Exercise 3

Topic: Conversion between systems of systems (CRS), simple operations on layers, performing calculations in the attribute table, data visualization.

Today's task concerns the development of a road density map in the Lublin province (where the basic unit will be municipalities). Please load three layers, the bottom of which are the 1992 Reference System (municipality_1992.shp; province_1992.shp) and the third in WGS84 (roads_wgs84.shp). Due to the large amount of data, we will first start by isolating the roads that interest us in terms of location.



P 🔏 /3 🖫 🚜 💺 🗹 🛈 😂 | 🔜 - 🗮 - 🎭 - 🛼 - 🔍 🕮 🐥 🗵 🗰 - 🄛 🌾 -🗟 🔁 💕 👘 🏶 e H p p ٩ ***** 0 V. 20 /0 M 80 60 60 Save as Layer Defin vate 51,077° 20,618° 🏶 Scale 1:513812 💌 🚔 Magnifier 100% E 🔎 Wys H E E E 5 5 7

Save the file to a new layer changing the coordinate reference system (CRS) (roads2_1992.shp).



As a result of changing the layout, the road network geometry is changed. Remember to change the CRS in the way the data is displayed (bottom left corner). Now all data is in the 1992 system.



Load data on the Lublin province (province_1992.shp). With its help, we will mark roads located within the province border.





Some of the roads extend beyond the province borders and need to be clip (Vector-Geoprocessing-Clip) to the province border. The selection effect is visible in yellow.





As in the case of roads, mark the communes located within the province borders.





Save selected polygons to a new layer (municipality 1992 clip.shp).

Use the tool to count the length of roads (Sum line length) in a given administrative unit. In the case of a geographical system (e.g. WGS84) it is not possible to calculate the length of the line, because the basic unit is a degree per unit of length (e.g. meter).



The result of this action is a new layer, with new data in the attribute table. The total length of roads is expressed in meters.



The effect of our activities is to be a map of road density relative to the area of a given commune (km/km²). To calculate it, we lack the area of the commune. You need to create a new column in the attribute table and calculate the area.



*Untitled Project — QGIS roject Edit View Layer	Settings Blugins Ve	ector Baster Databa	ase <u>W</u> eb Mesh	Progessing <u>H</u> elp											- ø ×
🗅 📁 🗐 🎦 🖸	S 💕 🛛 🖑 🍕	b 🗩 🏓 🎀	P 🗘 🕫	A 🖓 🖓 🖓) 🖥 🖺 🔇 🐔	3 🖳 - 🗏 -	🔩 - 🛶 - I 🔍	🛗 🏶 Σ		- 🏱	Q				
Ø. 🕖 📑 🖉 🖓	🔁 🎘 - 🕅 I		👆 🔿 🛛	ð V- 12	‡ px	37 8.X	×-7/10		8 8	88	7 %	F 🥔 🖓 👬 😵 🛠 🧐	⊘ +		
Layers	£ _Ω = 및 ≩ □ ensity	88					0 . 1 .	22	and	13-1-2-2-	and the second	5			
11 _	nads density	- Features Total: 213	Eiltered: 213 Select	web 0			Q roads density —	Field Calculator				×			
a' A			Only update 0 sele	ected features											
1 h	abcjpt_kod_je *	- E abc		a (_ · · .		Update Selected	Create a new fie	eld		V Up	date existi	ing field			
5	jpt_kod_je	jpt_nazwa_	LENGTH	COUNT	area		Output field name	ld			_				
	1 0613072	Sosnowica	293473,8487347	409,00000000000	ALEL		Output field type	123 Integer (32 bit)		· 1.2 a	rea	•			
a *	2 0613052	Podedwórze	152179,0578883	131,0000000000	NULL		Output field length	10 C Precis	sion 3	•					
	3 0613062	Siemień	236622,7669316	298,0000000000	NULL		Expression Fun	ction Editor							
	4 0614032	Janowiec	307067,6980784	484,00000000000	NULL	5	10870	1 1		Q, Show	w Help	function Sarea			
	5 0614011	Puławy	669988,1299219	4237,0000000000	NLEL	-	Sarea			geometr	Y A	Returns the area of the current feature. The			
	6 0614022	Baranów	324377,8132819	607,00000000000	NULL		2			row_num	iber s	area calculated by this function respects both the current project's ellipsoid setting			
	7 0614052	Końskowola	354099,7371624	879,00000000000	ALEL	1				Arrays Color		ellipsoid has been set for the project then the calculated area will be ellipsoidal, and if			
	8 0614043	Kazimierz Dolny	316854,7959462	862,00000000000	NLEL					Conditional Conversion	ls ng	no ellipsoid is set then the calculated area will be planimetric.			
	9 0614072	Markuszów	131782,6836991	397,00000000000	NLEL		4			Fields and Val	Val	Syntax			
	10 0614062	Kurów	333603,6900672	1003,0000000000	ALEL					Fuzzy Mati	ching	Sarea			
	11 0614112	Żyrzyn	384820,6970708	570,0000000000	NULL					 Geometry affine 	tr	Examples			
	12 0614092	Puławy	919121,1749907	1608,0000000000	NULL					angle	at	• Sarea - 42			
	13 0614083	Nałączów	234831,5156267	715,0000000000	NULL					area					
	14 0614102	Wąwolnica	202429,6374298	494,00000000000	NLEL) "\"	bearin	g				
	15 0615032	Czemierniki	231042,4100146	252,00000000000	NLEL		Feature 0601011			bound	s_h				
	16 0615011	Radzyń Podlaski	130064,8298098	699,00000000000	ALL	v	PTEVEW: 200 cover,	83843000		house	e (5) (
	Show All Features					8 🛅						OK Anulut Pomoc			
								-	22	2 w					
-2. Type to locate (Ctrl+K)									Coordina	te 638167 2	187820 🛞	5 Scale 1:988753 💌 🔒 Magnifier 100%	© Rotation 0,0 °	≎ V Render	ESRI: 102173
P Wyszukiwanie	e	X: 🖬 🕯	i 🖬 🌖 I										-1°C F	ochmurnie 🔨	💭 (1) POL 1

You need to create a new column in the attribute table and calculate the area. And then automatically calculate the area.

The calculations were made in square meters, due to the basic unit of the 1992 system. Remember to convert this unit to km^2 in the next steps.





Create a new column for final calculations (density) ("LENGTH" /1000)/("area" /(1000*1000))

📿 "Unti	tled Project — QGIS																			- 0	×
Project	Edit View Layer S	Settings Elugins Ver	ctgr Baster Datab	ase Web Mesh	Processing Help		~		0 5	r sie 15			(ð 11								
		1 📾 a 🗸 👒	• <u>• •</u> • •	90 90 90 									S								
<i>" M</i> .,	/ 📑 / 📲	🚡 🎉 * 🕅 🦷		5 🔿 🗠	<u>ک</u> او ا	‡ px	- Y 🗣 .	\times × · γ	M 🛃	- 78 7	3 🗞 🤊	8 % %	32	~ ~	V6 # 8	ह 👷 🤨 :	£ (? •				
V.	Layers		2 2									(T)									
	V roads density											2	mars								
												535	5	2mg							
20					2																
Pa								\sim	M	5	23	250	Ja	23							
V2								Co st	17/	54 5	~2 25	for	m	2.8							
Q		Q roads density -	- Features Total: 213	Filtered: 213, Select	ted: 0	chr		Zh	they want												
3		/ 🕖 📑 😂	10 × 10	🗄 i 🗧 🗾 🔝	13 3	5m	5 2	Y													
		abcjpt_kod_je 💌	= E abc			Update All Update S	elected 7	Y	3.L	-Frank	K	-									
(VA		jpt_kod_je	jpt_nazwa_	LENGTH	COUNT	area	density		- 5	5	5 2.	ہ کسر	J m								
v.		1 0613072	Sosnowica	293473,8487347	409,00000000000	171594838,116	1,710		- 5		2	h	The s	The							
-		2 0613052	Podedwórze	152179,0578883	. 131,00000000000	107130296,973	1,421		20	3-5-	SUE	3 6 5	LY	2 3	L						
		3 0613062	Siemień	236622,7669316	. 298,0000000000	111205454,243	2,128		-Ey	Star 1	B	Lotz.	. 8	Les !							
		4 0614032	Janowiec	307067,6980784	. 484,00000000000	78818921,745	3,896			Jaco	23	~2~2~	YT	~ Sh (
		5 0614011	Puławy	669988, 1299219	4237,0000000000	50492771,242	13,269		25	- fild	2 th	And	2 3	S	R						
		6 0614022	Baranów	324377,8132819	. 607,0000000000 42	37,000000000000000000	3,820		-	3.5	5m	frag	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Star	5						
		7 0614052	Końskowola	354099,7371624	879,00000000000	89881361,174	3,940		S	XF	-1	LE	503	· July	Sh						
		8 0614043	Kazimierz Dolny	316854,7959462	. 862,00000000000	72410689,040	4,376		2	/ Fu	25	05	and the	- rezz	Smy						
		9 0614072	Markuszów	131782,6836991	. 397,00000000000	40395604,050	3,262			LI :	En 2	241	a la	Smit							
		10 0614062	Kurów	333603,6900672	. 1003,0000000000	101090155,821	3,300		\$3	the	5 7	fre	-2-	Jone							
		11 0614112	Zyrzyn	384820,6970708	. 570,00000000000	129240536,731	2,978		2	The	277	2r	ZZ.	-En !	2-2	2					
		12 0614092	Pulawy	919121,1749907	. 1608,0000000000	161178772,846	5,702		3mi	en s	In	1 yr	2 th	۰ <u>۲</u> ~	5 2	1					
		13 0614083	Nałęczów	234831,5156267	715,00000000000	62937072,172	3,731		1	Y.	Front	> m	1.03	2 mg	ST.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
		14 0614102	Wąwolnica	202429,6374298	. 494,00000000000	62399149,774	3,244			5	23	NE~	End	Los	in	5]					
		15 0615032	Czemierniki	231042,4100146	. 252,00000000000	107491863,464	2,149			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	131	L ZC	The	2 3	IS	1					
		16 0615011	Radzyń Podlaski	130064,8298098	. 699,00000000000	19311723,395	6,735			3		Ing	Sal	DE E	2 Jane	5					
		- and an earlier	•							200	2 12	3	~	File	forth						
										1	-Pr	3 m	7	T_	1						
														1~							
Q, Typ	e to locate (Ctrl+K)										Coord	inate 630580	288344 🛞	Scale 1:988	8753 💌 🔒	Magnifier 100%	Rotati	on 0,0 °	🗘 🖌 Render	@ESRI: 10217	s 📿
н,	O Wyszukiwanie		Xi 🖩 🖥	i 🖬 🧕	a 🔍													🚬 WIG	20 -0.52%	🔨 🔛 🥼 POL	13:58

It presents several results using different methods of determining interval classes.



Equal Count



Equal Interval



Logarithmic Scale



Natural Breaks

Homework: Develop three maps for road density (km/km2) up to 50 km/h, from 50.1 km/h to 90 km/h, and above 90.1 km/h. The prompt is the appropriate query.

