prvi  Drugi  Oba  Skor

BG	Beograd	0.09	+	2.94
BO	Bor	1.46	+	2.13
KI	Kikinda	0.12	+	4.1
KG	Kragujevac	0.45	+	2.39
KŠ	Kruševac	2.41		1.97 +
NI	Niš	0.48	+	1.61
NS	Novi Sad	0.07	+	4.6
PP	Prijepolje	2.16	+	2.36
SO	Sombor	4.11	+	4.77
SM	Sremska Mitrovica	3.36	+	4
SU	Subotica	4.4	+	5.04
VA	Valjevo	2.61	+	3.67
VR	Vranje	2.28		1.24 +
VŠ	Vršac	3.63	+	3.87
ZR	Zrenjanin	3.67	+	4.74

START

Plave tačke [Polazni položaj](#)

Crvene tačke [Polazni položaj](#)

STOP

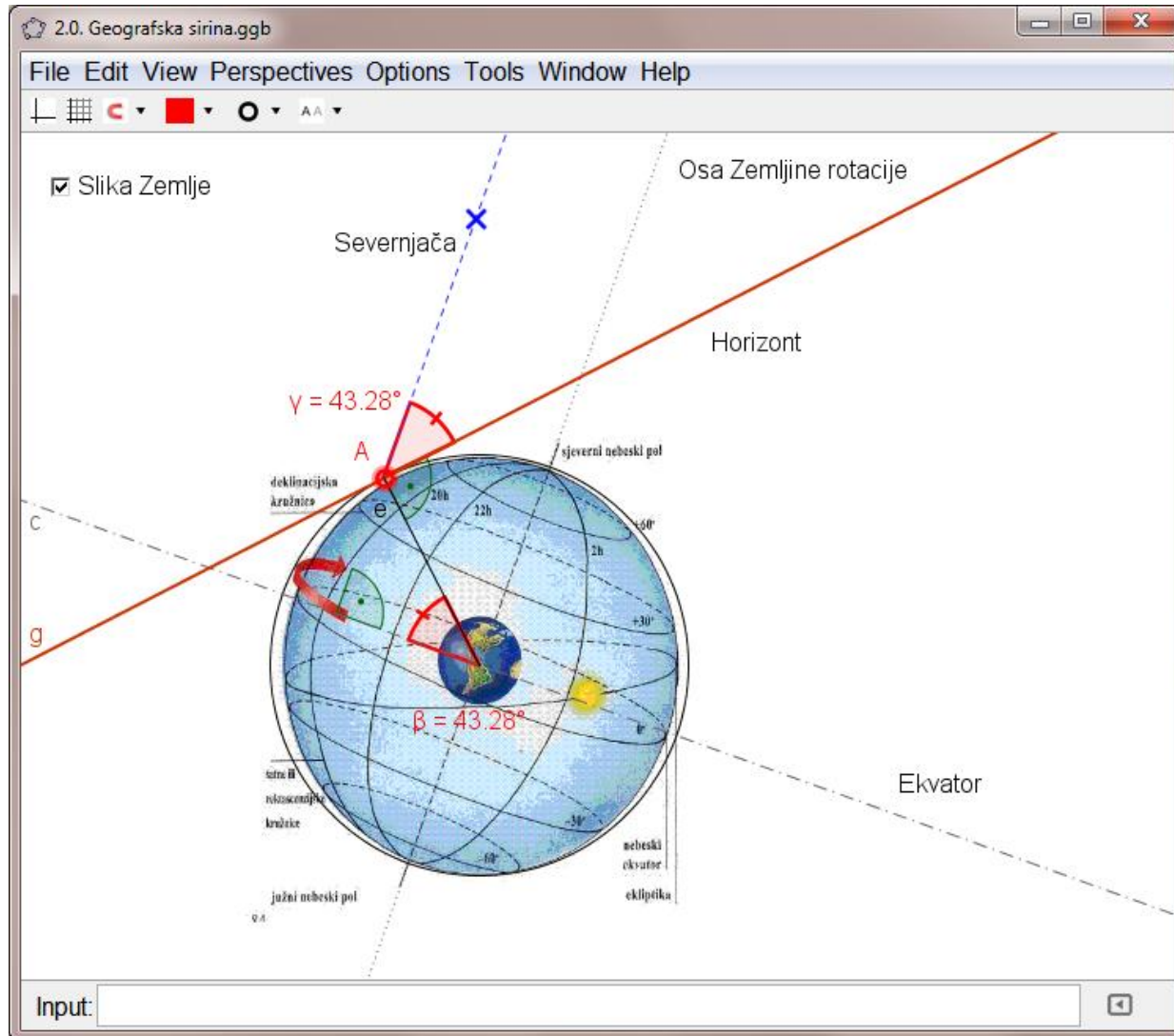
PP SO SM SU VA VR VŠ ZR

BG BO KI KG KŠ NI NS

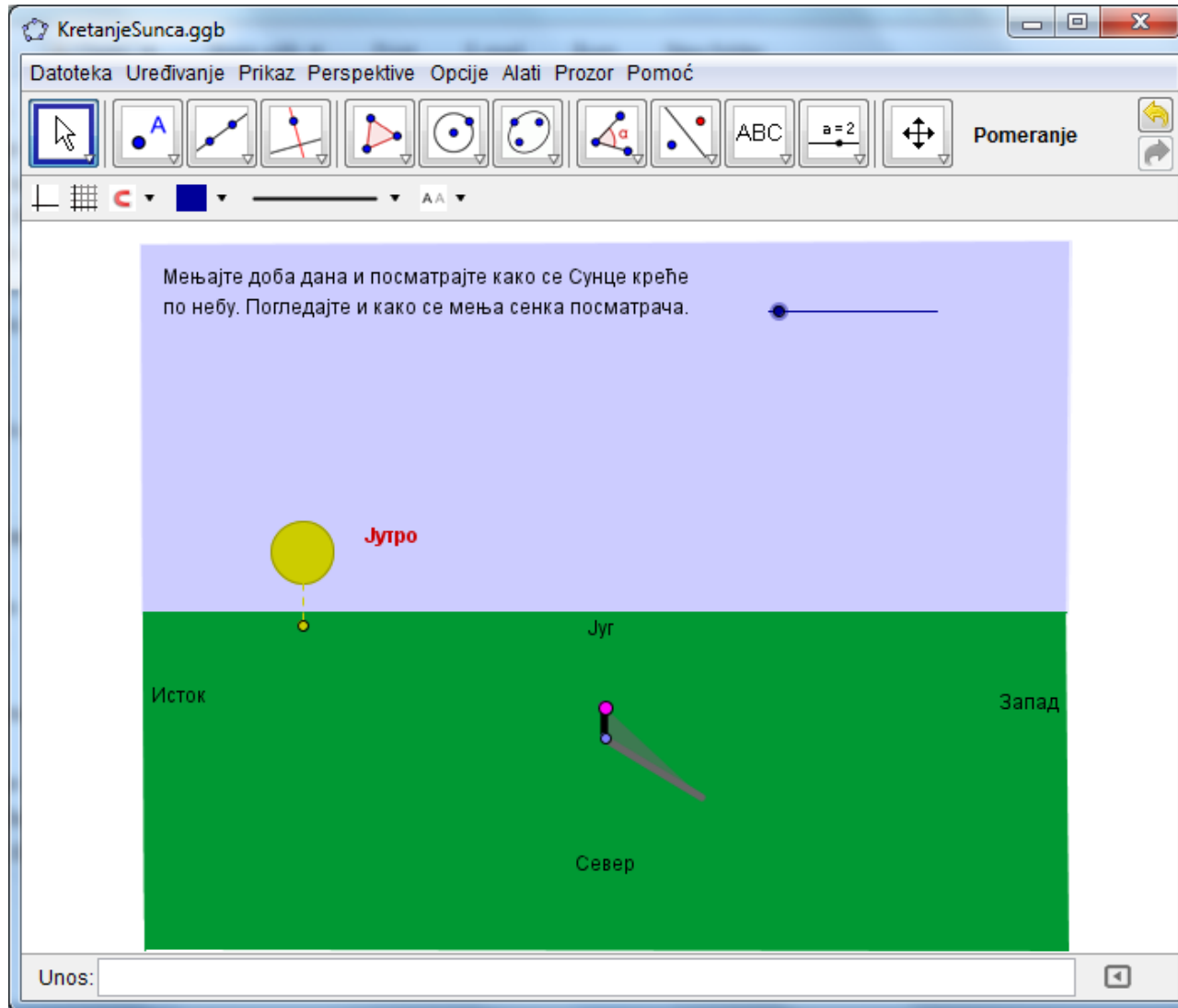
PP SO SM SU VA VR VŠ

(24.09, 40.88)

# Celestial navigation



# The motion of the Sun





# Pupils' poll results

We polled the pupils for their opinions after the class with GeoGebra.

Teacher	Vera Herceg Mandić	
Class	I1 and I3	
Questions	Answers	
	Yes	No
Did you like this class?	53	4
Did the class meet your expectations?	35	22
Was your group's assignment difficult?	9	46
Was your group's assignment too complex?	12	43
Were the additional study materials helpful?	47	9
Was your group leader good?	44	8
Was the teacher active enough?	54	2
Should the teacher be less active?	3	51
Did you understand the instructions you were given?	52	4
Would you use the Internet in a class like this one?	28	24

# Teaching the teachers

- Our students are trained to be teachers of geography and computer science.
- Subjects such as Multimedia, ICT in teaching, Methods of teaching geography etc. are in their curriculum
- We observed one group of 12 students who attended the course “Computers and multimedia in teaching”

# Course syllabus

- Our course covers the practical use of computers in the teaching of geography and computer science.
- Topics and software:
  - Programming - [Microsoft SmallBasic](#)
  - 2D vector drawing - [InkScape](#)
  - 3D vector drawing and construction - [Google SketchUp](#)
  - Mathematics and data processing - [Mathematica](#)
  - Movies - [Windows Live Movie Maker](#)
  - Communication - [WordPress](#)
  - Everything - [GeoGebra](#)

# Problems

- Instead of “the best of both worlds”, we get “I am good in the other world, and not-so-good in this one”
- The students perceive the course as a difficult one, due to the diversity of topics in the syllabus.
- Student quotes:
  - “I won’t use it if I don’t know how it works!”
  - “I didn’t enroll to be an engineer, but a professor!”
  - “I chose geography because they said there wouldn’t be much mathematics!”

# Our response

- Important prerequisite: The English language!
- Just use the software – don't try to learn more than what you need at the moment.
- Find articles on similar problems on the Web, research, extract information, organize it and put it to use.
- Don't be afraid of the course!
- Don't be afraid of the lecturer!

# Demonstration

- We gave the following assignment to the students:
  - Create the interactive GeoGebra drawing representing a country of your choice, place cities on it, and calculate the distance between them.
- Questions:
  - “Where do I obtain a map from?”
  - “How do I put it into GeoGebra?”
  - “How do I measure the distance?”
  - “Is the distance linear or along a road?”

# Demonstration

- Extract map data from a web service, using [Mathematica](#)
  - Learn how to export and convert data
- Import the map into [GeoGebra](#)
  - Get to know the geographic coordinate system
- Find locations of cities using [Google Maps](#)
- Draw points and a linear segment in [GeoGebra](#)
- Calculate the distance – [common sense](#)

# Comments from students

- “I could’ve never thought of this myself”
- “It was easier than I thought”
- “If there is no button for that, then it can not be done.”
- “This is so different from what I was taught before. **You** are doing it improperly.”
- Misconceptions about what the classes should look like hinder the student’s performance

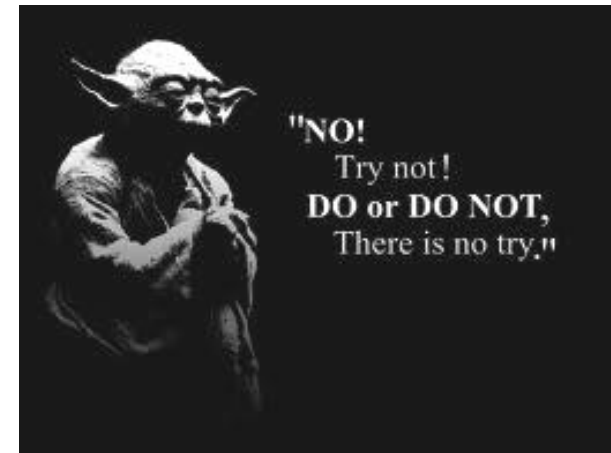


# Conclusions

- Integration of many disciplines in one course is inevitable
- There can be no excuses for not using the technology and resources which are available
- Static knowledge is not enough
- The process of discovery is important
- We have vast resources at our hand, the one who can find relevant information wins.

# And finally...

- Often the students are not confident enough
- This seems to be stem from the way they were taught before they came to us
- We must help the students build confidence and let them learn by themselves!
- “Do or do not. There is no try.”



Thank you for your attention!