Exercise 2A – Validating Topology:

- Install plugin Topology Checker. [Note: If is already installed, but you cannot find the button go to Plugins | Manage and Install Plugins and see if the box in front of the Topology Checker is checked.]
- 2. From folder Exercise 2 load shapefile murdock_sample.shp
- 3. Change to transparent fill



- 4. Click on Topology Checker 🎉
- 5. Click on Configure to set topology rules

		d				
		\chi Topology Ru	ile Setting	S		
u	rrent Rules					
١	lo layer	۵ 🤇		ᅌ 🛛 No layer		
				_		
			÷	Add Rule	📼 Delete	e Rule
	Rule	Layer #1	Layer #2	Tolerance		
1	must not have duplicates	murdock_ea_2010_3	No layer	No tolerance		
		I	1			
	Help			C	ancel	OK

7. Click OK and then click "validate All"

8. No errors.

- 9. Click on Configure
 10. Select rule 1 and "Delete Rule"
- 11. Add new rule "must not have gaps" 12. Click OK and then click "validate all"
- 13. Errors



14. Some Gaps are fine



... others are not



v.clean.advanced - Toolset for cleaning topology of vector ...

16. Set v.in.ogr tolerance to 0.1

	🕺 v.clean - Toolset for cleaning topology of vect	or map.
	Parameters Log Help	Run as batch process
Layer to clean		
Murdock_sample [EPS	G:54010]	
Cleaning tool		
break		
Threshold		
0.100000		
GRASS GIS 7 region exte	ent (xmin, xmax, ymin, ymax)	
[Leave blank to use min	covering extent]	
 Advanced parameter 	ers	
v.in.ogr snap tolerance (-	1 = no snap)	
0.1		
v.in.ogr min area		
0.000100		÷ …
		Close Hun

- 17. Creates new layer cleaned
- 18. Save as Murdock_nogaps.shp

19. **Try for yourself:** Check if there are still gaps in Murdock_nogaps.shp

20. Try for yourself:

Check for

- invalid geometries
- multipart geometries
- -overlaps.

Exercise 2B – Query Builder:

- 1. From the folder Exercise 1 load shapefile StGallen_roads.shp and StGallen_buildings.shp.
- 2. Double Click on StGallen_buildings.shp
- 3. Open Tab "General"
- 4. Click "Query Builder"

1	•		🕺 Layer Properties - StGallen_roads General	1
	\mathbf{X}	General	➡ Coordinate reference system	
1	~	Style	Selected CRS (EPSG:4326, WGS 84)	l
es	abc	Labels	Create spatial index Update extents	I
3		Fields		I
I	«	Rendering	▼	11/10
е	Ģ	Display	Minimum (exclusive) Maximum (inclusive)	11 (190
er	٩	Actions		Solution The
I	•	Joins	Provider feature filter	NON T
	1	Diagrams		1. 2. 5 1
-	i	Metadata		A 2846
al	3	Variables		I W A
al	÷	Legend		181 M
I				
I				1
			Query Builder	
			Help Style Apply Cancel OK	

- 5. In "Fields" click on type and in "Values" click on "All"
- 6. Set a filter that only displays residential buildings
- "type" = 'residential'

			🛢 🔘 🗧 Query	/ Builder	-
- 😡			Set provider filter on StGallen, buildings		2
~	·	<u> </u>	Fields	Values	
6	37 🚡 /🔏 [_
			osm_id	monastery	
			code	no	1.000
5			fclass	public	-
\mathbf{X}	General	- (name	residential	
• •		<u> </u>	type	roof	
2	Style	0	ID_0	school	
			ISO	shed	
_	Labala		NAME_0	 shelter 	
abc	Labeis		ID_1	stadium	
		-	NAME_1	station	
	Fields		ID_2	terrace	
			NAME_2	transportation	1
\sim	Rendering	-	ID_3		R
~		Č.	NAME_3	Sample All	N PK
	Display	Mi	CCN_3	Use unfiltered laver	
-	Display		LCCA 3	Ose unintered layer	2
O	Actions		Operators	•	
•	Joins	v I	= < > LIKE % IN	NOT IN	
1	Diagrams		<= >= != ILIKE AND OR	NOT	A
G	Metadata		Provider specific filter expression		
	Variables		"type" = 'residential'		
•	Legend				3 -
					T
					170
			Help Test Clear	Cancel OK	

- 7. Click test
- 8. Click Ok and Ok
- 9. Duplicate StGallen_buildings.shp
- 10. Save duplicate as "StGallen_residential.shp
- 11. Remove StGallen_buildings.shp
- 12. Repeat steps 2-11 for StGallen_roads.shp.

In steps 5 and 6 use fclass and set a filter that displays "motorway" and "primary".

13. Export the image StGallen_Homes_near_Motorway.png

Spatial Query

	🕺 Spatial Query	
Select source fe	atures from	
StGallen_P	ost	
Selected geo	metries	
Where the feature		
Within		
Reference feature	res of	
C StGallen_re	sidential	
Selected geo	metries	
And use the result	to	
Create new selec	tion	\$
Apply		Close

Exercise 2C – Erase Gas Flares:

- 1. From the folder Exercise 1 load shapefile countries.shp.
- 2. Create a Query that filters only African countries (continent = Africa)



- 3. Save as Africa_country_bnd
- 4. From the folder Exercise 2 load shapefile Flares_Lybia1.shp.



- 5. Change the CRS of both Layers to World Eckert VI
- 6. Clean Flares_Lybia1.shp
 - Processing | Toolbox
 - Search for v.clean



- Select Gas flares layer and increase threshold to 3.1 (smaller values might work as well)

9 🛡	V.clean - Toolset for cleaning topology of vect	or map.
	Parameters Log Help	Run as batch process
Layer to clean		
Flares_Libya_1 [EPS0	B:54010]	ᅌ 🧔
Cleaning tool		
break		•
Threshold		
3.100000		
GRASS GIS 7 region ex	tent (xmin, xmax, ymin, ymax)	
[Leave blank to use mir	covering extent]	
Advanced paramet	ers	
Cleaned		
[Save to temporary file]		
Open output file after Errors	running algorithm	
		CIUSE

- 7. Vector | Geoprocessing Tools | Difference
 - Input Layer "Africa_country_bnd"
 - Difference Layer "cleaned"

0	💋 Difference	
Parameters Log	Run as batch process	Difference
Input layer		This algorithm extracts features from the Input layer that fall outside, or partially overlap, features in the Difference layer
Africa_country_bnd [EPSG:54010]	○ <i>②</i>	Input layer features that partially overlap
Difference layer		along the boundary of the difference layer feature(s) and only the portions outside
Cleaned [EPSG:54010]	• 🦻	the difference layer features are retained.
Ignore invalid input features [optional]		Attributes are not modified
Difference		
[Create temporary layer]		
Open output file after running algorithm		
		Close Run

- Save new layer "Difference" as Lybia_Clipped
 Export Image Lybia_Clipped.png

Exercise 2D – Union: Murdock Ethnic Homelands and African Country Boundaries

- 1. From Exercise 1 folder load shapefile Africa_country_bnd.shp
- 2. From Exercise 1 folder load shapefile murdock_ea_2010_3.shp
- 3. Check if CRS of both shapefiles is consistent.
- 4. Generate transparent fill for both shapefiles.
- 5. Change to different boundary colours.



- 6. Vector | Geoprocessing Tools | Union
- 7. Input 1 Africa, Input 2 Murdock.
- 8. Check Results
- 9. Slivers?

Exercise 2E – Spatial Join: Conflict, Mines, and ADM2

- 1. From Exercise 2 folder load shapefile admin_Merge_Corrected_Africa.shp
- 2. Transparent Fill
- 3. Check CRS (World Eckert VI)



4. Add XY Data Layers | Add Layer | Add Delimited Text Layer

•					Cr	eate a Lay	er from a Deli	mited Text File		
File Name /Users/praschky/Desktop/GIS for Economists/Exercises/Exercise 2/Data/Berman_Mines.csv Browse										
Layer name Berman_Mines Encoding UTF-8 🗘										
File	format	00	CSV (co	omma s	eparate	d values)	O Custom de	elimiters	Regular expres	sion delimiter
Rec	ord optior	ns Num	ber of	header	lines to	discard 0	🗘 🔽 Fir	st record has field	d names	
Field	d options	T	rim fiel	ds 🗌 D	iscard e	mpty fields	Decimal s	eparator is comm	a	
Geo	Geometry definition O Point coordinates Well known text (WKT) No geometry (attribute only table)									
		X fie	ld lor	ngitude		ᅌ Y fi	eld latitude		DMS coordinates	
Laye	er settings	s 🔽 L	Jse spa	atial inde	ex		Use subse	t index	Watch file	
	latitude	longitude	year	iso_1	mines	mines_a	main_lprice	main_lprice_a		
1	-32.25	24.75	1997	ZAF	1	1	4.3174882	0		
2	-32.25	24.75	1998	ZAF	1	1	4.3174882	0		
3	-32.25	24.75	1999	ZAF	1	1	4.3438053	0		
4	-32.25	24.75	2000	ZAF	1	1	4.4067192	0		
5	-32.25	24.75	2001	ZAF	1	1	4.4067192	0		
H	elp								Cance	I OK

- 5. From Folder Exercise 2 import
 - Berman_Mines.csv -Berman_Acled.csv

IMPORTANT, pick World Eckert VI CRS.



- 6. Save Berman_Mines and Acled as layers. (CRS!!!)
- 7. Vector |Data Management Tools | Join Attributes by Location



- 8. Save new Layer
- 9. Save as .. | Change File type to .csv | OK to save the attribute table.

Classroom Discussion 1:

If you would like to replicate Table 2 of Berman et al (2017) at the ADM2 level, how would you proceed?

Classroom Discussion 2:

If you would like to replicate Table 2 of Berman et al (2017) at the grid cell level, what would you do?

