

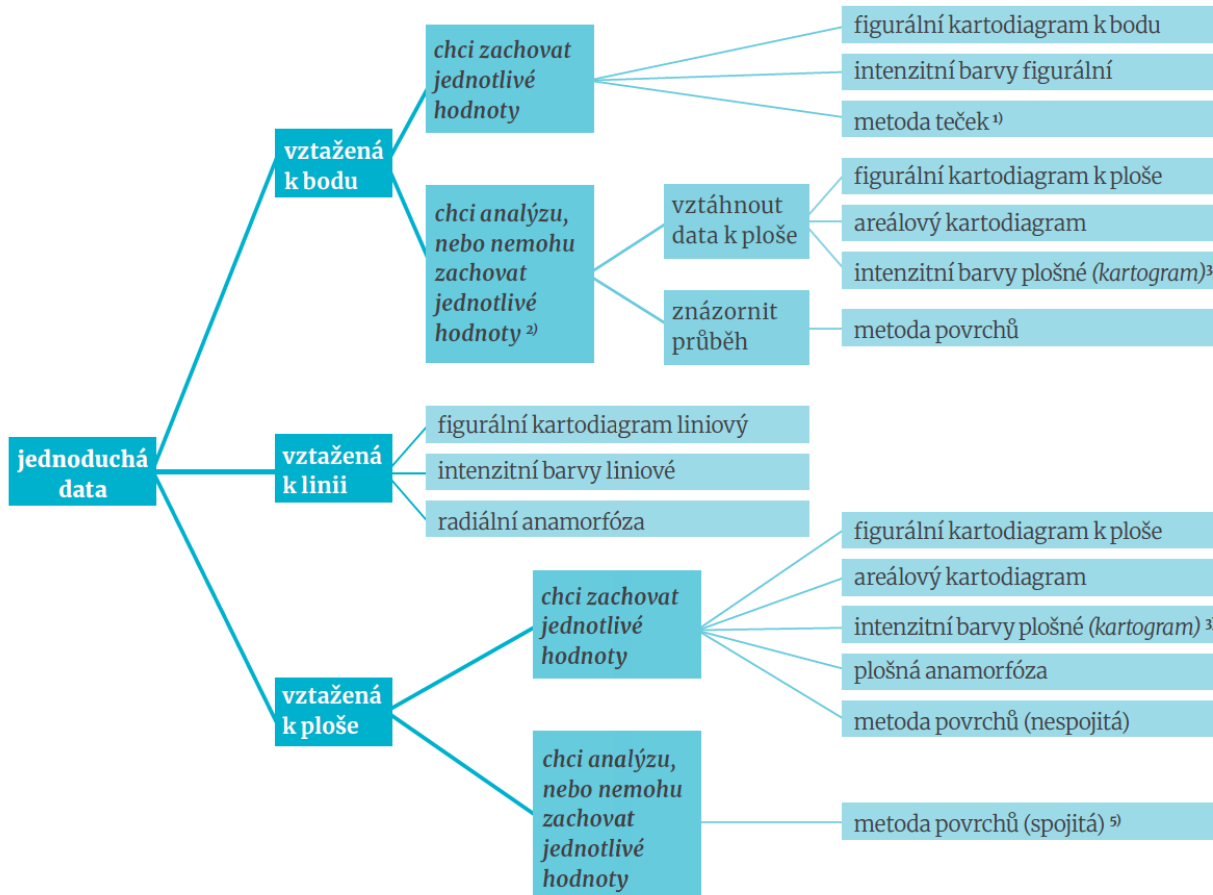
Kartografická vizualizace & chyby

Lukáš HERMAN

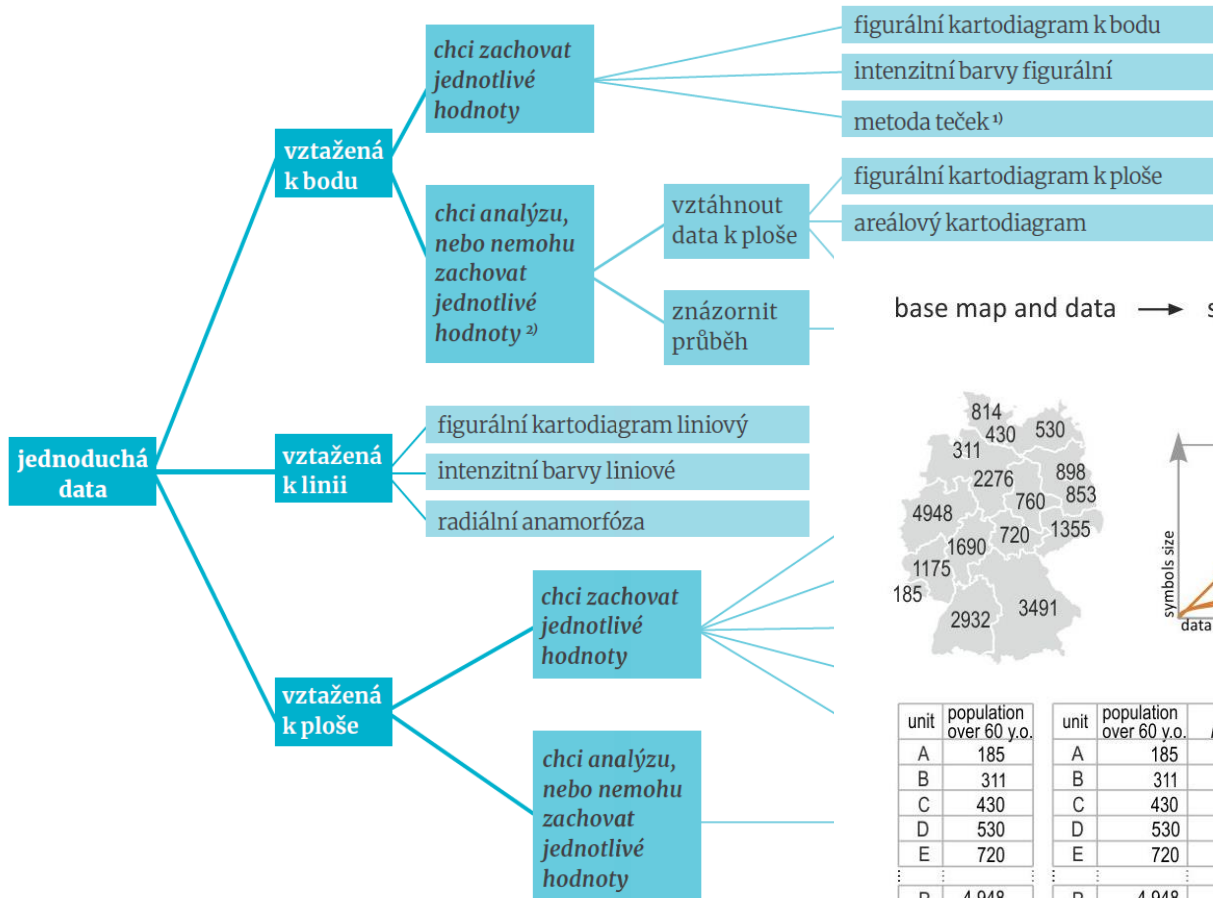
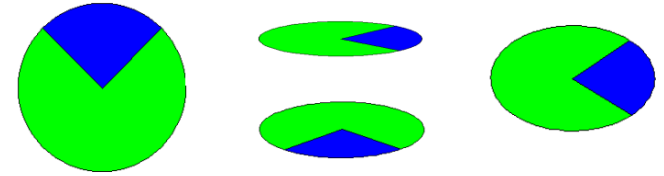
O ČEM BUDE ŘEČ

- Volba metody
- Matematické základy (zobrazení apod.)
- Klasifikace a stupnice
- Legendy
- Barvy
- Popis
- Rozvržení mapového listu a celkový design

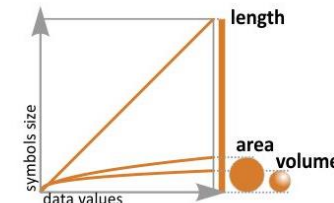
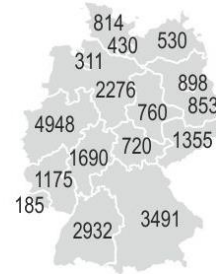
VOLBA METODY



VOLBA METODY

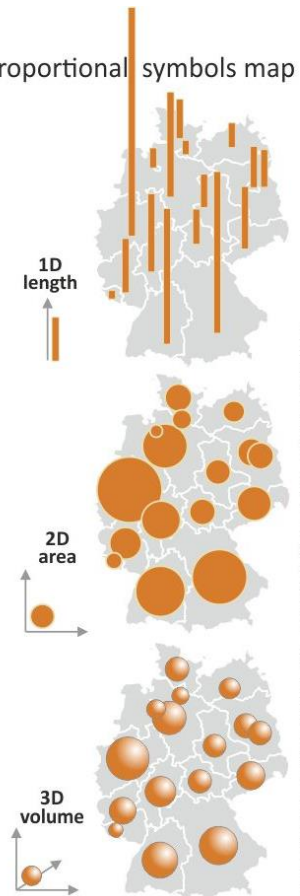


base map and data → symbols scaling → proportional symbols map



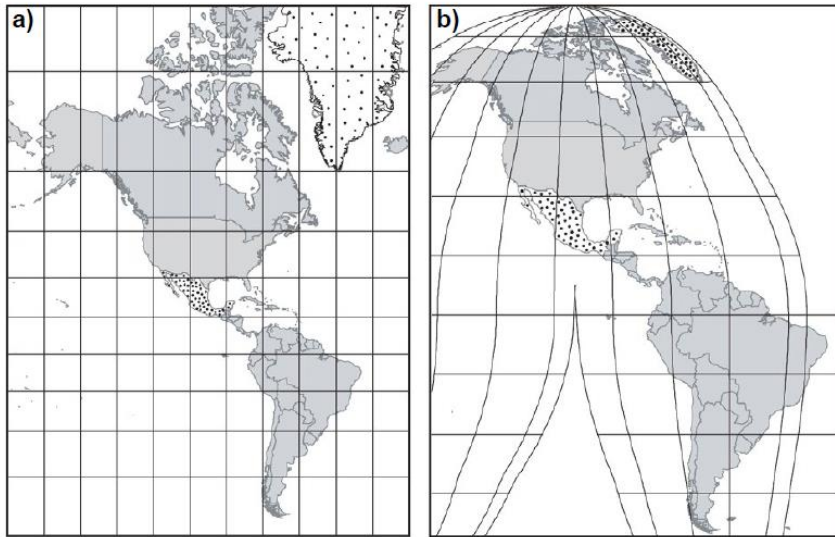
unit	population over 60 y.o.	unit	population over 60 y.o.	bar height	circle diameter	sphere diameter
A	185	A	185	18	2.7	3.3
B	311	B	311	31	3.5	3.9
C	430	C	430	43	4.2	4.3
D	530	D	530	53	4.6	4.7
E	720	E	720	72	5.4	5.2
P	4 948	P	4 948	494	14.2	9.8

Share of population over the age of 60

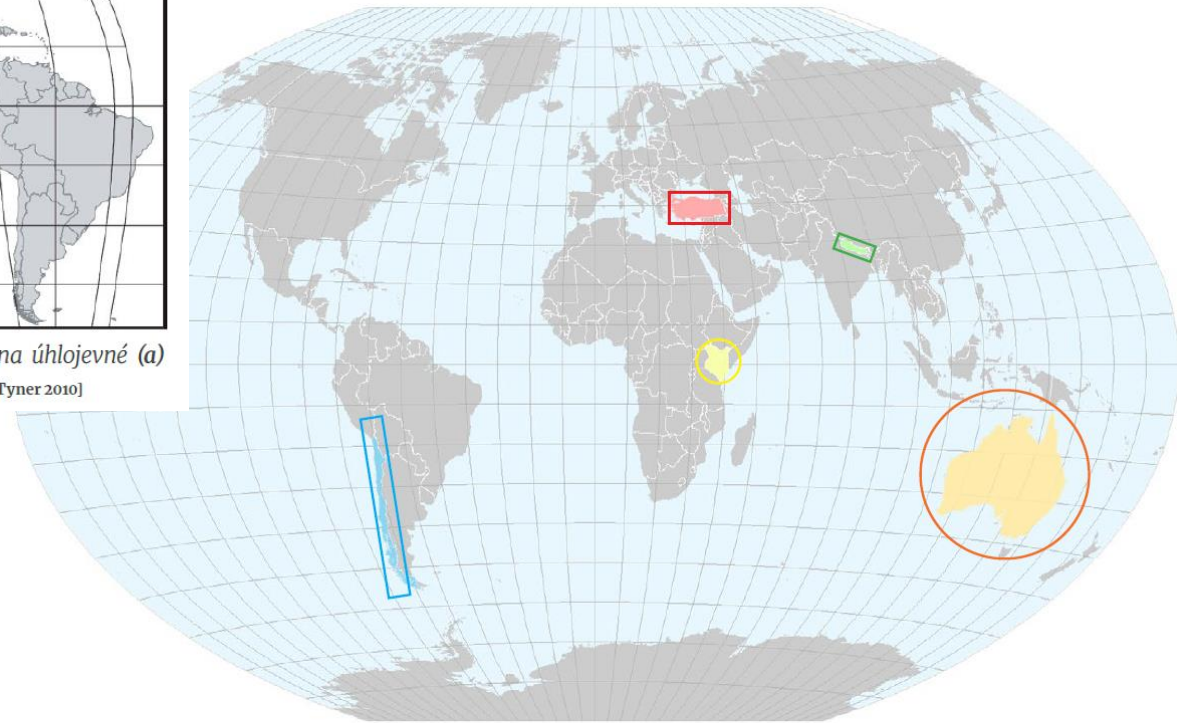


data: Eurostat, © EuroGeographics for the administrative boundaries

MATEMATICKÉ ZÁKLADY

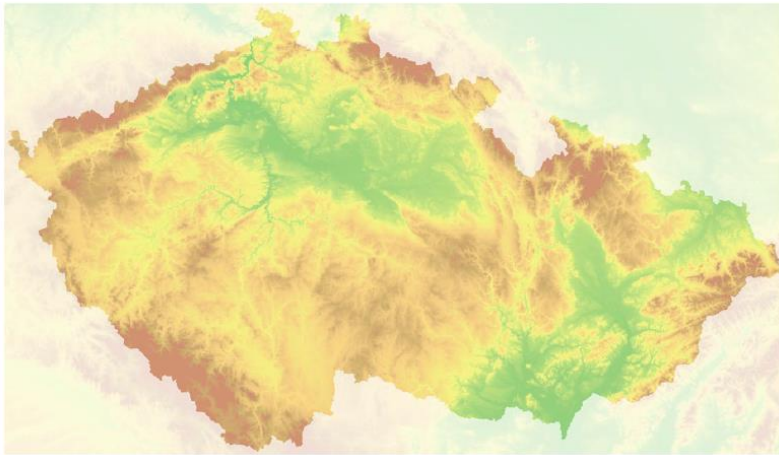


Obr. 3.15 – Stejný počet teček v Mexiku a Grónsku rozmístěných na úhlojevné (a) a plochojevné (b) mapě působí naprosto odlišným dojmem. [převzato z Tyner 2010]

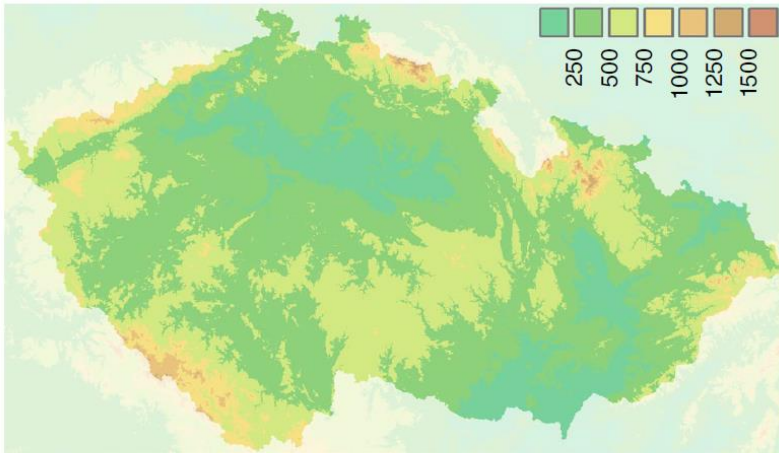


Obr. 3.16 – Vliv polohy a tvaru území na výběr zobrazení: • **Turecko** má tvar protažený ve směru rovnoběžky, použijeme válcové zobrazení s nezkreslenou 38° rovnoběžkou s. š.; tvar • **Nepálu** je protažený v šikmém směru, použijeme válcové nebo kuželové zobrazení v obecné (šikmé) poloze; • **Keňa** má pravidelný tvar a leží na rovníku, můžeme použít azimutální zobrazení v příčné poloze; vzhledem k tvaru můžeme použít azimutální zobrazení i pro • **Austrálii**, ale v obecné poloze s dotykovým bodem ve středu kontinentu; vzhledem k velmi protáhlému tvaru podél poledníku je pro • **Chile** vhodné válcové zobrazení v příčné poloze s nezkresleným poledníkem 70° z. d.

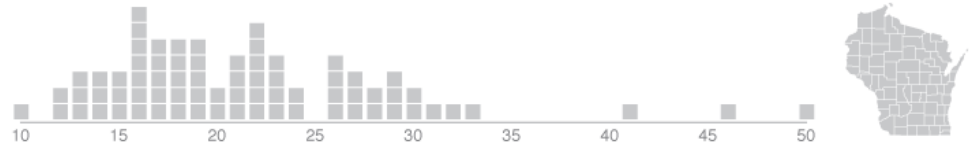
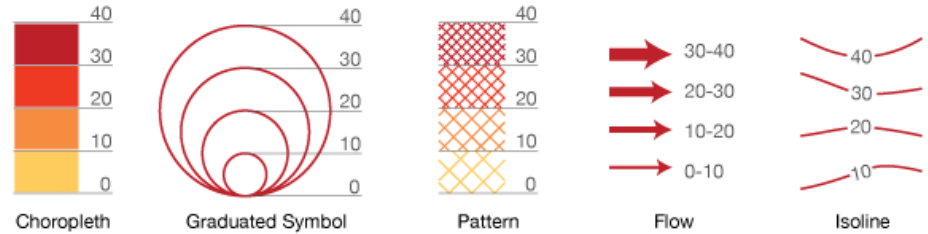
KLASIFIKACE A STUPNICE



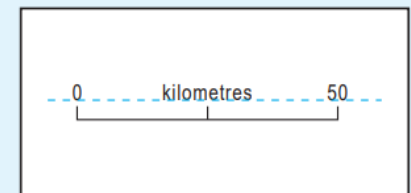
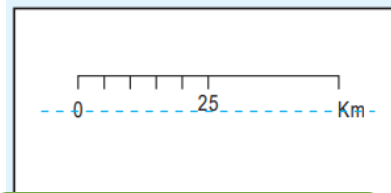
Obr. 5.15 – Barevná hypsometrie Česka s kontinuální škálou.



Obr. 5.16 – Barevná hypsometrie Česka se stejnými intervaly (po 250 m).

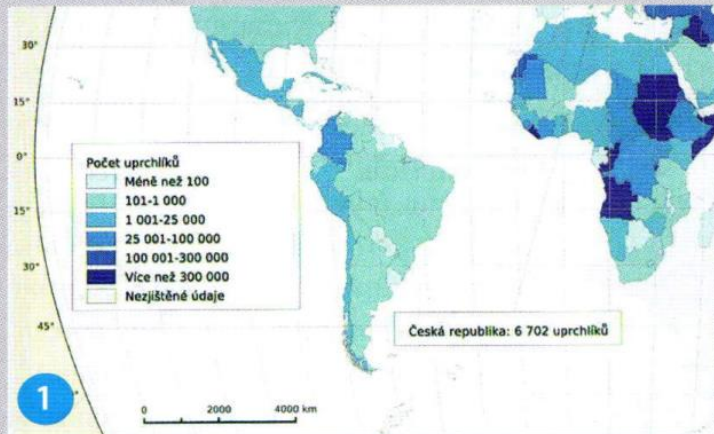


CZ: km !!!

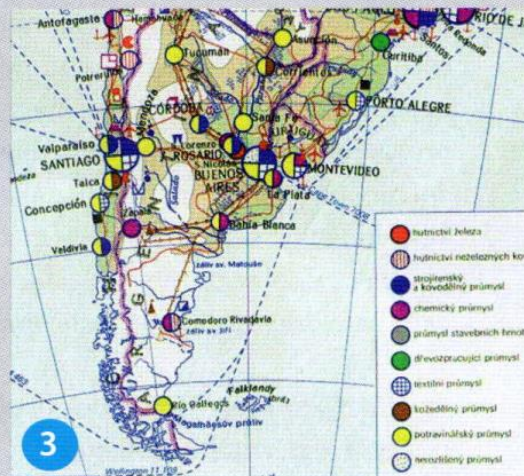


Scale bars should be kept simple. Spell 'kilometres' and 'metres' in full if space allows. kilometres should be spelt in US or UK English dependent upon the manuscript.

Takhle ne



1



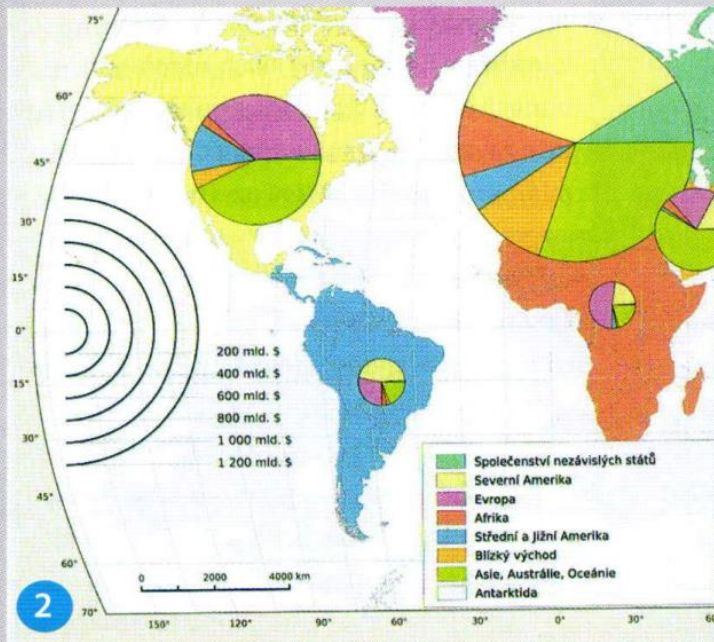
3



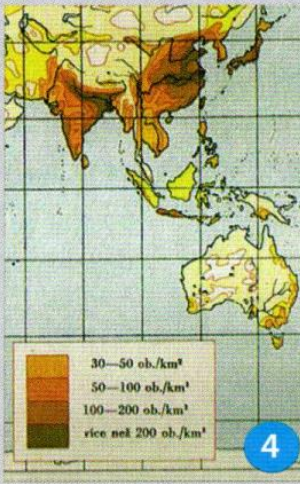
5



6



2



4

Obr. 1 – Příklad záměny metody pro zpracování absolutních a relativních hodnot. Data jsou typická pro zpracování metodou kartodiagramu, ale jsou chybně zpracovány „kartogramem“.

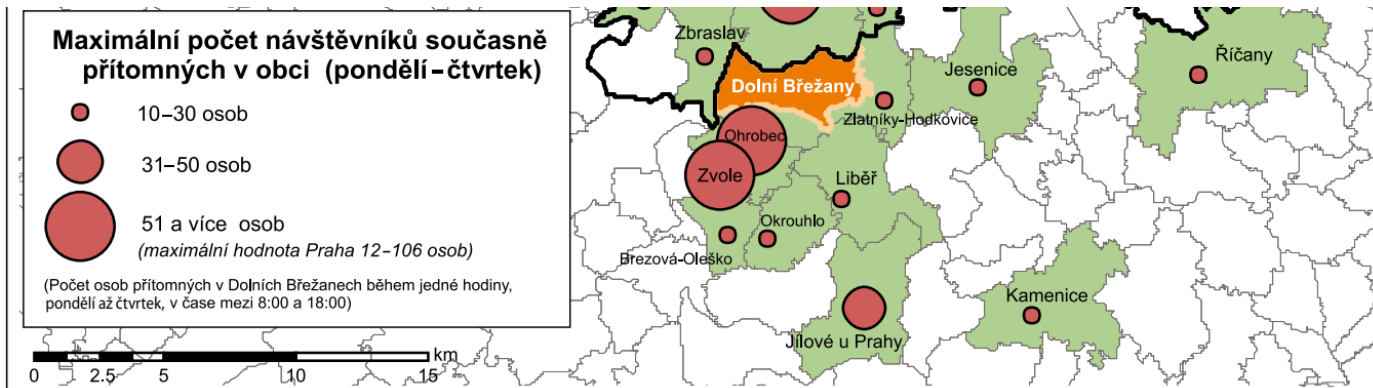
Obr. 2 – Nevhodné velikosti diagramů (špatná stupnice). Diagramy zakrývají podstatné části mapového podkladu.

Obr. 3 – Jsou-li v mapě rozdílné velikosti znaků, musí být také stupnice, která čtenáři sdělí hodnotu jevu.

Obr. 4 – Příklad stupnice plně chyb, kromě jiného je zde překryv hranic intervalů.

Obr. 5 – Na příkladu chybí stupnice. Nestáčí napsat, že velikosti „terčů“ (správně kruhových diagramů) jsou úměrné počtu obyvatel.

Obr. 6 – Příklad vážné chyby při tvorbě stupnice. Se změnou struktury nebyla dodržena rostoucí intenzita jevu.



Obr. 3: Hlavní zdrojové oblasti denní dojížd'ky do Dolních Břežan – pondělí až čtvrtek

Poznámka: Model přítomného obyvatelstva neumožňuje extrahovat informace o počtu unikátních osob, jež obec během dne navštívily. Jako alternativa byl zvolen maximální počet osob současně přítomných během jedné hodiny.

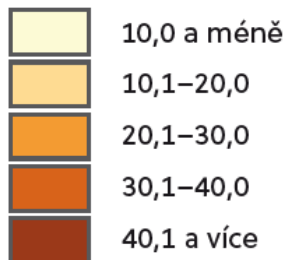
diskrétní jevy

celočíslné

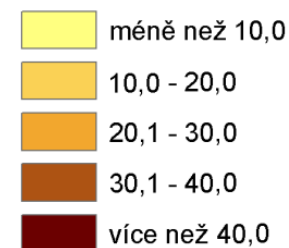
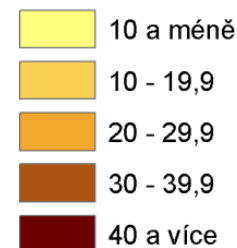


intervaly se nepřekrývají a navazují na sebe

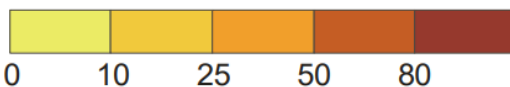
neceločíslné



intervaly se nepřekrývají a navazují na sebe za předpokladu vyjádření jevu s přesností 0,1

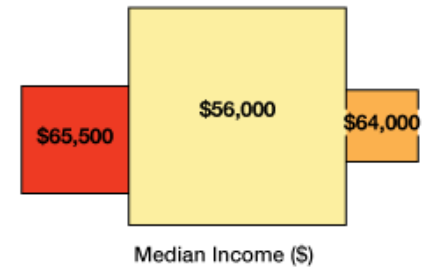


Podíl orné půdy na celkové rozloze regionu [%]



Obr. 4. Doporučená podoba legendy kartogramu pro spojité jevy.

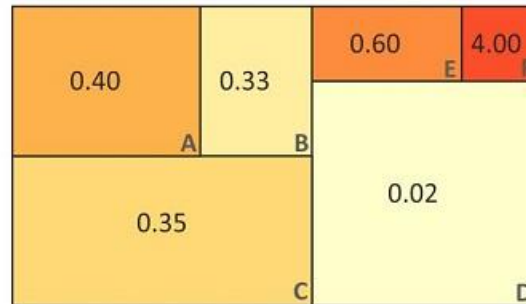
NORMALIZACE



absolute data

	area (sq km)	pop (K)	pop <20 (2000)	pop <20 (2020)
A	5	12	0.68	0.80
B	3	4	1.08	1.00
C	8	40	2.48	2.50
D	9	2	0.12	0.18
E	2	25	1.22	1.20
F	1	45	4.80	4.00

DATA NORMALIZATION



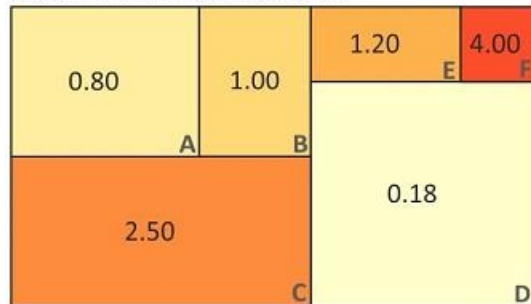
NORMALIZATION BY UNIT AREA
density of people under 20 in 2020 (per sq km)



NORMALIZATION BY SUMMARY VALUE WITHIN THE UNIT
mean number of people under 20 (2020)

NORMALIZATION BY SUMMARY VALUE ACROSS ALL UNITS
percentage above/below average number of people under 20 (2020)

people under 20 years old (in K)



NORMALIZATION BY RELEVANT POPULATION
percentage of people under 20 in total population (2020)
rate: people under 20 per 1,000 total population (2020)



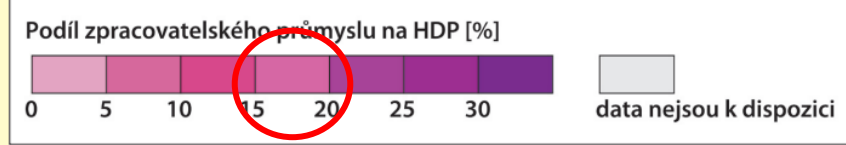
NORMALIZATION BY A PRIOR TIME STEP
percentage population under 20 change from 2000 to 2020

relative data

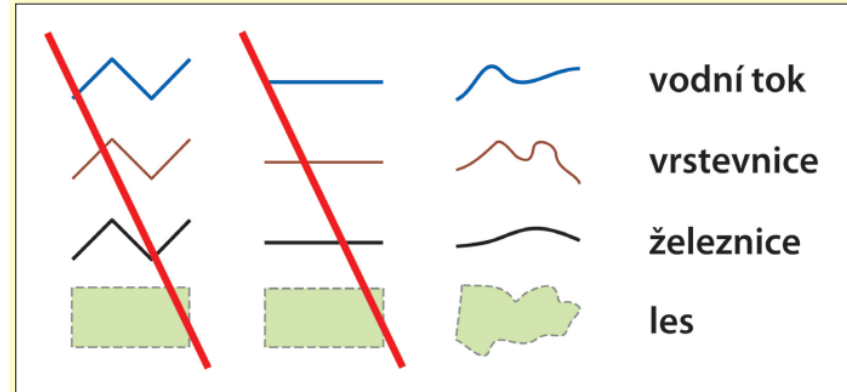
	pop <20 / sq km	% pop <20 / total pop	pop <20 / 1,000 persons	% pop <20 above/below average	% pop <20 / change 2000-20
A	0.40	6.7	0.067	-50.3	+17.6
B	0.33	25.0	0.250	-37.9	-7.4
C	0.35	6.3	0.063	+55.3	+0.8
D	0.02	9.0	0.090	-88.8	+50.0
E	0.60	4.8	0.048	-25.5	-1.6
F	4.00	8.9	0.089	+148.4	-16.5

LEGENDY

- Proč je tak důležitá?
- Musí být vždy součástí mapy?



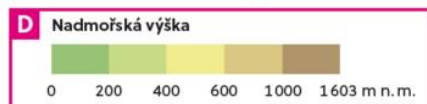
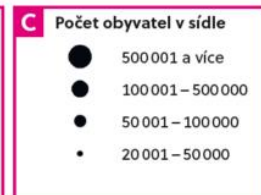
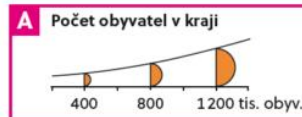
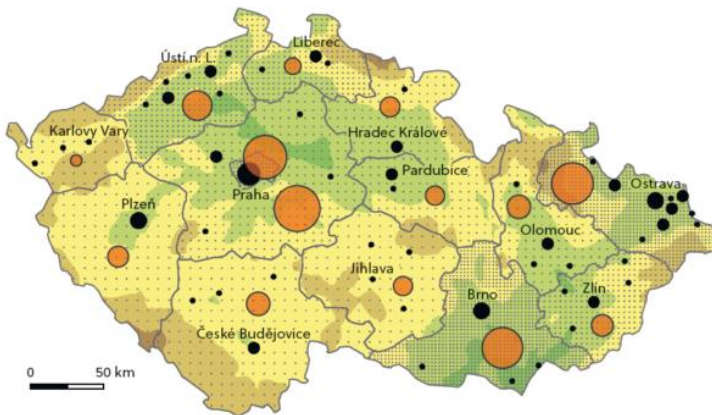
Obr. 2.: Ukázka „propadání“ barev (4. kategorie zleva má špatný odstín)




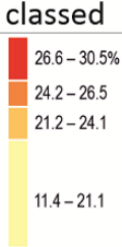
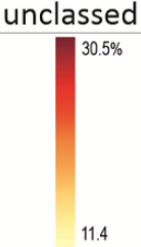
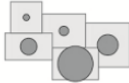
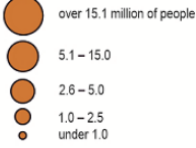
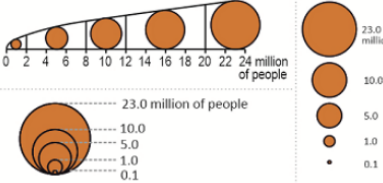
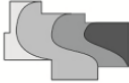


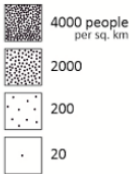
Obr. 3.: Využití defaultního nastavení legendy v programu ArcGIS bez invence autora


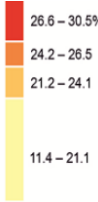
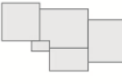

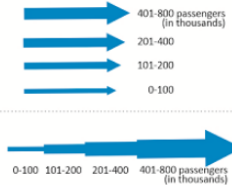



Obr. 4.: Nesprávná prezentace znaku v legendě (liniový znak je nahrazen polygonem).
Zdroj obrázků: archiv autorů



LEGENDY

	classed	unclassed
 <p>choropleth map</p>		
 <p>proportional / graduated symbols map</p>		
 <p>isoline / isarithmic map</p>		
 <p>dot density map</p>	<p>· 20 people</p> <p>1 dot represents 20 people</p> 	

 <p>dasymetric map</p>	<p>Legend design appropriate to the adjusted map type, e.g., choropleth map.</p> 	
 <p>cartogram</p>		<p>Explanation often expressed in a sentence, e.g., area resized by population over the age of 60 (millions).</p>
 <p>flow map</p>		

- krajské město

silnice

- ≡ dálnice
- ≡ rychlostní komunikace
- ≡ silnice 1. třídy

vodní toky a plochy

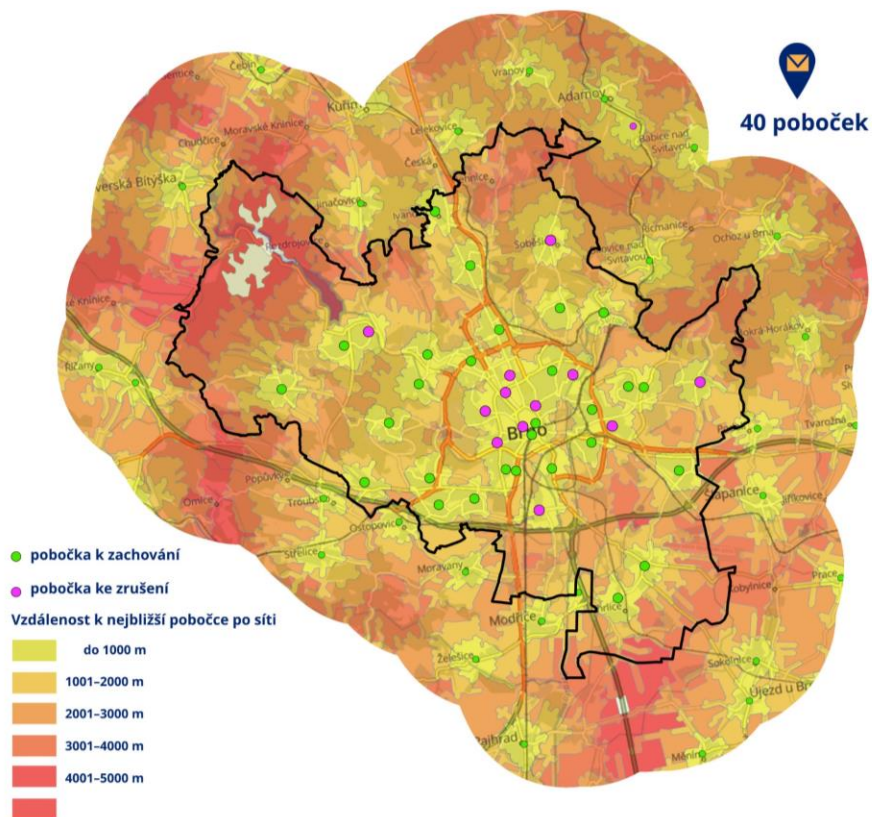
- ~ vodní tok
- ~ vodní plocha

chráněná území

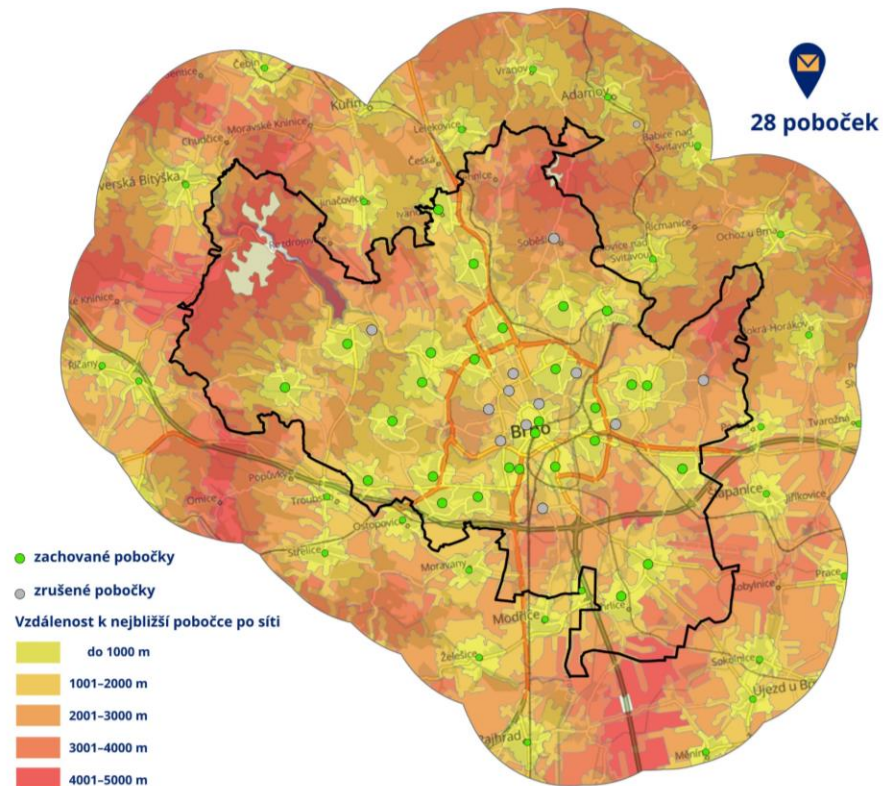
- ~ chráněná krajinná oblast
- ~ národní park

LEGENDY

DOSTUPNOST POBOČEK ČESKÉ POŠTY V BRNĚ stav před zrušením: duben 2023



DOSTUPNOST POBOČEK ČESKÉ POŠTY V BRNĚ stav po zrušení: červenec 2023



Data:
Aktuální počet provozovaných poboček v Brně včetně poboček "Pošta partner"
Dostupnost je počítána k nejbližší pobočce pošty, včetně poboček mimo území Brna
<https://www.ceskaposta.cz/-/ceska-posta-zrusi-300-svych-pobocek>



BARVY

Takhle ne



Mineral Products

- ▲ Oil
- ▲ Natural gas
- Coal
- ⊗ Uranium
- ✕ Bauxite
- Gold
- ◆ Diamonds
- Phosphates
- Manganese
- Iron ore
- Tin
- ◆ Copper



BARVY

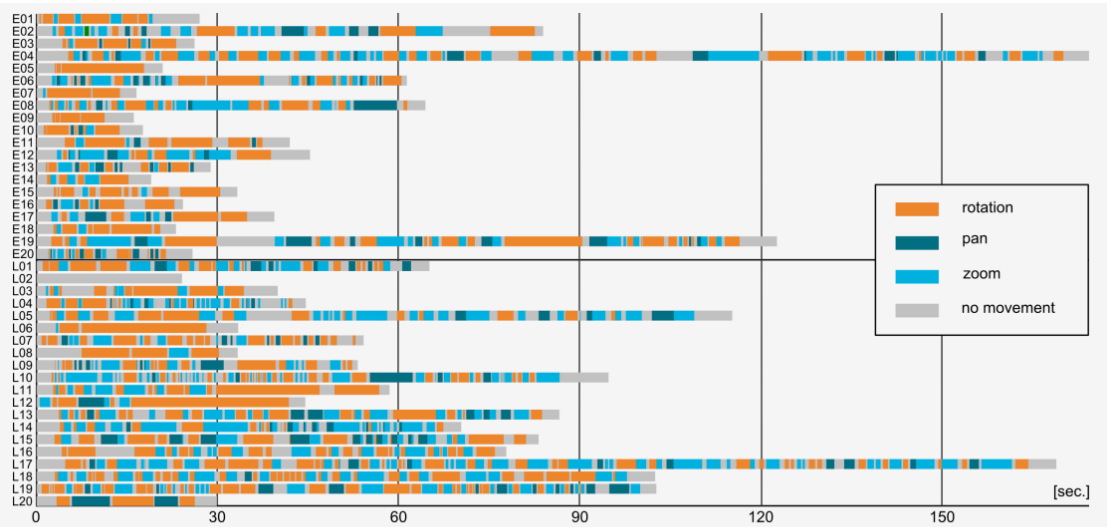


Figure 3. Sequence chart of user interactions. An online version of the sequence chart with sample data is available at: olli.wz.cz/webtest/3dmover/visualizations_cp.

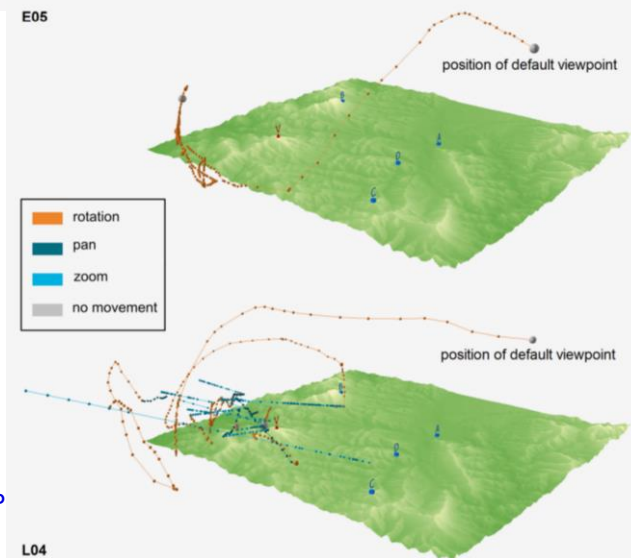


Figure 5. Comparison of the virtual trajectories of participant "E05" and participant "L04". The sizes of the spheres represents delays at individual virtual camera positions. An online version of these visualizations is available at: olli.wz.cz/webtest/3dmover/visualizations_cp.

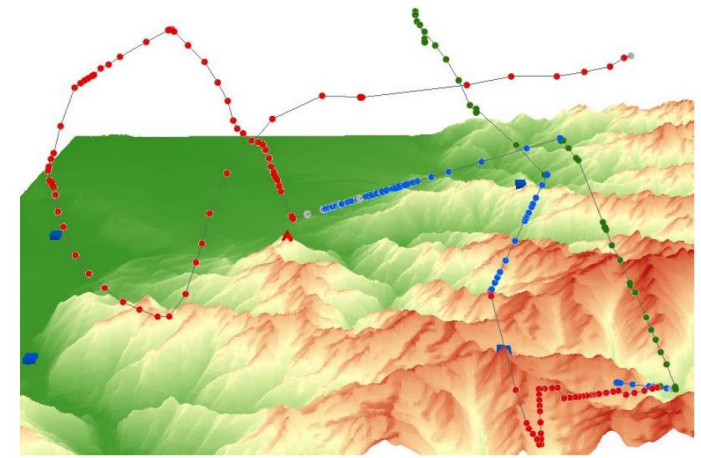


Fig. 8. Example of trajectory visualization

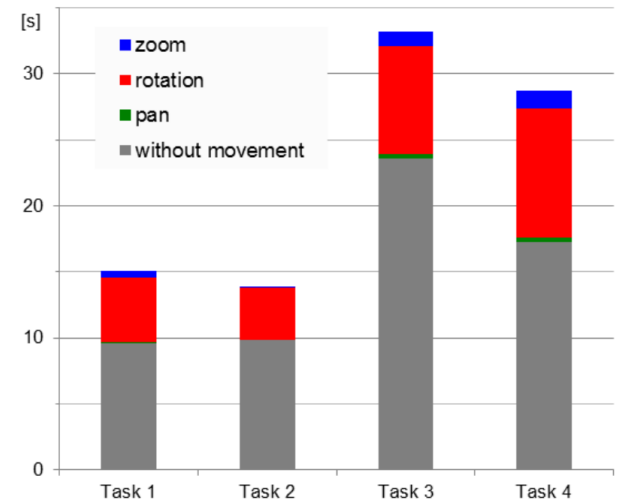
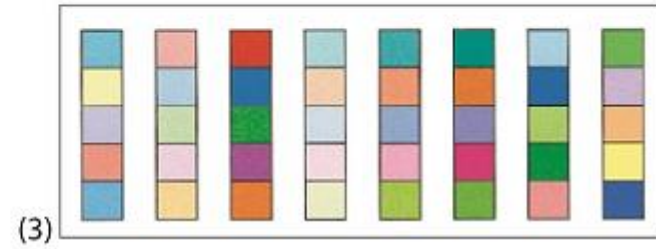
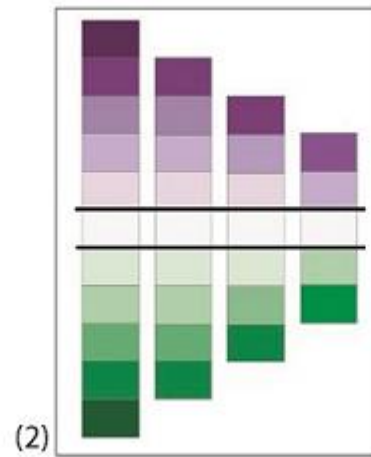
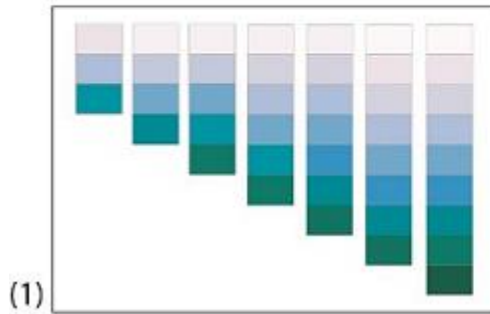


Fig. 7. Average duration of use of individual types of movement

BARVY

<https://colorbrewer2.org/>



Number of data classes: 6

how to use | updates | downloads | credits

COLORBREWER 2.0

color advice for cartography

Nature of your data:
 sequential diverging qualitative

Pick a color scheme:
Multi-hue: Single hue:

Only show:
 colorblind safe
 print friendly
 photocopy safe

Context:
 roads
 cities
 borders

Background:
 solid color
 terrain

6-class PuBu

EXPORT

HEX

- #f1eef6
- #d0d1e6
- #a6bddb
- #74a9cf
- #2b8cbe
- #045a8d

color transparency

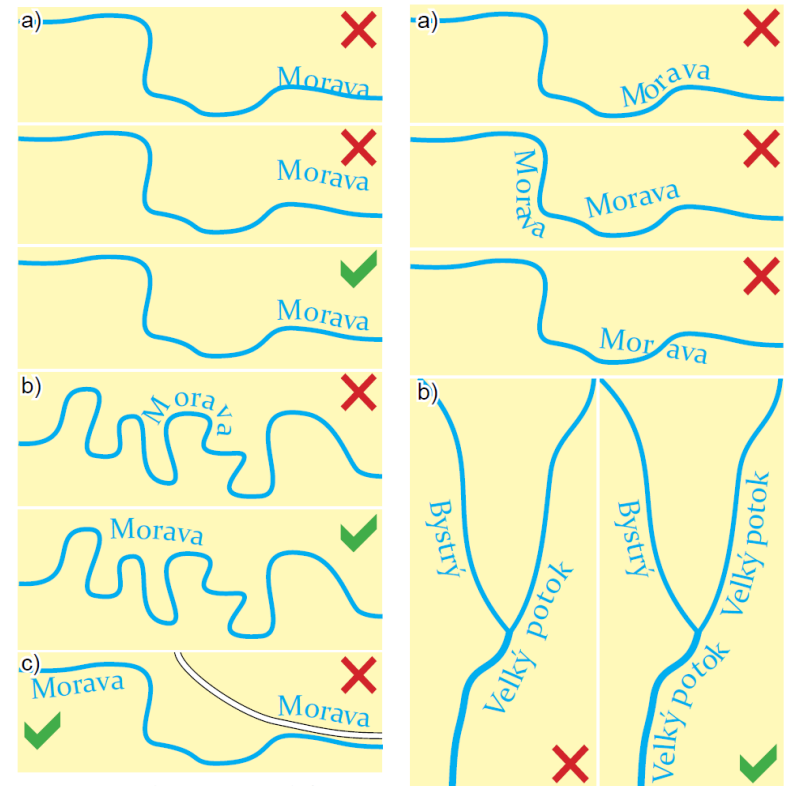
POPIS

- K čemu popis v mapě složí?
- Písma a fonty

Břeclavských běhů
Břeclavských běhů
Břeclavských běhů

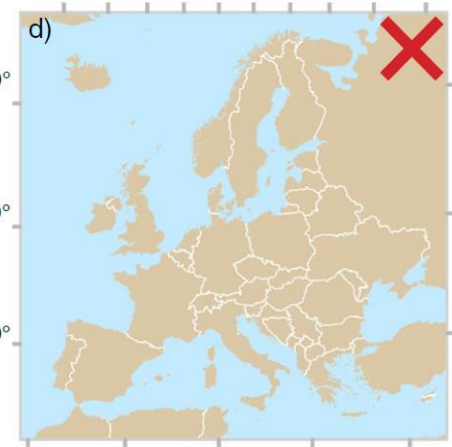
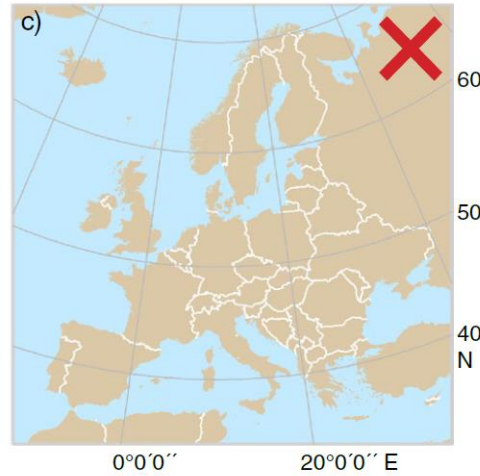
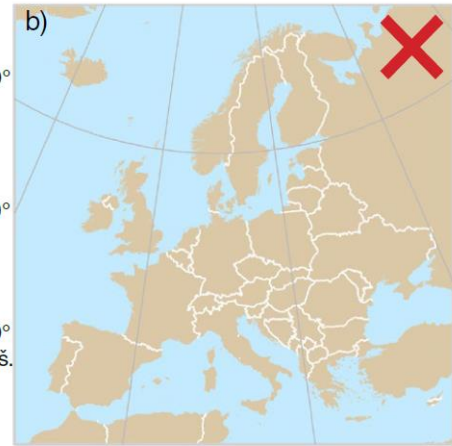
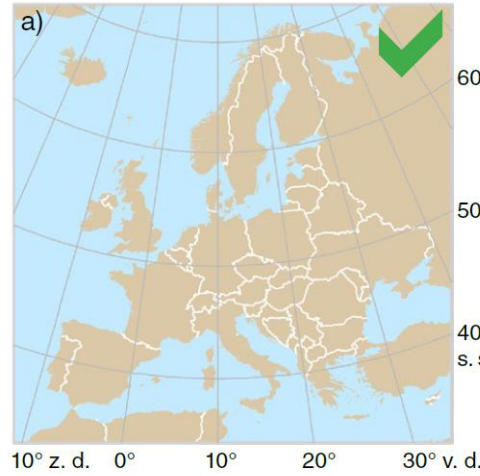


Obr. 9.36 – (Ne)vhodné zarovnání víceřádkového popisu figurálních prvků.

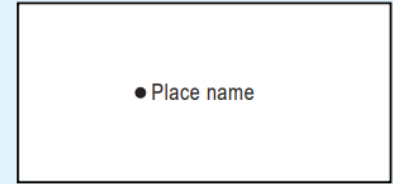
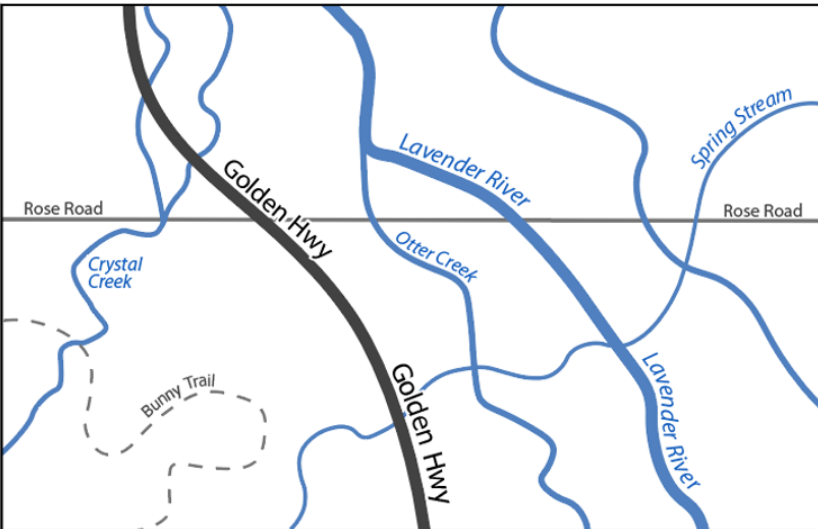
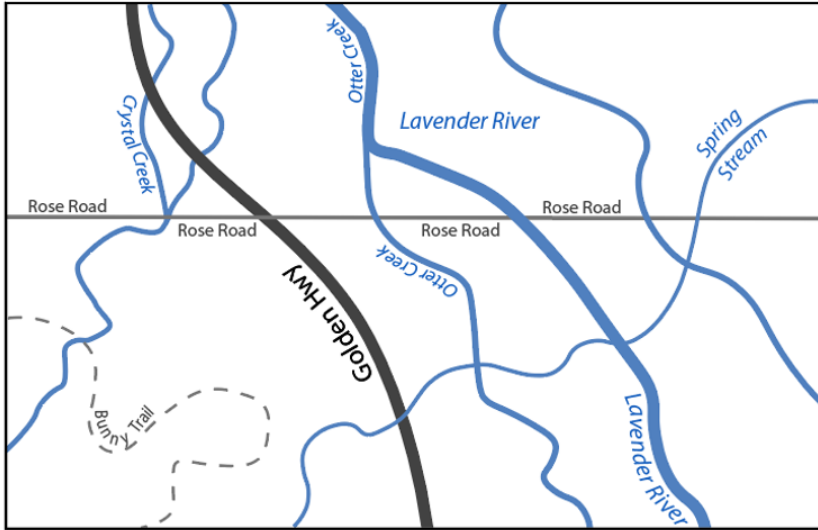


Obr. 9.38 – Zásady umístování popisu liniových prvků.

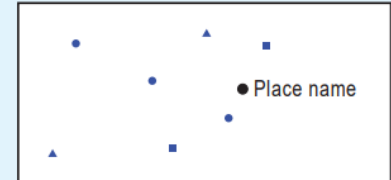
POPIS



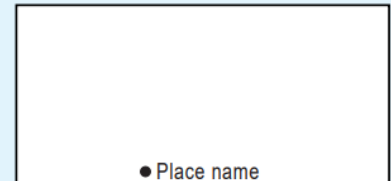
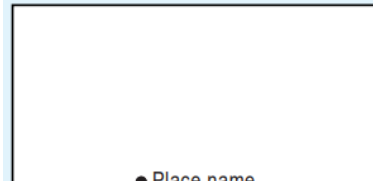
POPIS



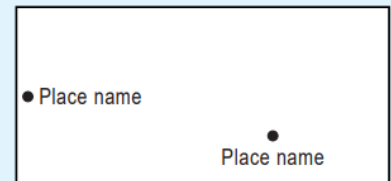
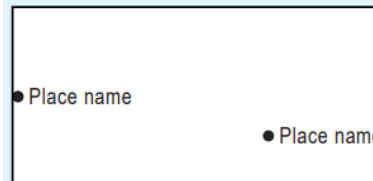
Ensure that text isn't too small - generally a minimum of 7pt should be used.



Ensure that symbols are large enough to be seen clearly.

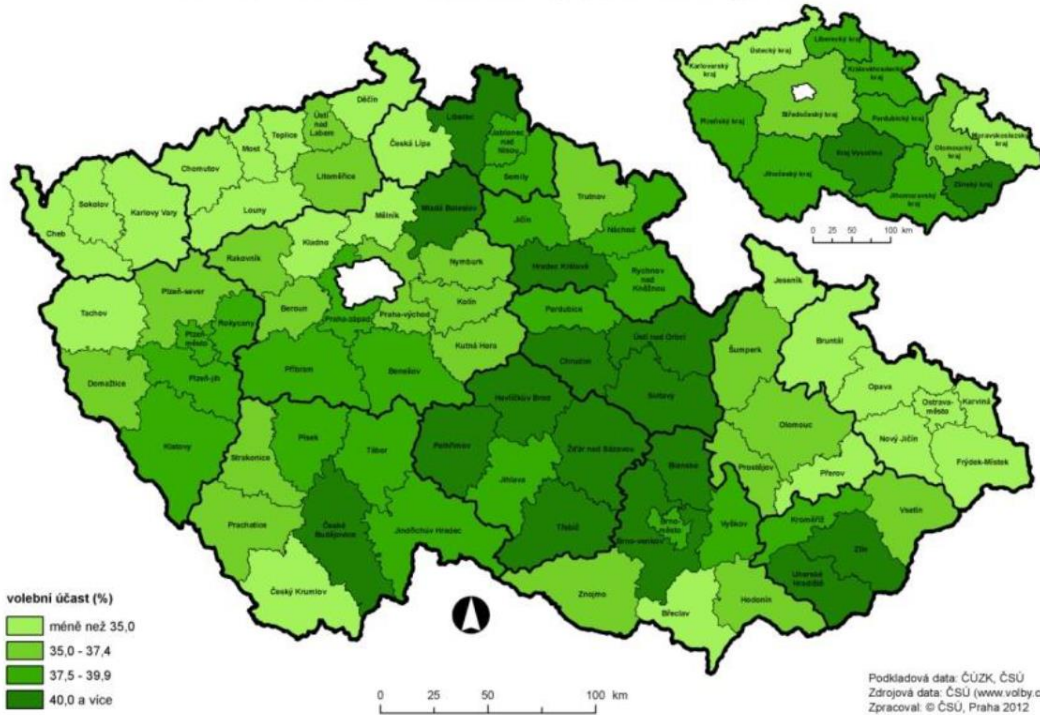


Ensure that text isn't cropped by the frame.

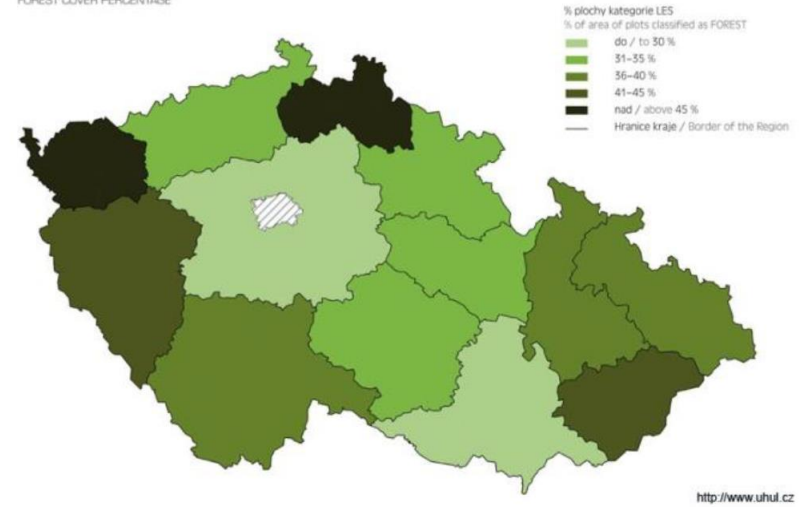


POPIS

Volební účast ve volbách do zastupitelstev krajů podle okresů a krajů v roce 2012

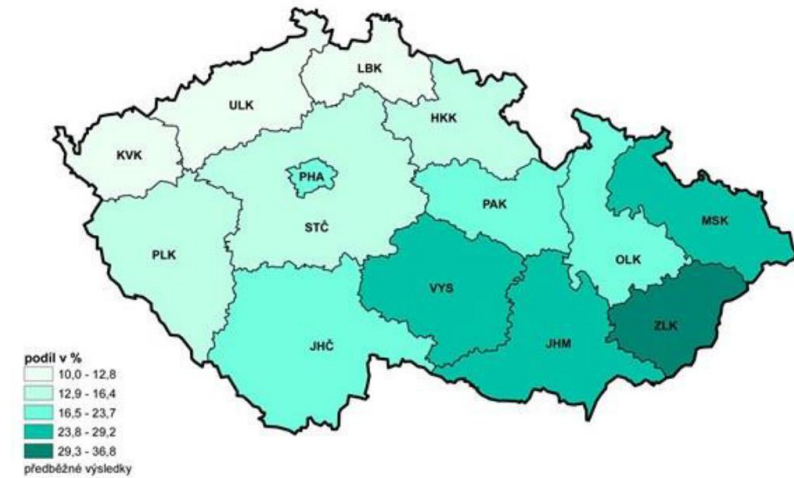


LESNATOST
FOREST COVER PERCENTAGE

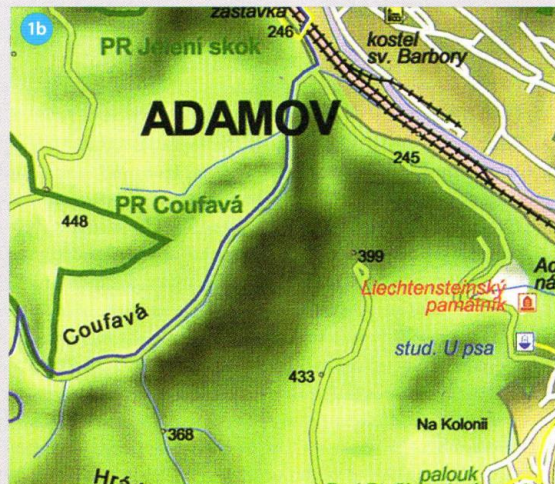
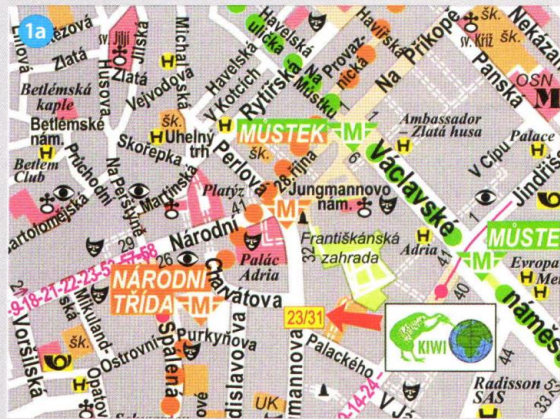


SČÍTÁNÍ LIDU,
DOMÁBYTŮ
2011

Podíl věřících v krajích (SLDB 2011)

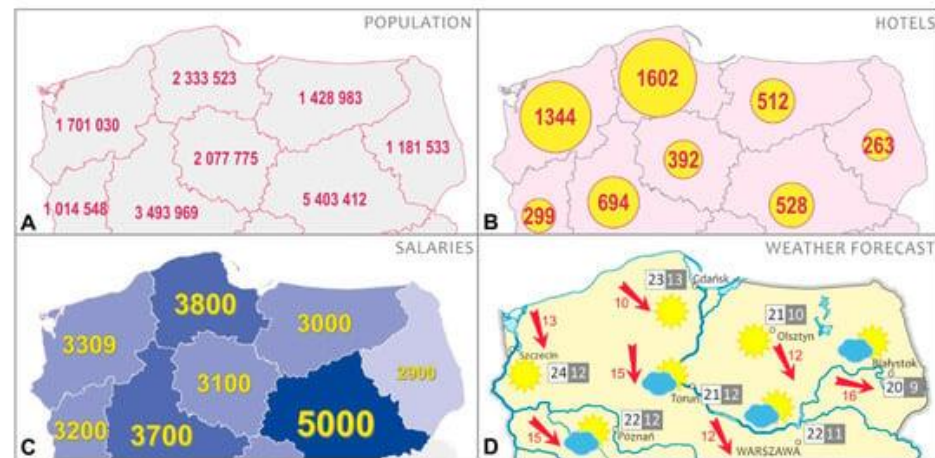
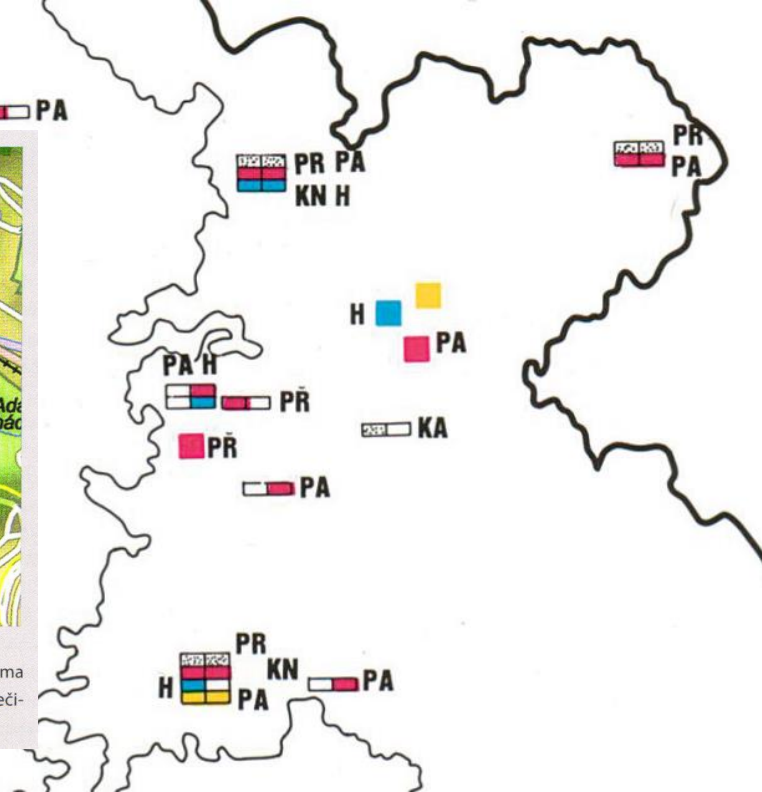


Takhle ne

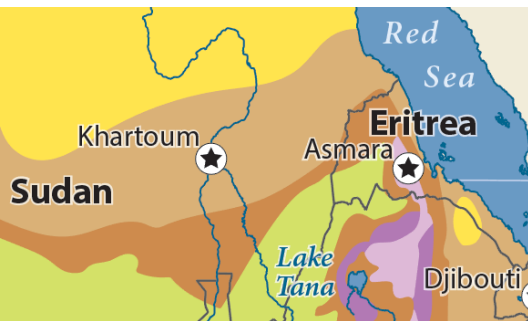
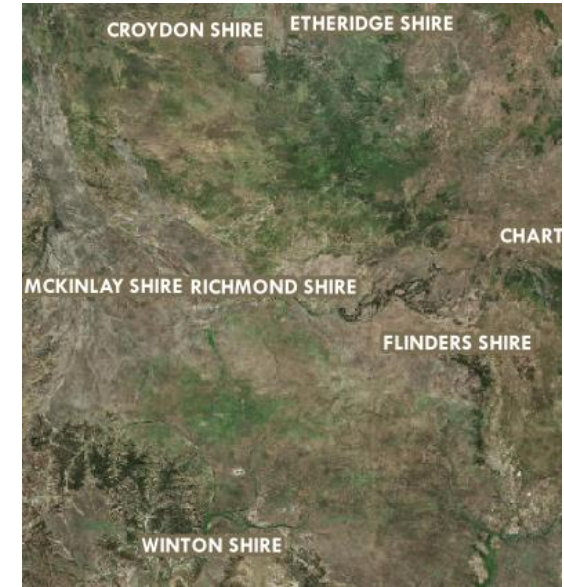
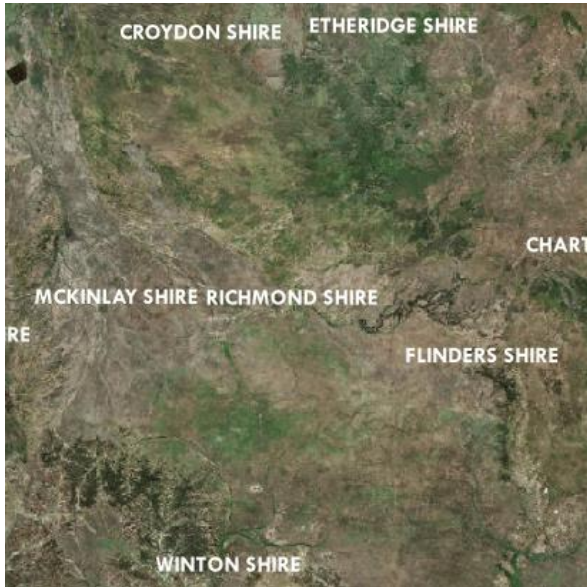


Obr. 1a, b – Nevhodně zvolená barva písma ve vztahu k podkladu. 1a – Bílé písmo na oranžovém a zeleném podkladu společně s přesahem písma v popisu ulic způsobuje špatnou čitelnost celé mapy. 1b – Přestože jsou barvy písma zvoleny asociativně podle druhu objektů, je místy popis nečitelný kvůli barvě podkladu (zelená na zelené).

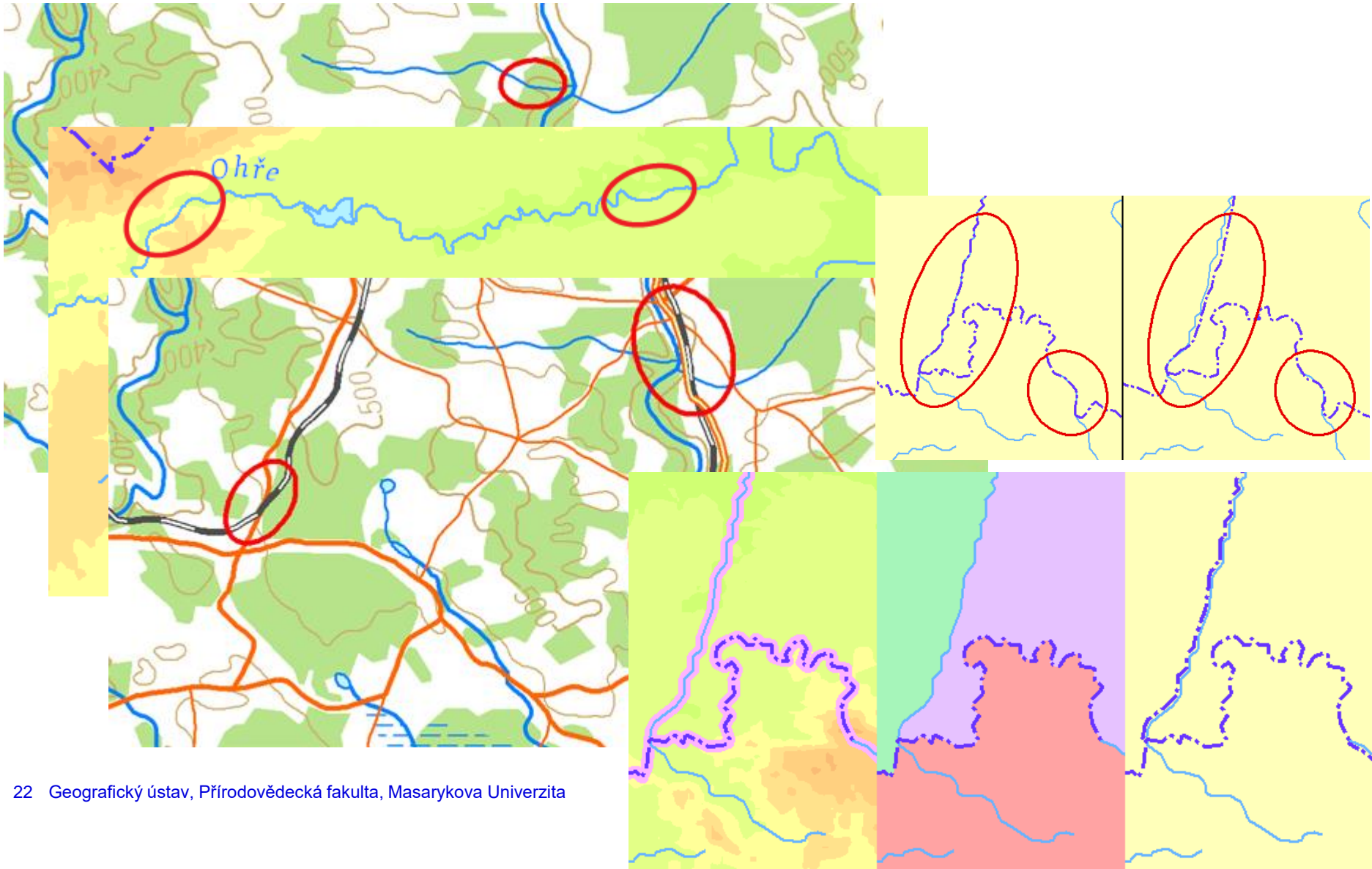
PA



HALO

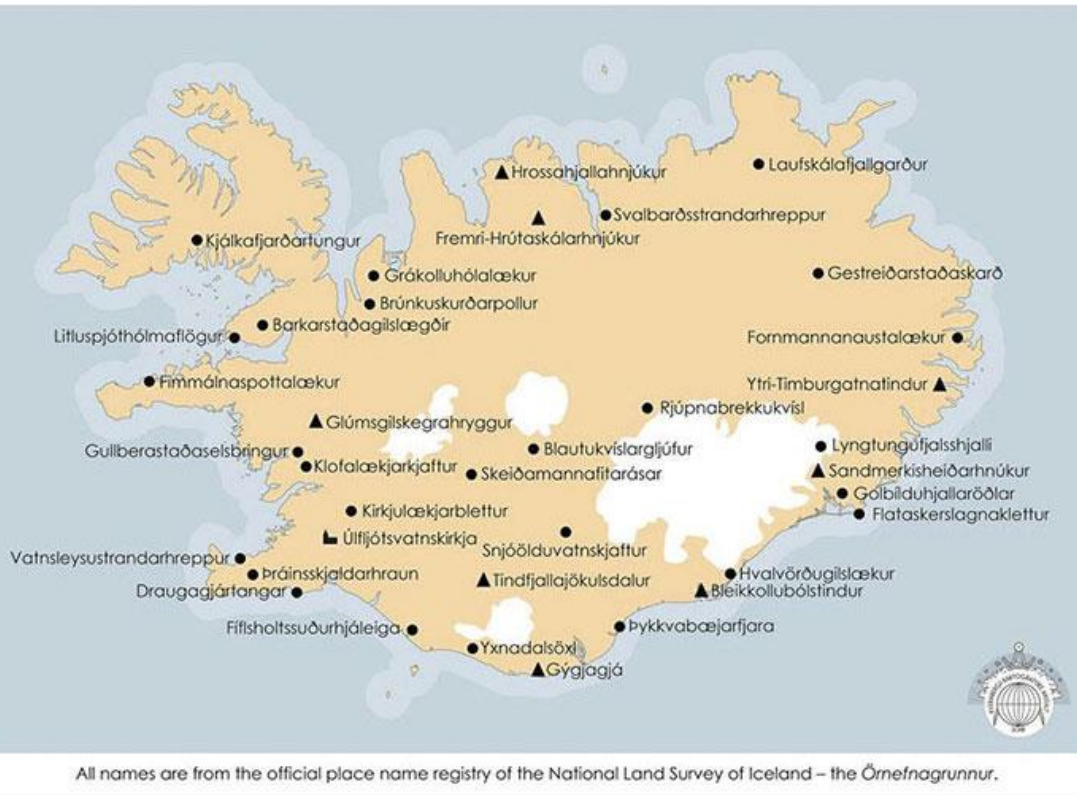


TOPOLOGICKÉ CHYBY & POŘADÍ VRSTEV





35 place names in Iceland that will help you understand what dyslexia feels like



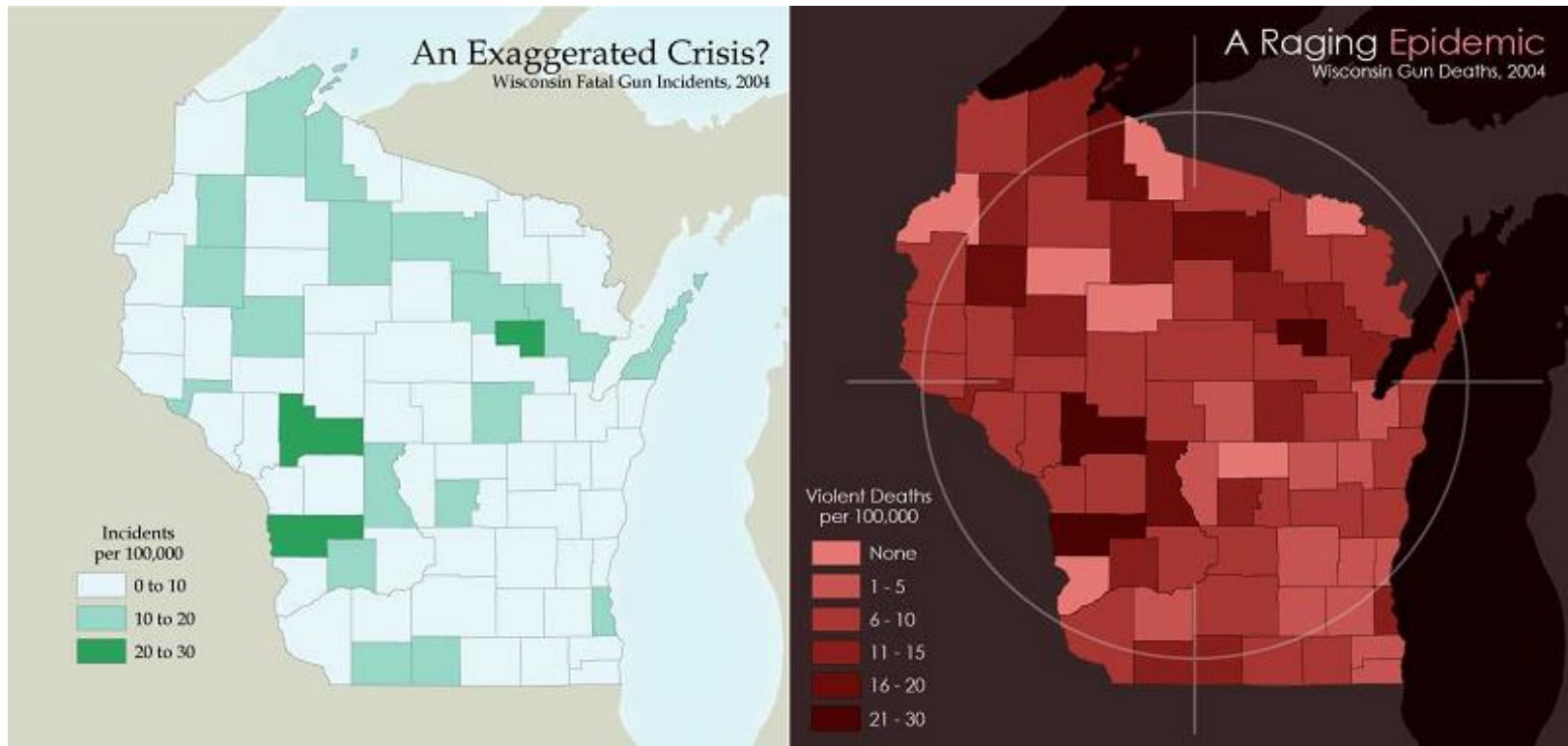
Cat Earth Theory

THE WORLD IS A CAT



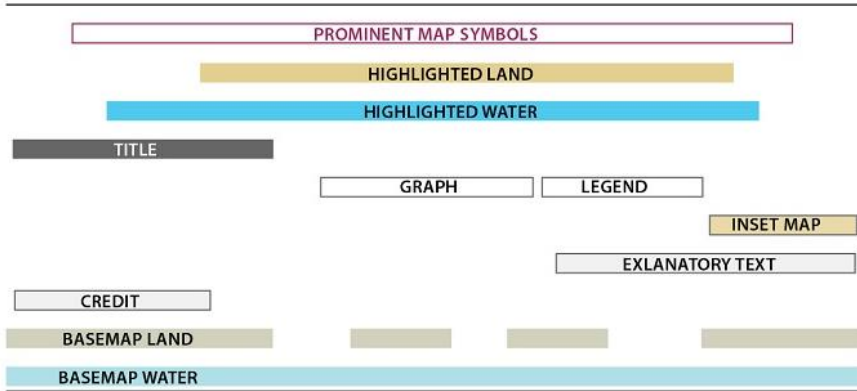
PLAYING WITH AUSTRALIA

STYL & DESIGN

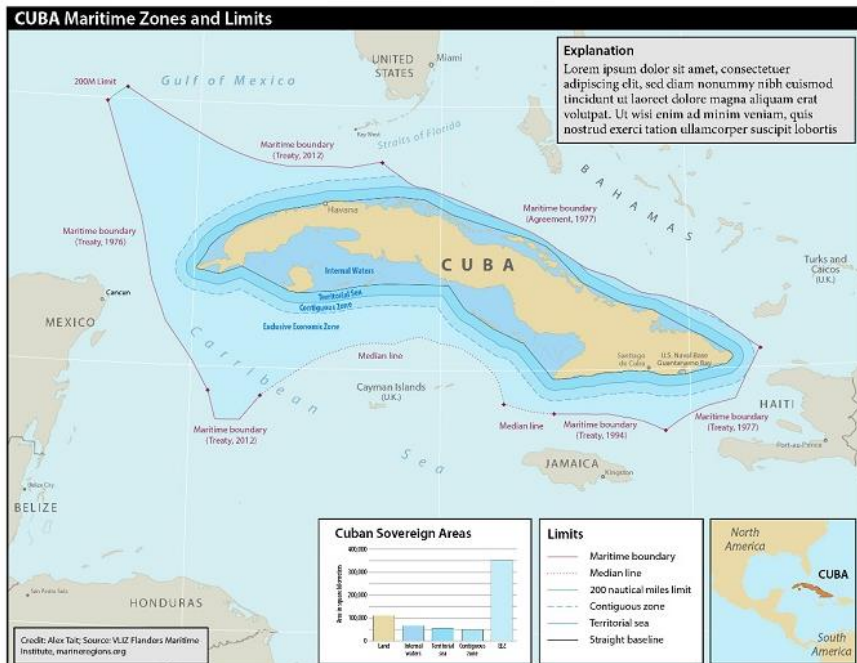


DESIGN

Visual Hierarchy



Map Layout

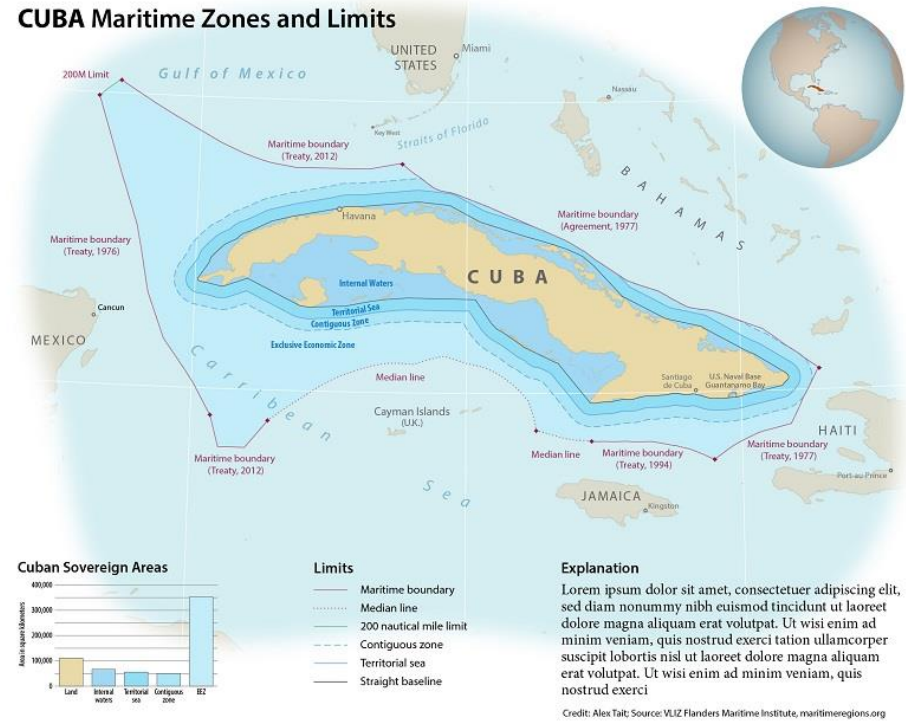
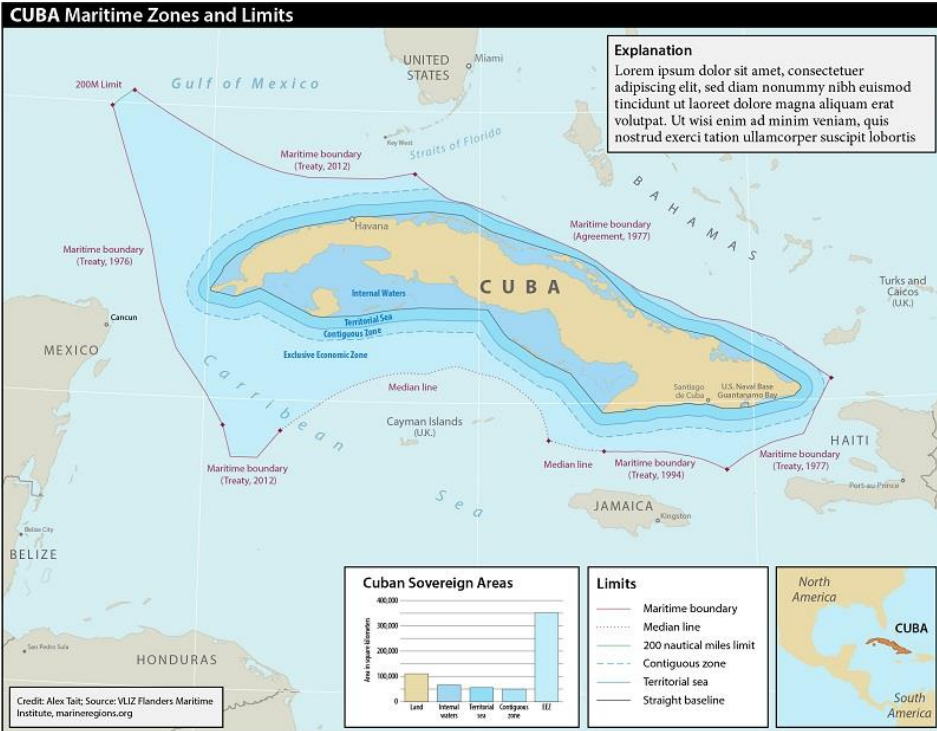


Type	Stronger		vs		Weaker
Size*	Large		vs		Small
Color: Hue	Warm		vs		Cool
Color: Saturation	Intense		vs		Pale
Color: Value‡	Dark/Light		vs		Light/Dark
Focus	Sharp		vs		Blurry
Position	Center		vs		Periphery
Continuity	Edged		vs		Continuous
Grouping*	Isolated		vs		Grouped
Arrangement	Ordered		vs		Random
Distribution	Dense		vs		Sparse
Cropping	Entire		vs		Cropped
Detail*	Intricate		vs		Generalized





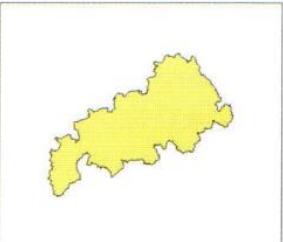
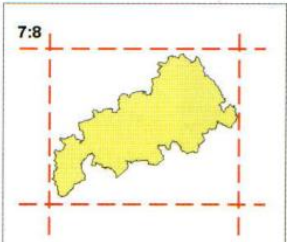
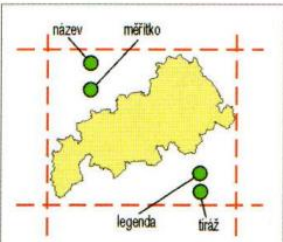
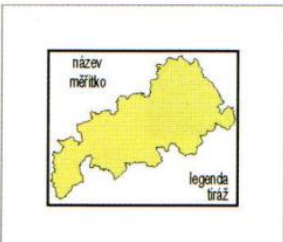
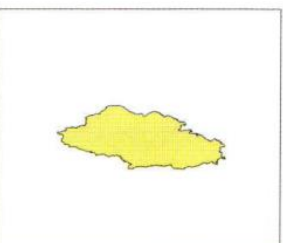
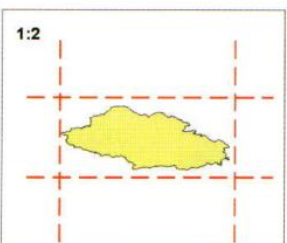

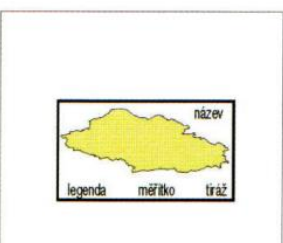
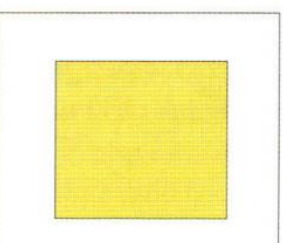
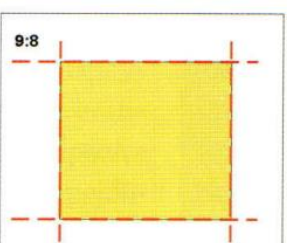
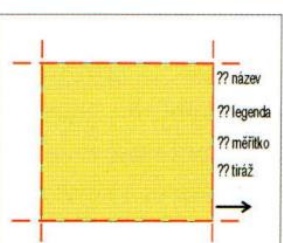
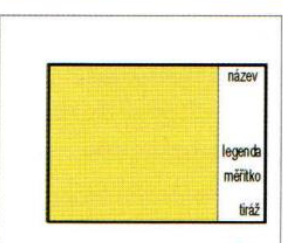
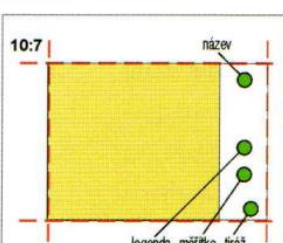
*Cartography texts disagree on which is stronger and which weaker.

‡Value's strength depends on the background, dark is stronger on a light background and light on dark one.

DESIGN



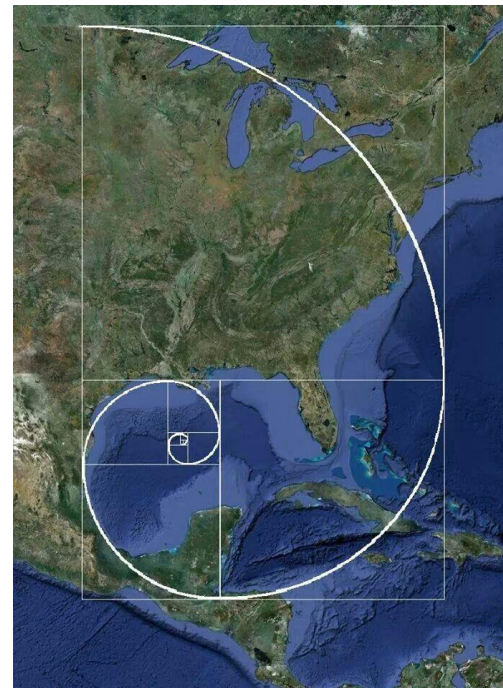
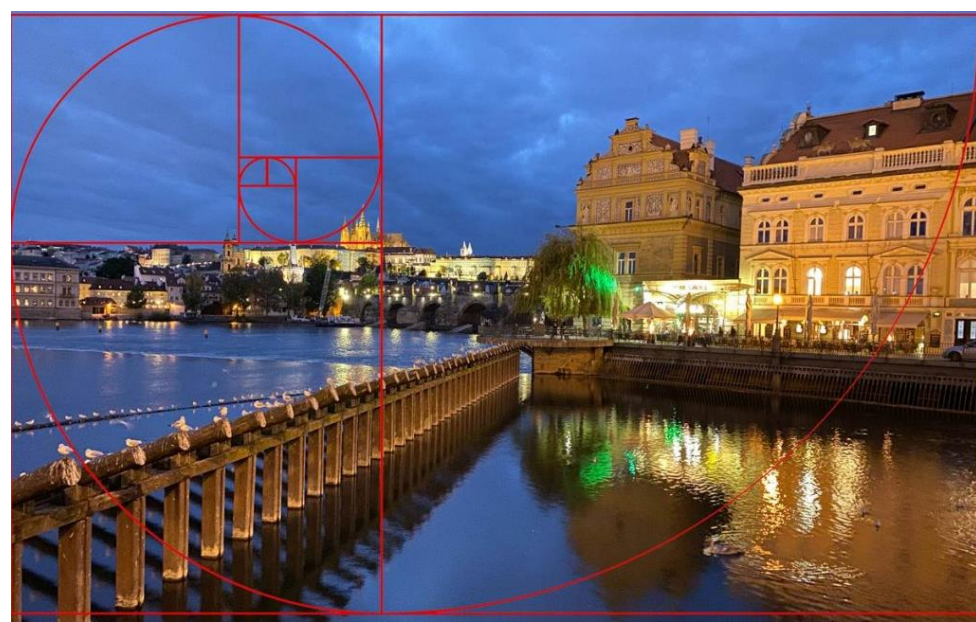
ROZVEŽENÍ MAPOVÉHO LISTU

	1:1 		
	7:8 		
	1:2 		
	9:8 		
			10:7 

ZLATÝ ŘEZ

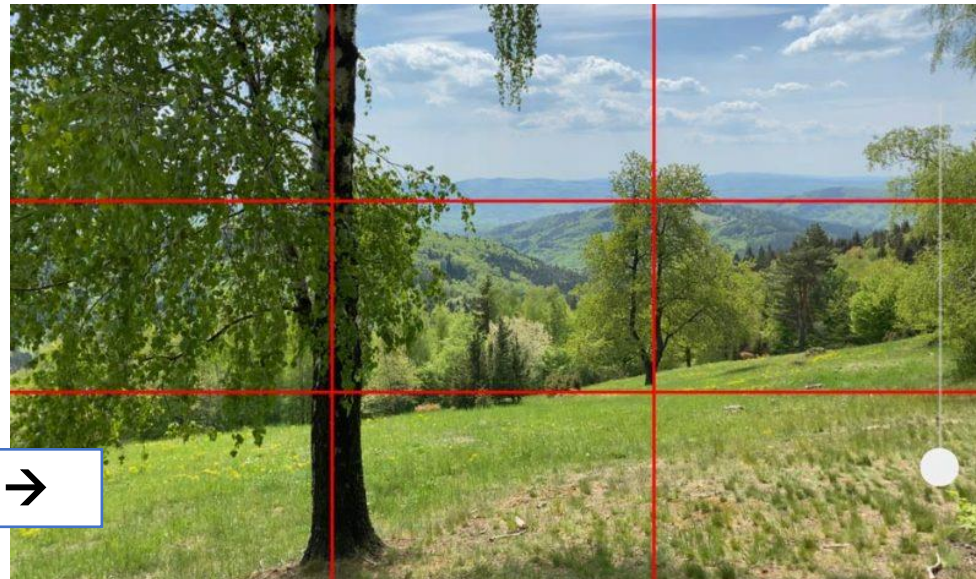
$$\frac{a + b}{a} = \frac{a}{b}$$

1,61



akulta,

Pravidlo třetin →



KVÍZ ...

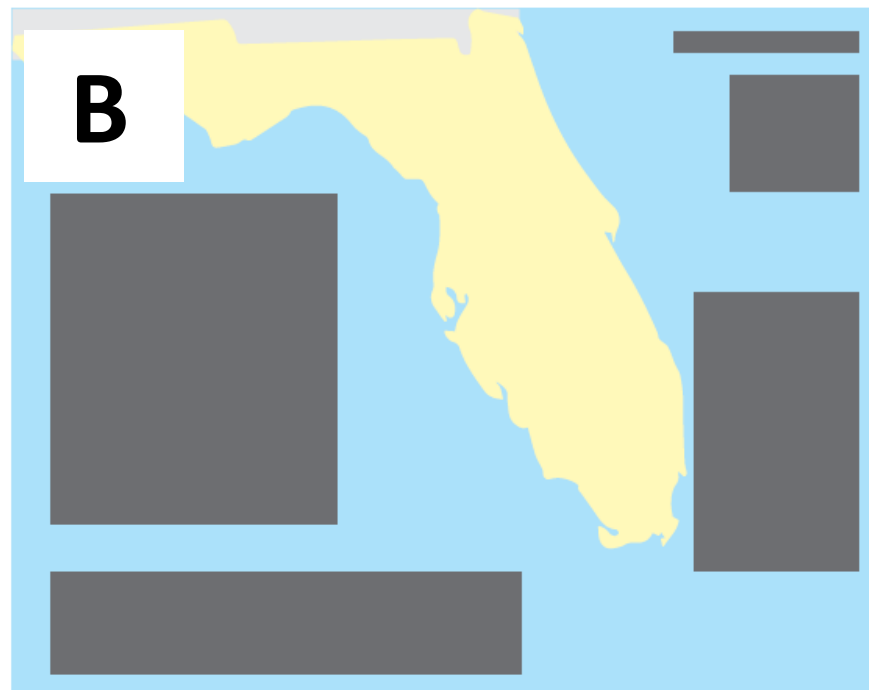
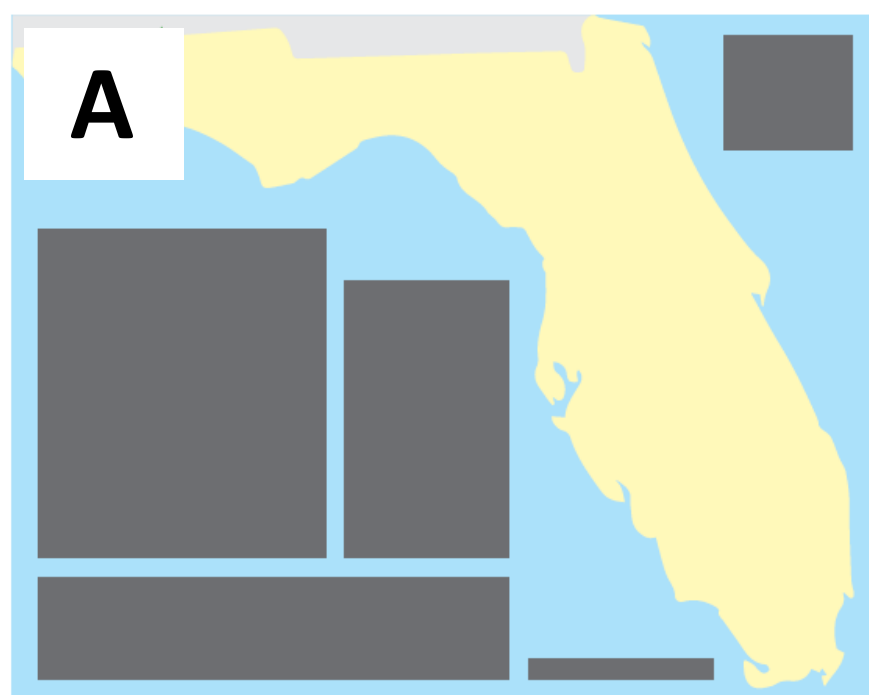
Urči, která varianta mapového layoutu je **správná / lepší**

V potaz berte uvedenou **charakteristiku**

Pokud není uvedeno jinak, vybíráš jednu možnost ze dvou.

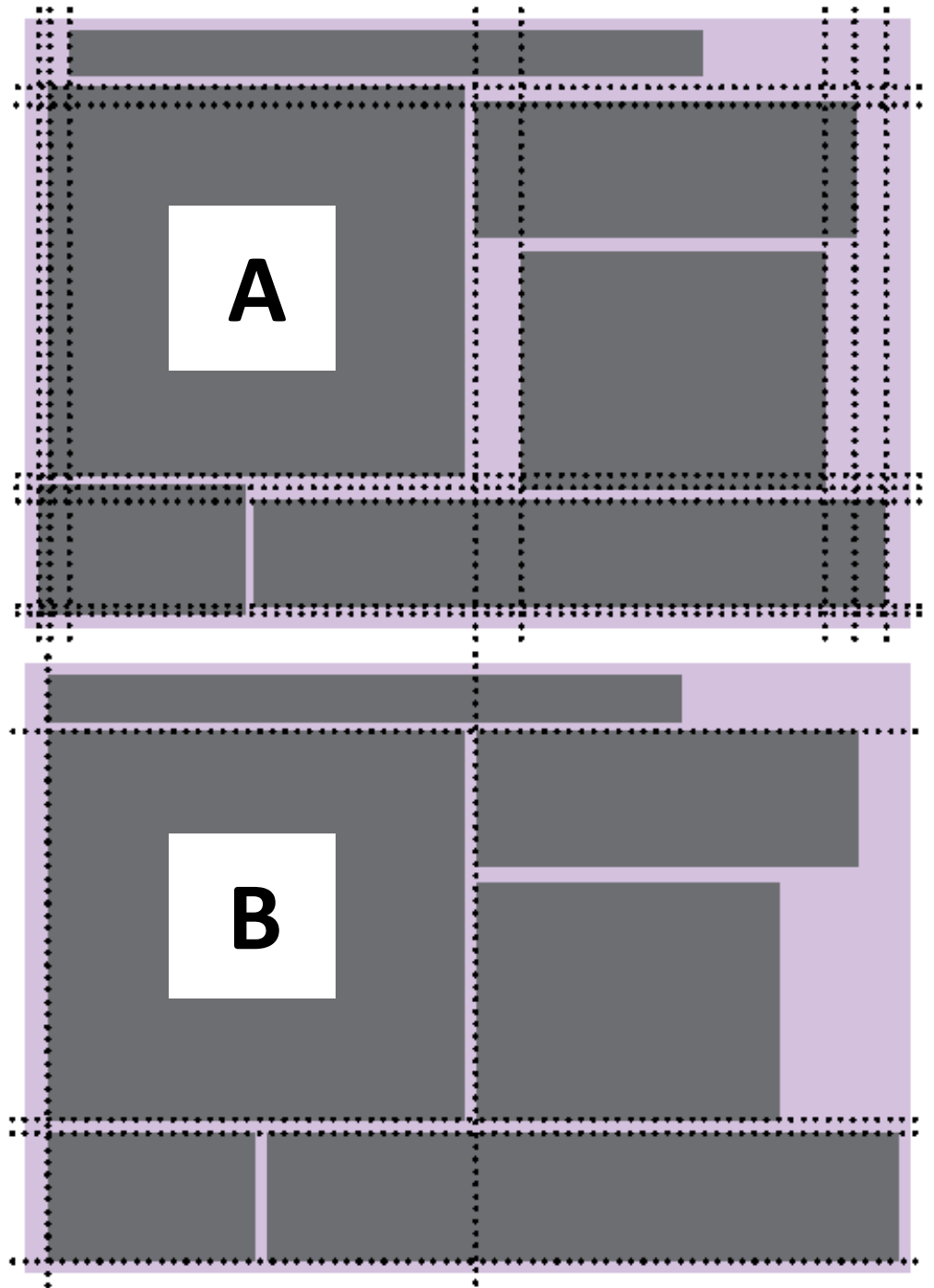
1)

Využití tvaru zobrazovaného území při kompozici prvků na listu



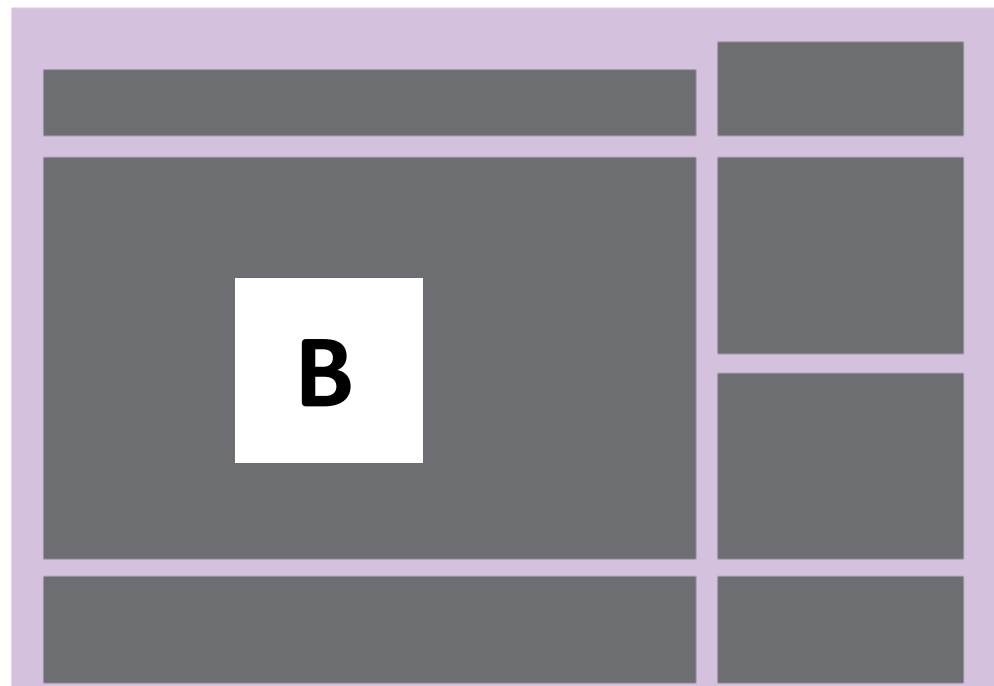
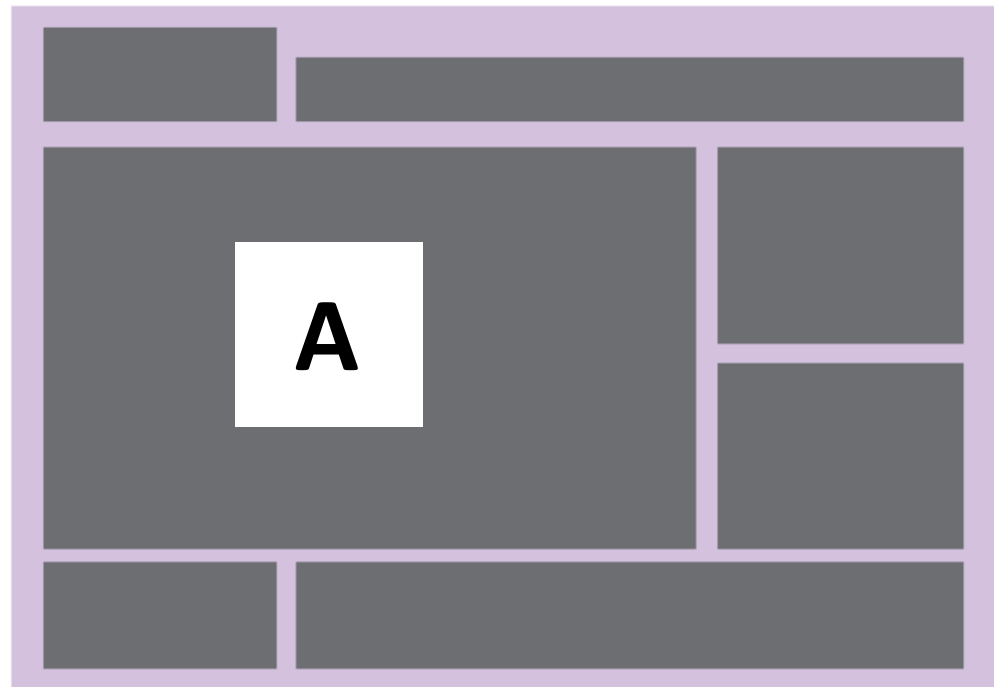
2)

Zarovnání prvků ke
kompozičním osám



3)

Propojení nebo rozbití
jednotlivých prvků
mapy na listu



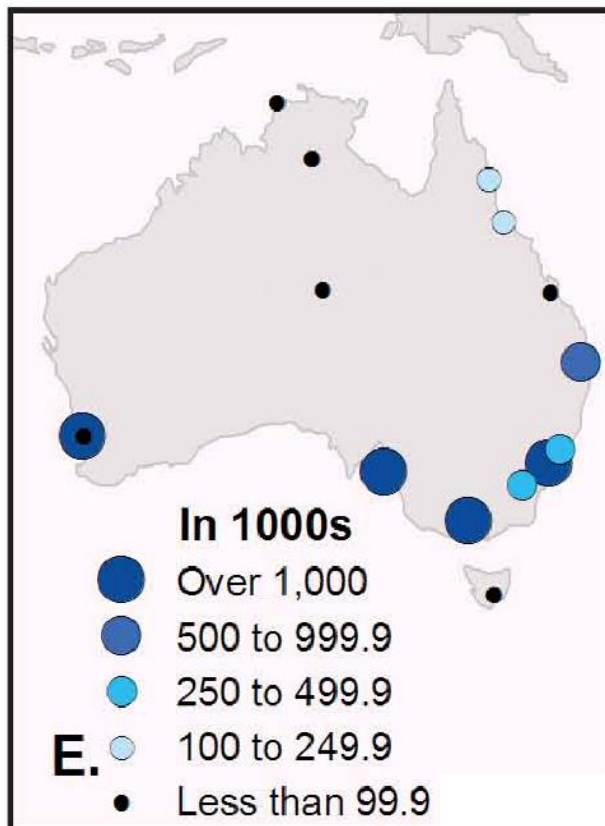
4) Vizuální kontrast I.

Vyber dvě možnosti

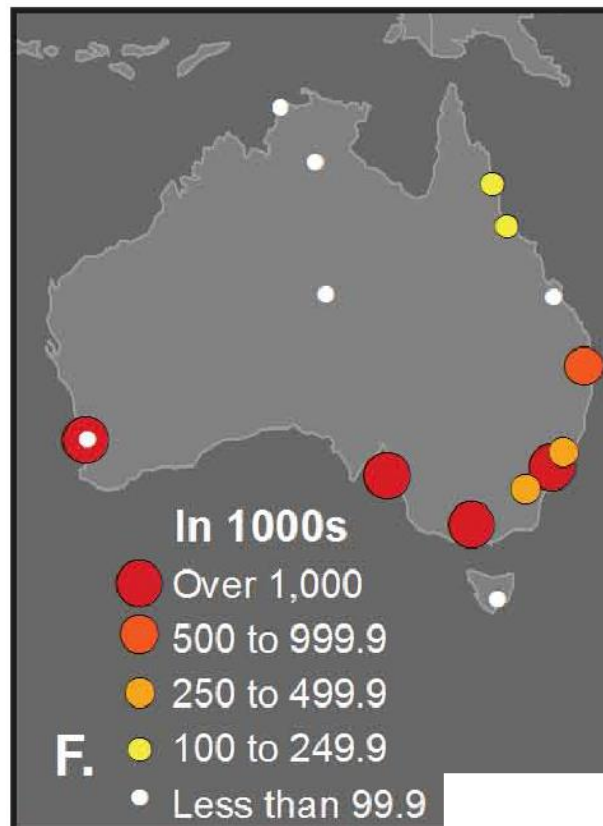


5) Vizuální kontrast II. – tematická mapa

2000 Population in Cities

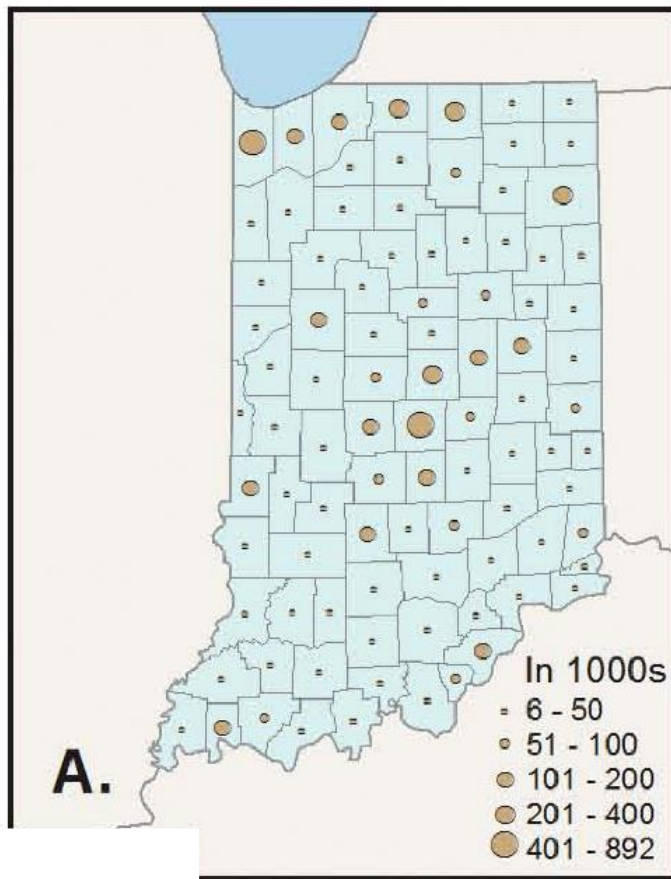


2000 Population in Cities

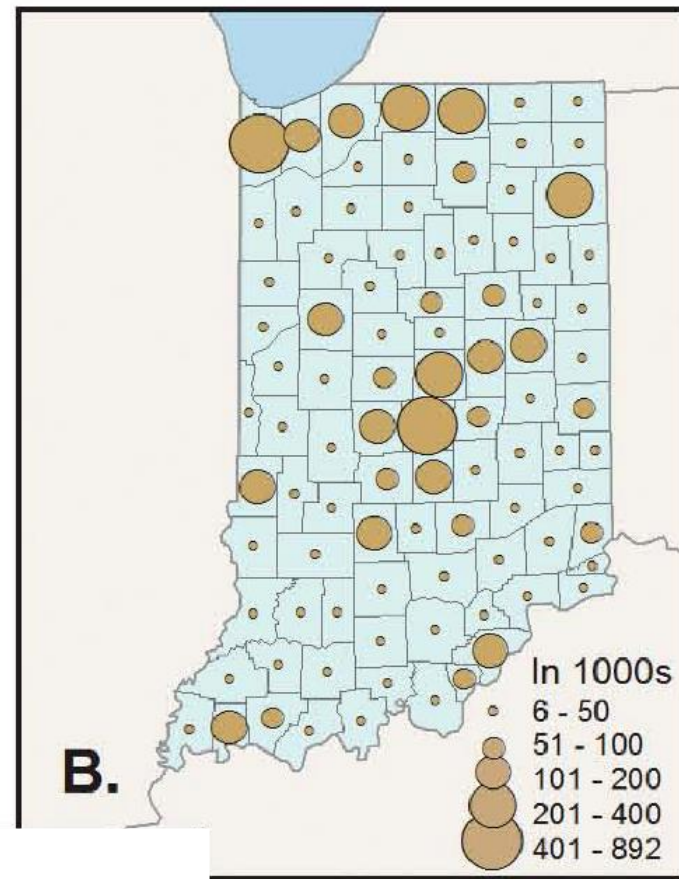


7) Čitelnost I.

2010 Population

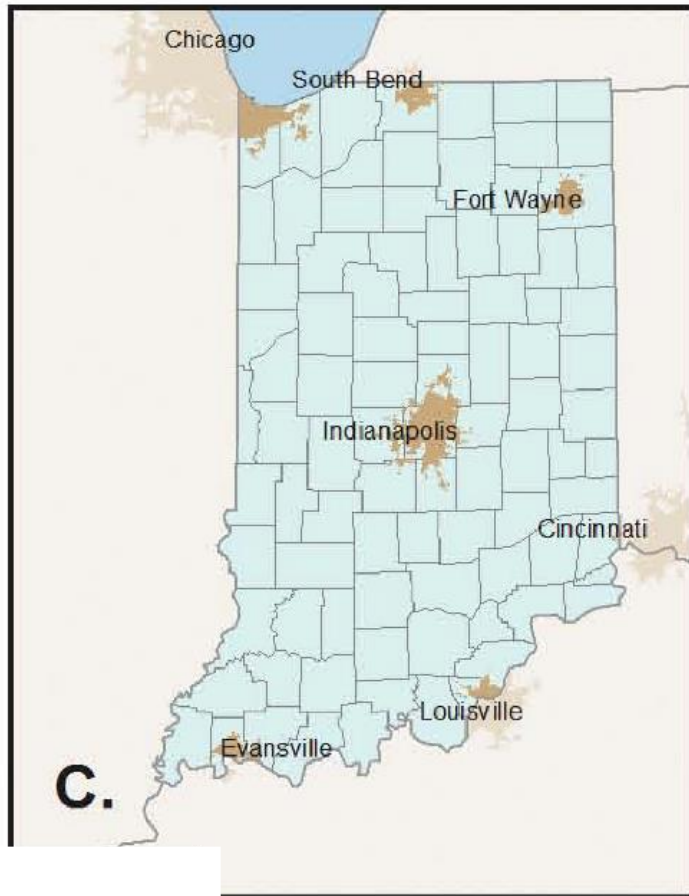


2010 Population



8) Čitelnost II.

Major Metropolitan Areas

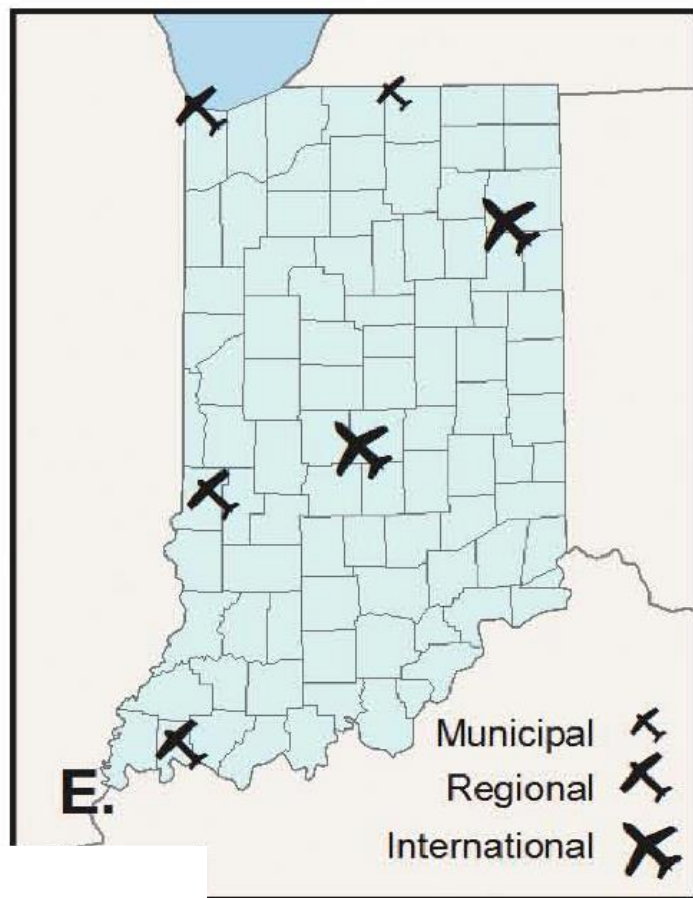


Major Metropolitan Areas

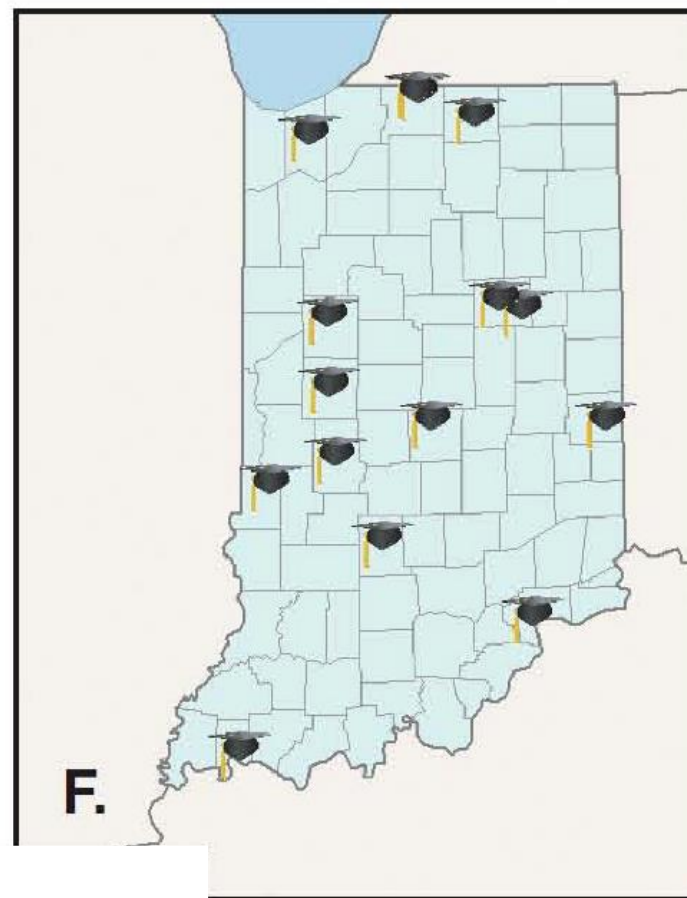


9) Čitelnost III.

Major Airports



Fifteen Top Colleges



10) Hierarchie, „pořadí vrstev“

Vyber minimálně
jednu možnost

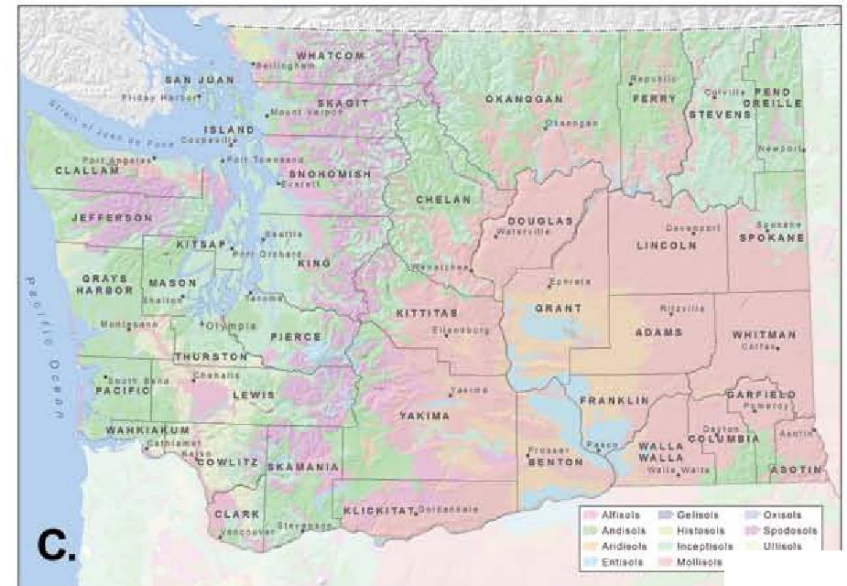
Washington State

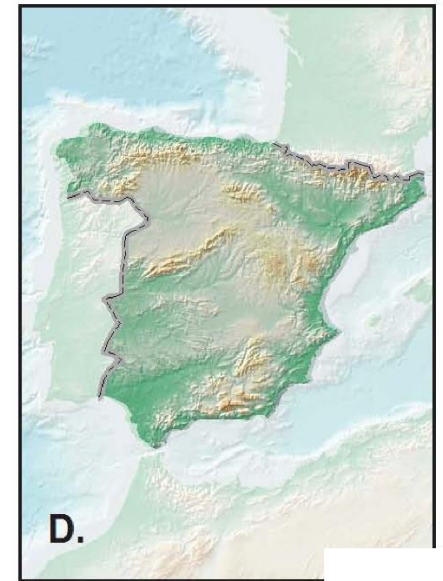
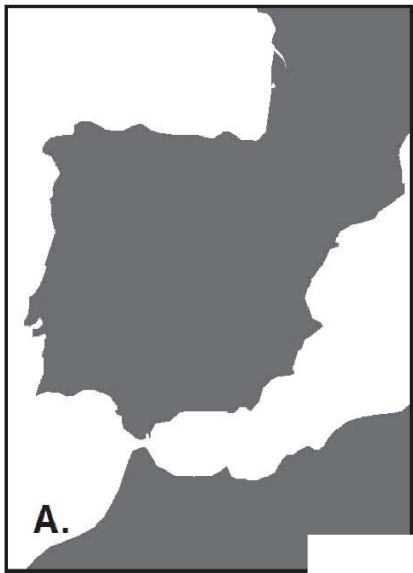


WASHINGTON STATE



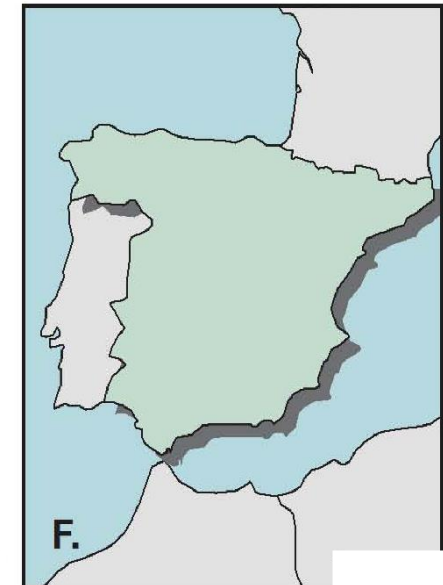
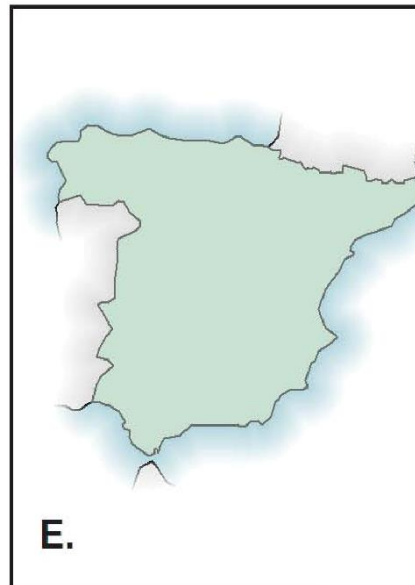
WASHINGTON SOILS





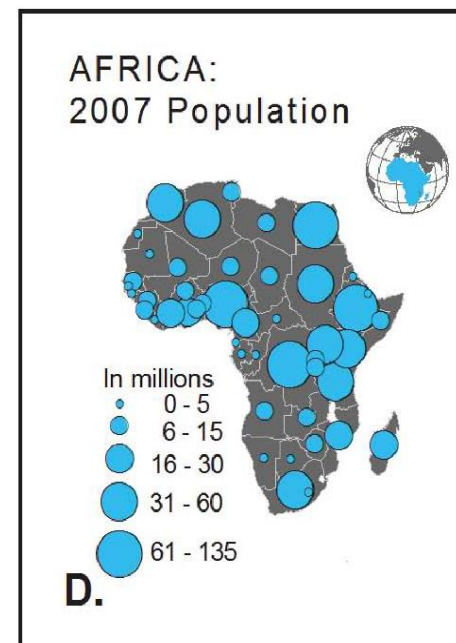
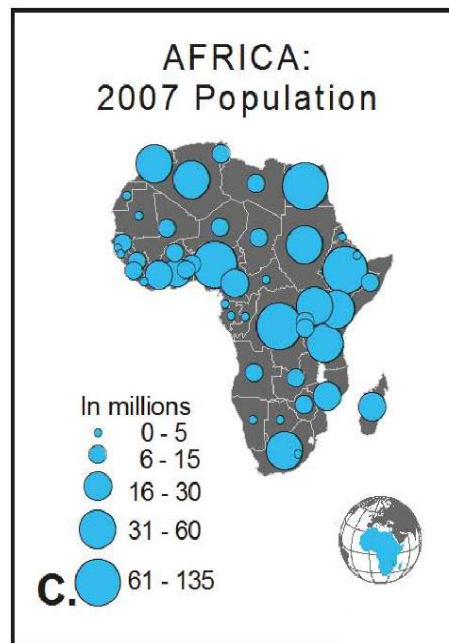
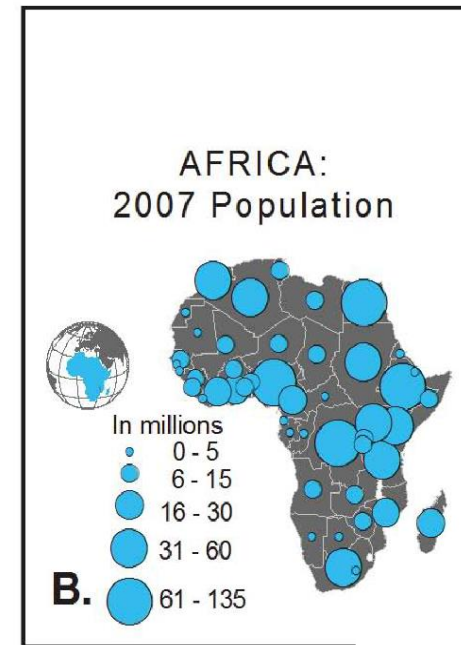
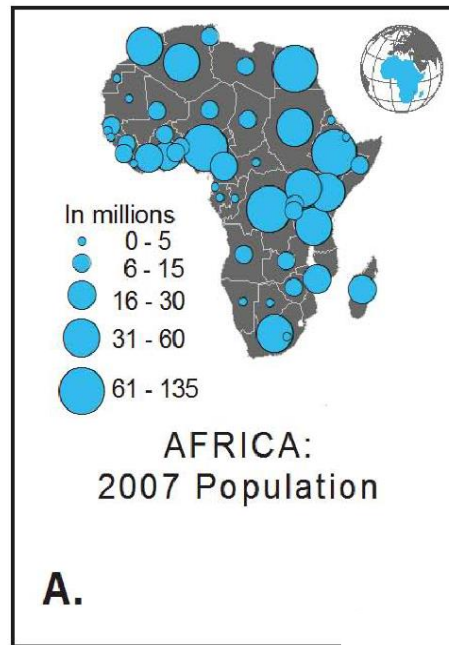
10) Figura a pozadí

Vyber alespoň tři možnosti



12) Vyvážení, rozmístění

**Vyber minimálně
jednu možnost**



13) Vyvážení, rozmístění

Vyber minimálně jednu možnost

A.

CUBA MARITIME LIMITS



Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod

B.



Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis

CUBA MARITIME LIMITS

C.

CUBA MARITIME LIMITS




Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim



D.

CUBA MARITIME LIMITS



Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis



KVÍZ – VÝSLEDKY

1)

Využití tvaru zobrazovaného území při kompozici prvků na listu

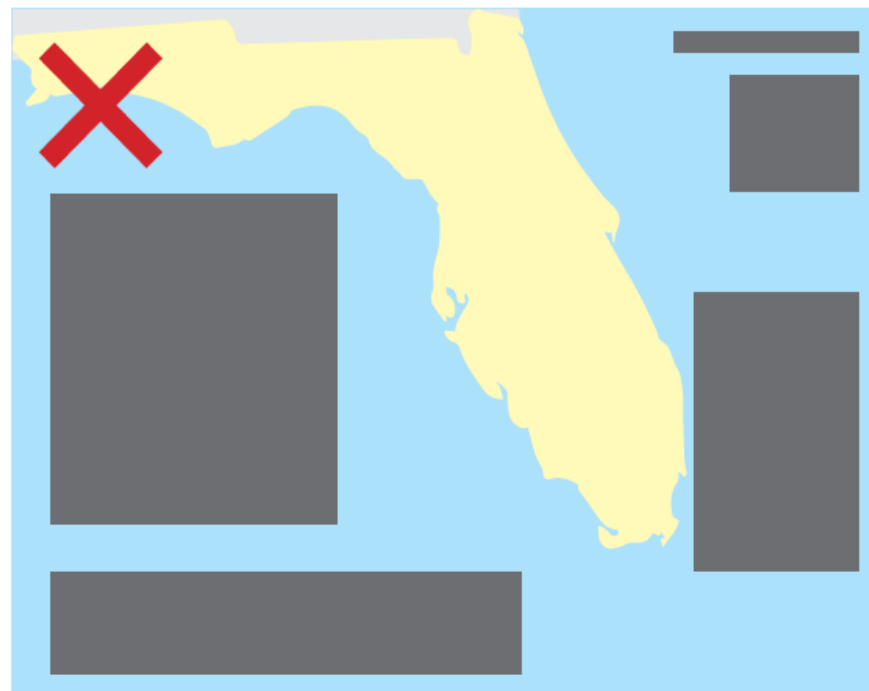
K maximálnímu využití prostoru mapového listu je třeba využívat konkrétního tvaru jednotlivých prvků mapy a umísťovat je tak, aby volné (a jinak nevyužitelné) místo bylo minimalizováno.

Zároveň bychom ale související prvky (např. mapu a její legendu a měřítko) umísťovat blízko sebe tak, aby byla zřejmá souvislost.

A



B

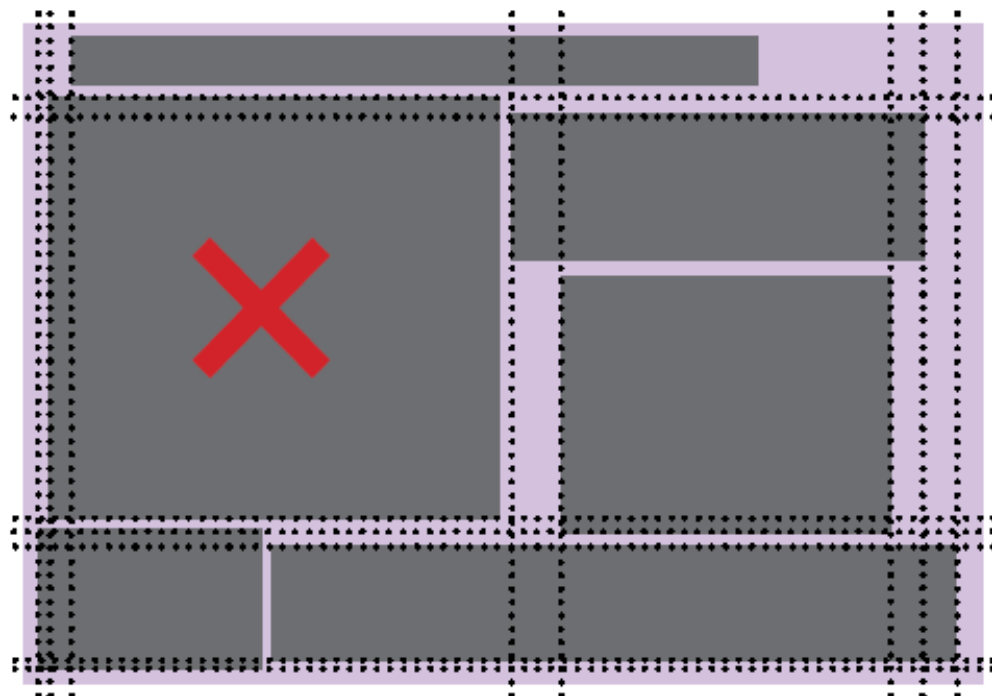


2)

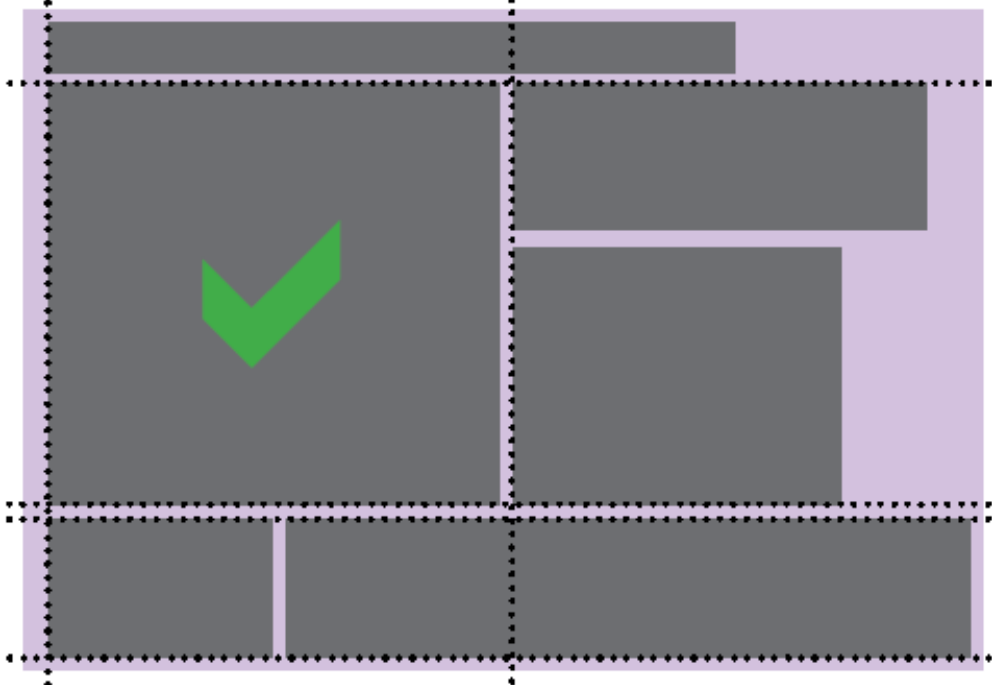
Zarovnání prvků ke
kompozičním osám

Zarovnání jednotlivých prvků k
pomyslným kompozičním osám
(kompozičnímu *gridu* stránky) je
důležitým prvkem, který má vliv
na vnímání uspořádanosti stránky

A



B

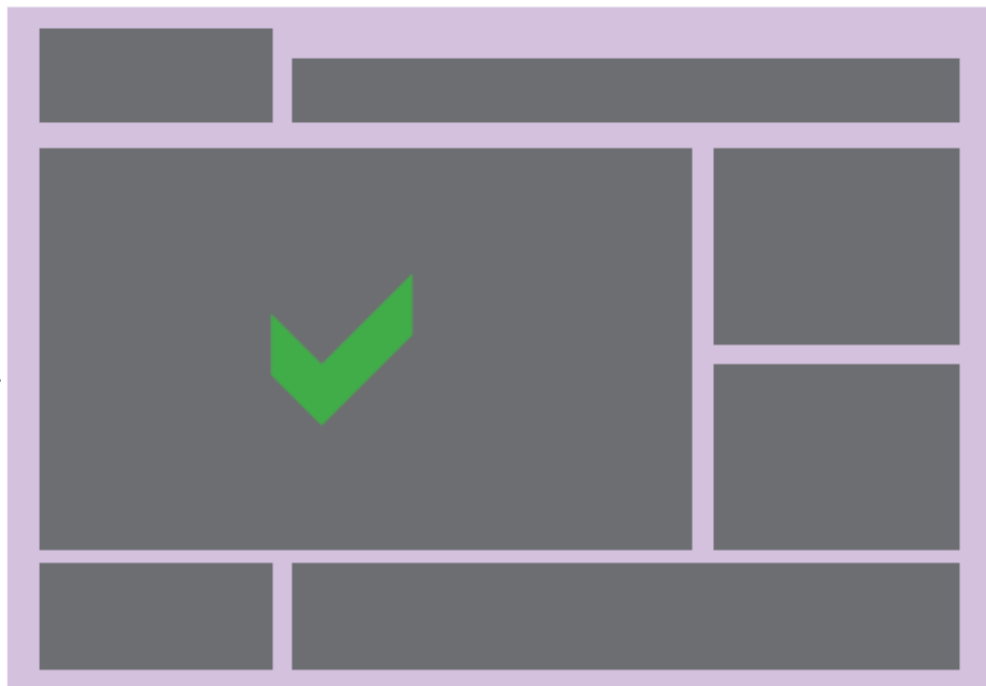


3)

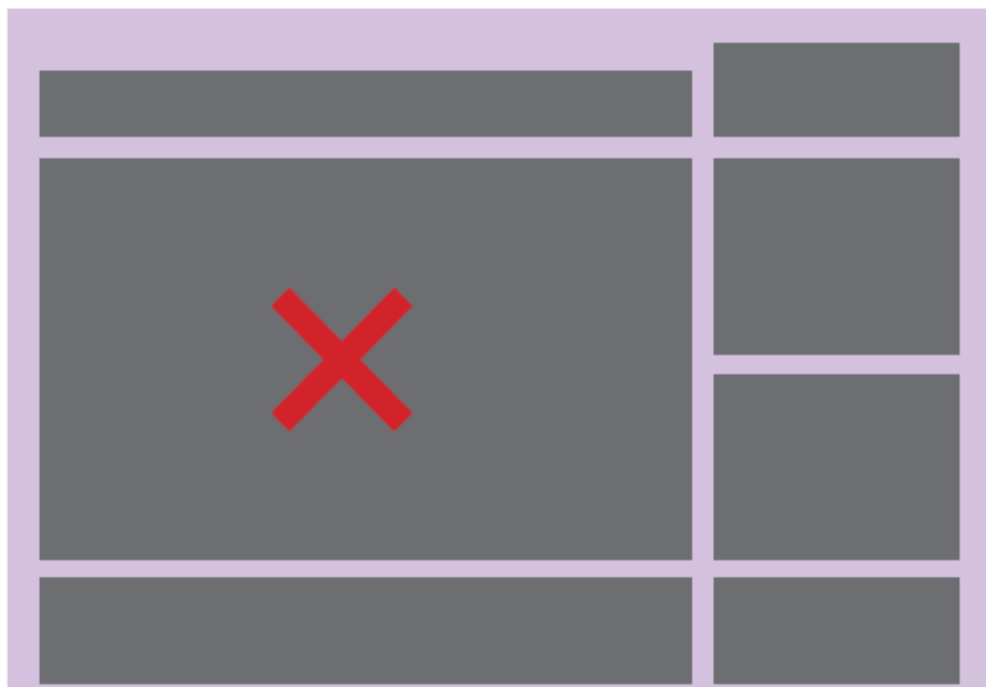
Propojení nebo rozbití jednotlivých prvků mapy na listu

Vzájemnému propojování jednotlivých prvků napomáhá, pokud nejsou ohraničeny rámečky. Kompaktního dojmu dosáhneme rozmístěním prvků na listu tak, aby nevznikaly sloupce/řady oddělené po celé výšce/délce listu.

A



B



4) Vizuální kontrast I.

Although black and white (A) provide the best visual contrast, this is not always the best color combination for maps.

When using colors of similar high (B) or low (C) saturation (brightness), the hues (blue and green, in this case) must be distinguishable. If they are not, varying the saturation or value (lightness or darkness) of a color (as with the water in D) can create the contrast that is missing.



A.
Good



B.
Poor



C.
Poor

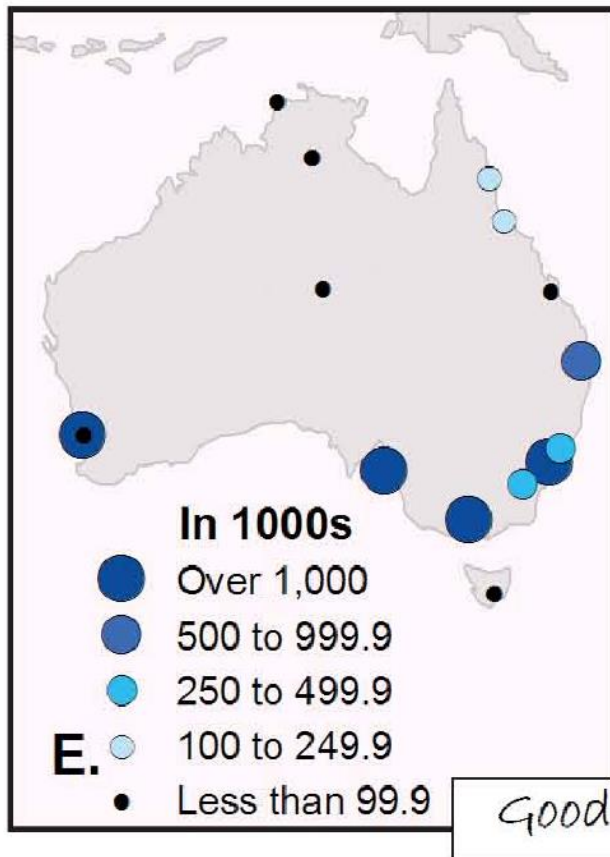


D.
Good

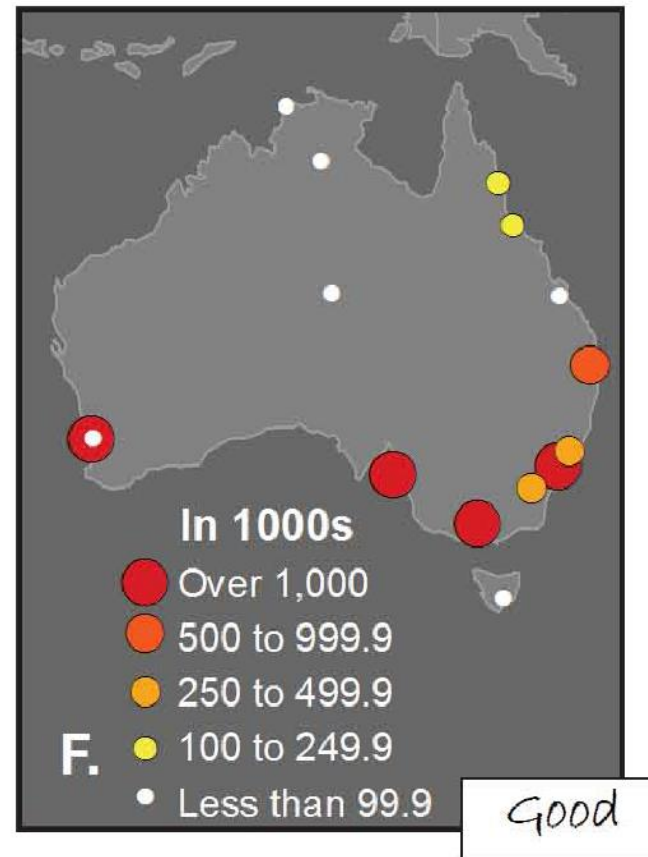
5) Vizuální kontrast II. – tematická mapa

Operational overlays should contrast with the basemap (E and F).

2000 Population in Cities



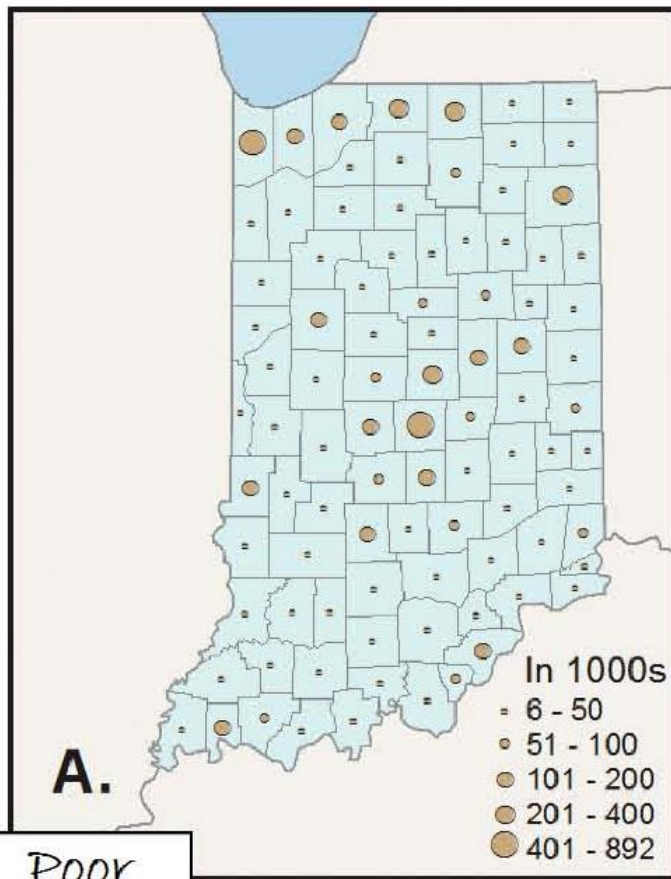
2000 Population in Cities



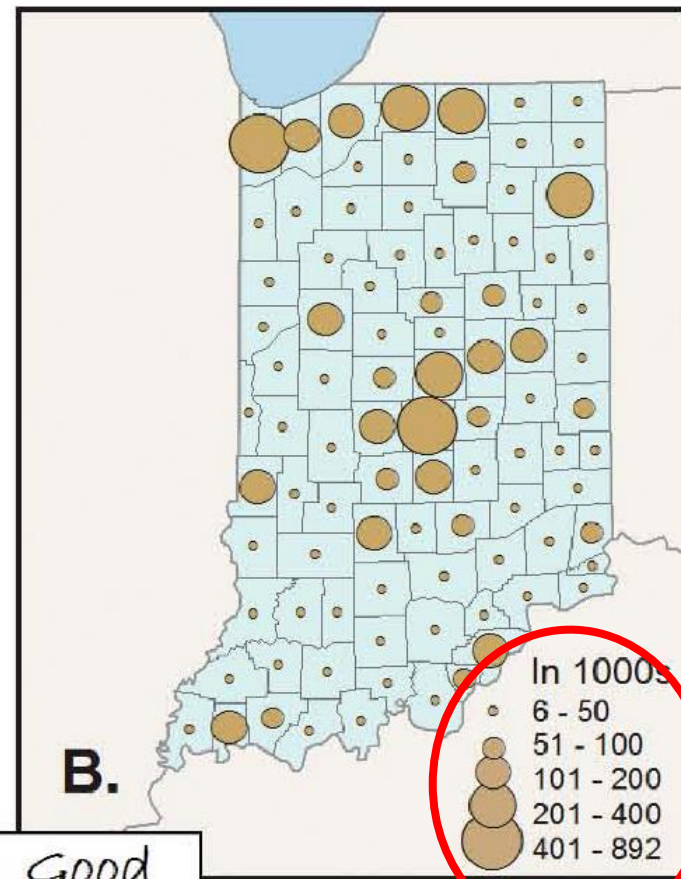
7) Čitelnost I.

Symbols (A) that are too small are illegible. Appropriately sized symbols (B) can be easily distinguished and read.

2010 Population



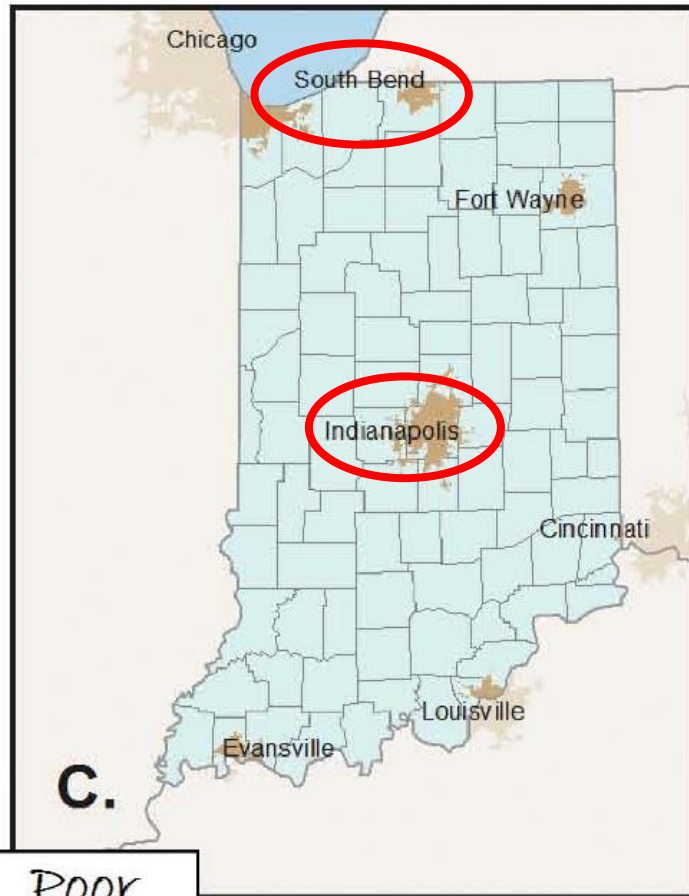
2010 Population



8) Čitelnost II.

Labels (C) that are too small are illegible.
Appropriately sized text (D) can be easily distinguished and read.

Major Metropolitan Areas



POOR

Major Metropolitan Areas

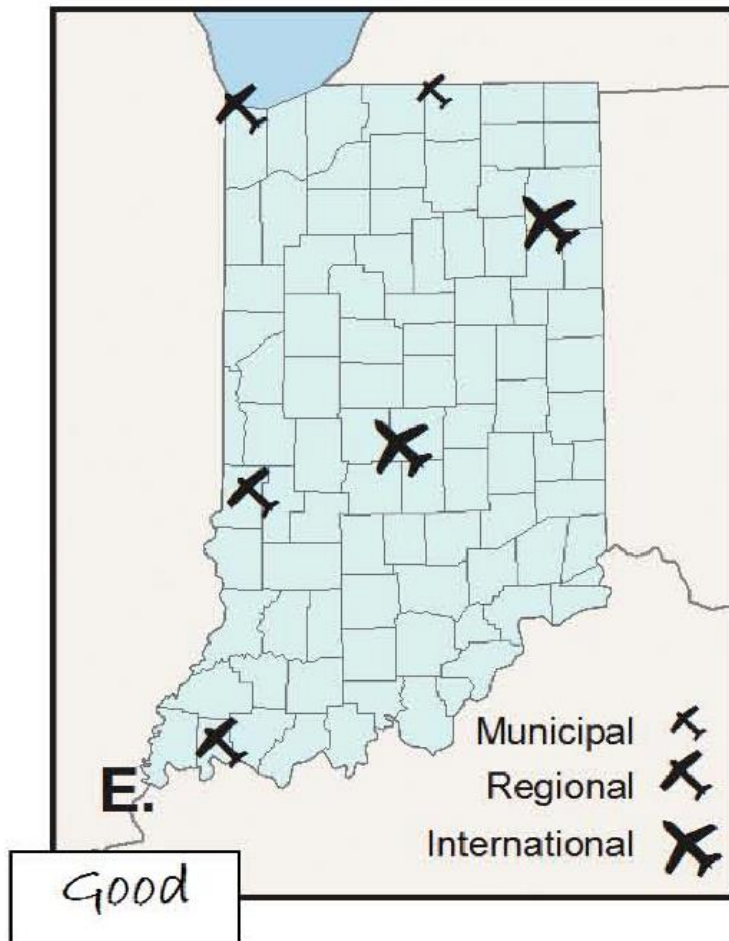


Good

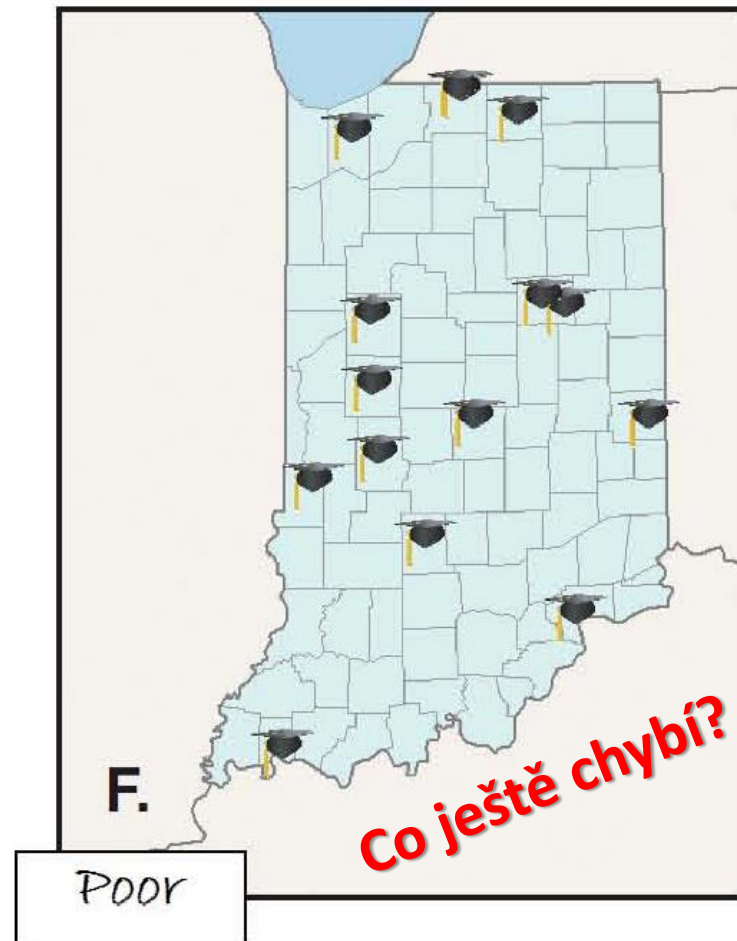
9) Čitelnost III.

Using familiar geometric icons, such as an airplane for airports (E), helps readers immediately understand the meaning of the symbol. More complex symbols, such as a mortarboard for universities (F), need to be larger to be legible.

Major Airports

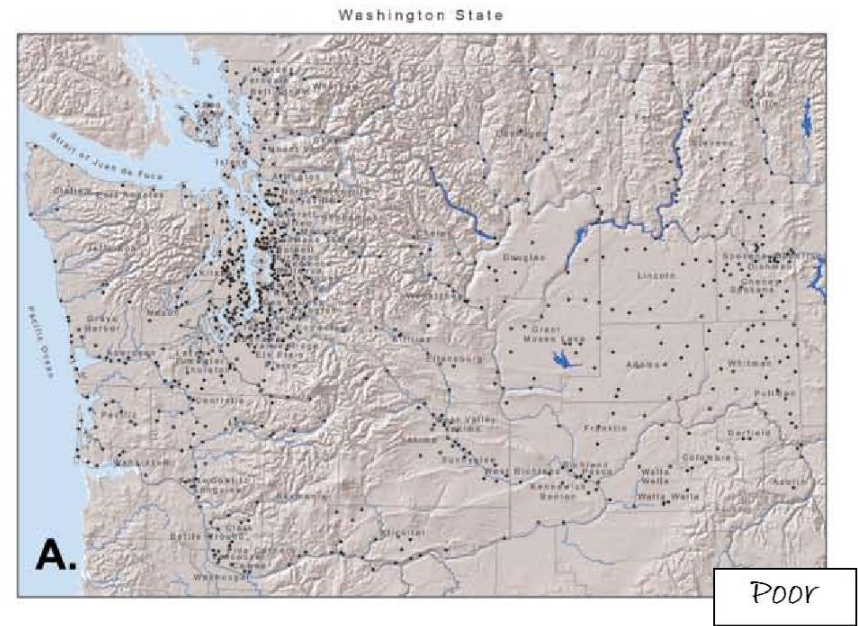


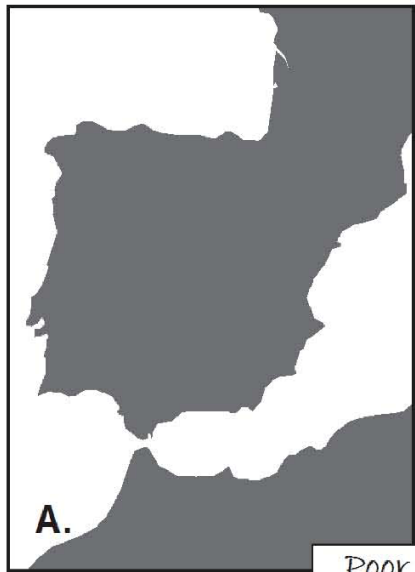
Fifteen Top Colleges



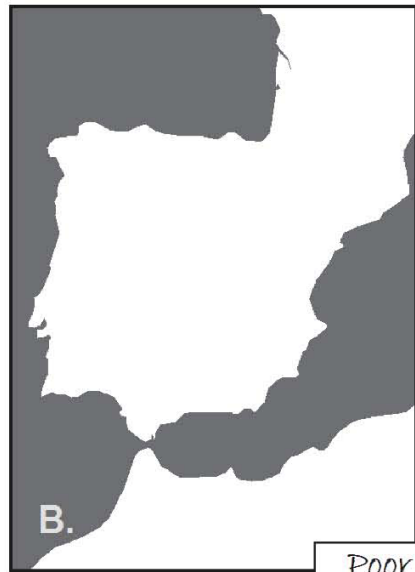
10) Hierarchie, „pořadí vrstev“

When the symbols and labels are on the same visual plane (A), it is difficult for the map reader to distinguish among them and determine which are more important. For a general reference map (B), using different sizes for the text and symbols (e.g., city points and labels), different line styles (e.g., administrative boundaries), and different line widths (e.g., rivers) are some of the ways you can add hierarchy to the map. When mapping thematic data (C), the base information (e.g., county boundaries and county seats) should be kept to a minimum so that the theme (e.g., soils) is at the highest visual level in the hierarchy.





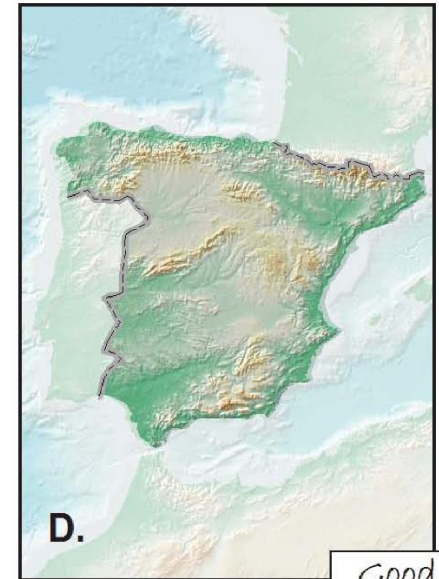
Poor



Poor



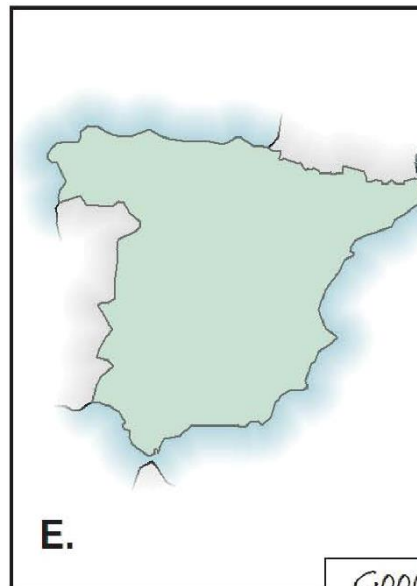
Good



Good

10) Figura a pozadí

It is sometimes hard to tell what is the figure and what is the ground (A and B). Simply adding detail to the map (C) can help map readers distinguish the figure from the ground. Using a whitewash (D), feathering (E), or a drop shadow (F) can also help.



Good



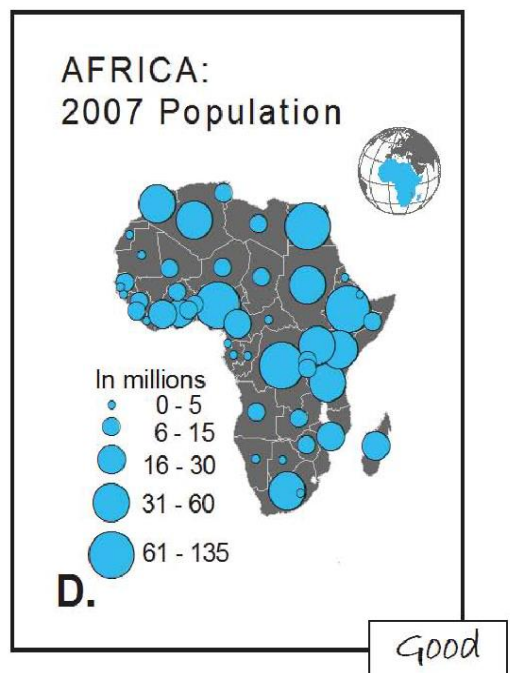
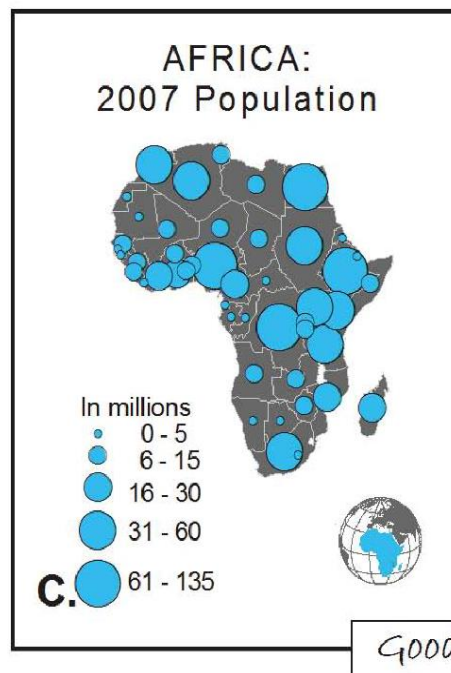
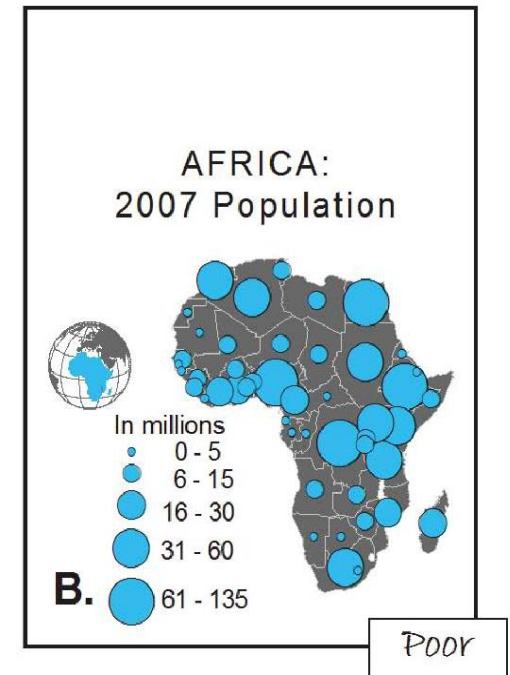
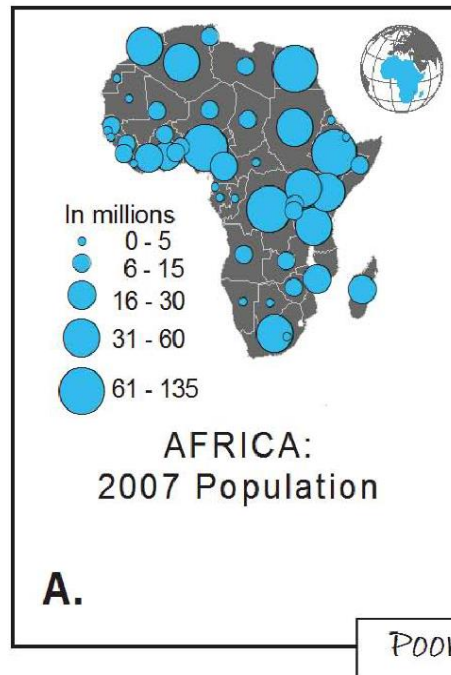
Good

12) Vyvážení, rozmístění

Positioning heavier elements together can make the page look top-heavy (A) or bottom heavy (B).

Centering the map slightly above center (C) ensures that it is in the most prominent position on the page. The position of elements can also cause the eye to move in a desired direction.

In D, the title is the first thing read, followed by the locator map, then the map of Africa, and finally the legend.



13) Vyvážení, rozmístění

A. Poor balance and white space; tips left, not unified

CUBA MARITIME LIMITS



Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod



B. Poor balance and white space; bottom heavy, big hole



Explanation
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CUBA MARITIME LIMITS



C. Better balance and white space; tips right, crowded

CUBA MARITIME LIMITS



Explanation
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D. Much better balance and white space

CUBA MARITIME LIMITS



Explanation
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis



ZDROJE

- <https://gistbok.ucgis.org/bok-topics/common-thematic-map-types>
- <https://www.natur.cuni.cz/geografie/geoinformatika-kartografie/ke-stazeni/projekty/moderni-geoinformacni-metody-ve-vyuce-gis-a-kartografie/kartogram/>
- <https://www.geograficke-rozhledy.cz/archiv/clanek/815/pdf>
- <https://tvorbamap.osu.cz/ke-stazeni/>
- <http://gis.fsv.cvut.cz/kartografie/1-8-0-kartograficke-chyby.php>
- https://www.dibavod.cz/data/gis_kartografie/kart_mystifikace.pdf
- <https://www.mdpi.com/2220-9964/9/7/415/htm>
- <https://is.muni.cz/el/ped/podzim2014/Ze0013/um/50648388/Stupnice.pdf>
- http://gisak.vsb.cz/gis_ostrava/GIS_Ova_2008/sbornik/Lists/Papers/050.pdf
- https://is.muni.cz/el/ped/podzim2014/Ze0013/um/50648388/Barvy_v_mapach.pdf
- <https://is.muni.cz/el/ped/podzim2014/Ze0013/um/50648388/Legenda.pdf>
- https://is.muni.cz/el/ped/podzim2014/Ze0013/um/50648388/Kompozice_mapy.pdf
- <https://files.taylorandfrancis.com/TJOM-suppmaterial-quick-guide.pdf>

Zapamatujme si

1. Chyby v mapách ovlivňují čtení a následnou interpretaci jevu. Rozdělují se podle vzniku na chyby z nutnosti, chyby z neznalosti a nedbalosti a na pravou mystifikaci.
2. Chyby z nutnosti vyplývají principiálně ze samotných kartografických metod (kartografické zobrazení, zkreslení, měřítko, generalizace, míra přesnosti atd.).
3. Chyby z neznalosti a nedbalosti jsou většinou ovlivněny vzděláním tvůrců map v kartografii, kvalitou kontroly a recenzním řízením (faktografické chyby, chybné volby metod zpracování dat, chybné volby barev, atd.).