Working with Attributes

QGIS Tutorials and Tips

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Working with Attributes

GIS data has two parts – features and attributes. Attributes are structured data about each feature. This tutorial shows how to view the attributes and do basic queries on them QGIS.

Overview of the task

The dataset for this tutorial contains information about populated places of the world. The task is to query and find all the capital cities in the world that have a population greater than 10,00,000.

Get the data

We will use the Populated Places dataset from Natural Earth. Download the Natural Earth Populated Places shapefile..

Procedure

1. Once you have downloaded the data, open QGIS. Go to Layer • Add Vector Layer.

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2. Click on Browse and navigate to the folder where you downloaded the data.

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3. Locate the downloaded zip file *ne_10m_populated_places_simple.zip*. You do not need to unzip the file. QGIS has the ability to read zip files directly. Select the file and click Open.

V Open an OGR Supported Vector Layer						
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 Libraries Documents Music Pictures Videos 						
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4. You will get a dialog asking you to select the layer to open. Select *ne_10m_populated_places_simple.shp* and click OK.

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0	ne 10m populated places simple.shp	Vector		
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5. The selected layer will now be loaded in QGIS and you will see many points representing the populated places of the world.



6. To see the attributes of right-click the layer and select Open Attribute Table.



7. Explore the various attributes and their values.

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	scalerank ∇	natscale	labelrank	featurecla	name	namepar	namealt				
0	10	1	8	Admin-1 capital	Colonia del Sac	NULL	NULL				
1	10	1	8	Admin-1 capital	Trinidad	NULL	NULL				
2	10	1	8	Admin-1 capital	Fray Bentos	NULL	NULL				
3	10	1	8	Admin-1 capital	Canelones	NULL	NULL				
4	10	1	8	Admin-1 capital	Florida	NULL	NULL				
5	10	1	8	Admin-1 capital	Bassar	NULL	NULL				
6	10	1	8	Admin-1 capital	Sotouboua	NULL	NULL				
7	10	1	7	Admin-1 capital	Medenine	NULL	NULL				
8	10	1	7	Admin-1 capital	Kebili	NULL	NULL				
9	10	1	7	Admin-1 capital	Tataouine	NULL	NULL				
10	10	1	7	Admin-1 capital	L'Ariana	NULL	NULL				
11	10	1	7	Admin-1 capital	Jendouba	NULL	NULL				
12	10	1	7	Admin-1 capital	Kasserine	NULL	NULL				
13	10	1	7	Admin-1 capital	Sdid Bouzid	NULL	NULL				
14	10	1	7	Admin-1 capital	Siliana	NULL	NULL				
15	10	1	7	Admin-1 capital	Mahdia	NULL	NULL				
16	10	1	7	Admin-1 capital	Monastir	NULL	NULL				
17	10	1	7	Admin-1 capital	Zaghouan	NULL	NULL				
18	10	1	5	Admin-1 capital	Tay Ninh	NULL	NULL				
19	10	1	5	Admin-1 capital	Luan Chau	NULL	NULL				
20	10	1	5	Admin-1 capital	Bac Kan	NULL	NULL				
21	10		5	Admin-1 capital	Lang Son	NULL	NULL	Ŀ			
							(1)				
Sh	now All Features										

8. We are interested in the population of each feature, so **pop_max** is the field we are looking for. You can click twice on the field header to sort the column in descending order.

🕺 At	🕺 Attribute table - ne_10m_populated_places_simple :: Features total: 7322, filtered: 7322, selecte 🗕 🗖 🗙									
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	longitude	changed	namediff	diffnote	pop_max $ abla_{\!$	pop_min	pop_other 📤			
7312	139.75140742900	0.00000000000	0	NULL	3567600	8336599	12945252			
7297	-73.98001692880	0.00000000000	0	NULL	19040000	8008278	9292603			
7303	-99.13098820170	0.00000000000	0	NULL	19028000	10811002	10018444			
7313	72.85698929740	0.00000000000	0	NULL	18978000	12691836	12426085			
7318	-46.62501998040	0.00000000000	0	NULL	18845000	10021295	11522944			
7221	77.23000402720	4.00000000000	0	Changed featur	15926000	7633213	6747384			
7311	121.43650467800	0.00000000000	0	NULL	14987000	14608512	16803572			
7316	88.32467565810	4.00000000000	1	Name changed	14787000	4631392	7783716			
7248	90.40857946670	5.0000000000	0	Changed scale	12797394	7000940	14995538			
7290	-58.39753137370	0.00000000000	0	NULL	12795000	10929146	10271457			
7295	-118.17998051100	0.00000000000	0	NULL	12500000	3694820	142265			
7168	66.99000891000	5.0000000000	0	Changed scale	12130000	11624219	11570278			
7310	31.24996821970	0.00000000000	0	NULL	11893000	7734614	13720557			
7317	-43.22502079420	0.00000000000	0	NULL	11748000	2010175	1821489			
7280	135.46014481500	4.0000000000	0	Changed featur	11294000	2592413	9630783			
7306	116.38828568400	0.00000000000	0	NULL	11106000	7480601	9033231			
7274	120.98221716200	0.00000000000	0	NULL	11100000	3077575	2381280			
7302	37.61552282590	0.00000000000	0	NULL	10452000	10452000	10585385			
7299	29.01000158560	0.00000000000	0	NULL	10061000	9945610	9651488			
7314	2.33333532574	0.00000000000	0	NULL	9904000	11177	7142744			
7273	126.99973099700	0.00000000000	0	NULL	9796000	9796000	12018058 🔺			
7304	3.39153107121	4.00000000000	0	Location adiust	9466000	1536	6567892			
Sł	now All Features									

9. Now we are ready to perform our query on these attributes. Select features using an expression.

🔏 At	🕺 Attribute tablene_10m_populated_places_simple :: Features total: 7322, filtered: 7322, selecte 🗕 🗖 🗙										
	longitude	Select features us	ing an expression	diffnote	pop_max 🗸	pop_min	pop_other 📤				
7312	139.75140742900	0.00000000000	0	NULL	35676000	8336599	12945252				
7297	-73.98001692880	0.00000000000	0	NULL	19040000	8008278	9292603				
7303	-99.13098820170	0.00000000000	0	NULL	19028000	10811002	10018444				
7313	72.85698929740	0.00000000000	0	NULL	18978000	12691836	12426085				
7318	-46.62501998040	0.00000000000	0	NULL	18845000	10021295	11522944				
7221	77.23000402720	4.0000000000	0	Changed featur	15926000	7633213	6747384				
7311	121.43650467800	0.00000000000	0	NULL	14987000	14608512	16803572				
7316	88.32467565810	4.0000000000	1	Name changed	14787000	4631392	7783716				
7248	90.40857946670	5.0000000000	0	Changed scale	12797394	7000940	14995538				
7290	-58.39753137370	0.00000000000	0	NULL	12795000	10929146	10271457				
7295	-118.17998051100	0.00000000000	0	NULL	12500000	3694820	142265				
7168	66.99000891000	5.0000000000	0	Changed scale	12130000	11624219	11570278				
7310	31.24996821970	0.00000000000	0	NULL	11893000	7734614	13720557				
7317	-43.22502079420	0.00000000000	0	NULL	11748000	2010175	1821489				
7280	135.46014481500	4.0000000000	0	Changed featur	11294000	2592413	9630783				
7306	116.38828568400	0.00000000000	0	NULL	11106000	7480601	9033231				
7274	120.98221716200	0.00000000000	0	NULL	11100000	3077575	2381280				
7302	37.61552282590	0.00000000000	0	NULL	10452000	10452000	10585385				
7299	29.01000158560	0.00000000000	0	NULL	10061000	9945610	9651488				
7314	2.33333532574	0.00000000000	0	NULL	9904000	11177	7142744				
7273	126.99973099700	0.00000000000	0	NULL	9796000	9796000	12018058 🔺				
7304	3.39153107121	4.00000000000	0	Location adiust	9466000	1536	6567892				
L Sł	Show All Features										

10. In the Select By Expression window, expand the Fields and Values section and double-click the **pop_max** label. You will notice that it is added to the expression section at the bottom. If you aren't sure about the field values, you can click the Load all unique values to see what the attribute values are present in the dataset. For this exercise, we are looking to find all features that have a population greater than 10,00,000. So complete the expression as **"pop_max" > 1000000** and click Select.

Select B	y Expression ? ×
Function List	Selected Function Help
Search Geometry Record Fields and Values scalerank natscale labelrank featurecla name namepar namealt diffascii nameascii adm0can Operators = + - / * ^ (Expression Tpop_max* > 1000000	Field Double click to add field name to expression string. Right-Click on field name to open context menu Field Values 15926000 18845000 18978000 19028000 19028000 19040000 35676000 Coad all unique values Load 10 sample values
Output preview: 0	ε <mark>⊢ Select</mark> ⊂ Close

11. Click on Close and return to the main QGIS window. You will notice that a subset of points is now rendered in yellow. This is the result of our query and you are seeing all places from the dataset that have the *pop_max* attribute value greater than 10,00,000.



12. The goal for this exercise is to find the places that are country capitals. Let's refine our query to select only those places which are capitals. Click on the Select feature using an expression button in the attribute table.

🔏 At	tribute table - n	e_10m_populat	ed_places_simp	ole :: Features to	otal: 7322, filtere	ed: 7322, selecte	e – 🗆 🗙
			🗟 😻 🎾				?
	scalerank ∇	natscale	labelrank	featurecla	name	namepar	namealt 📤
7295	0	600		Populated place	Los Angeles	NULL	Los Angeles-Lo
7296		600		Admin-0 capital	Washington, D.C.	NULL	Washington D.C.
7297		600		Populated place	New York	NULL	New York-New
7298		600	5	Admin-0 capital	London	NULL	NULL
7299		600	5	Admin-1 capital	lstanbul	NULL	NULL
7300		600	5	Admin-0 capital	Riyadh	NULL	Ar-Riyadh
7301		600		Admin-0 capital	Cape Town	NULL	NULL
7302		600		Admin-0 capital	Moscow	Moskva	NULL
7303		600		Admin-0 capital	Mexico City	NULL	Ciudad de Méxi
7304		600		Admin-0 capita	Lagos	NULL	NULL
7305		600		Admin-0 capital	Rome	NULL	NULL
7306		600		Admin-0 capital	Beijing	NULL	NULL
7307		600	5	Admin-0 capital	Nairobi	NULL	NULL
7308		600		Admin-0 capital	Jakarta	NULL	NULL
7309		600	5	Admin-0 capital	Bogota	NULL	Bogotá
7310		600		Admin-0 capital	Cairo	NULL	Al-Qahirah
7311		600		Admin-1 capital	Shanghai	NULL	NULL
7312		600		Admin-0 capital	Tokyo	NULL	NULL
7313		600		Admin-1 capital	Mumbai	Bombay	NULL
7314		600		Admin-0 capital	Paris	NULL	NULL
7315		600		Admin-0 capital	Santiago	NULL	NULL
7316	0	600	1	Admin-1 capital	Kolkata	Calcutta	NULL
🖬 Sh	ow All Features						

13. The field containing this data is *adm0cap*. The value *1* indicates that the place is a capital. Enter the expression as *"adm0cap" = 1*. Since we want to search only within our previous query results, select Select within selection.

Select	t By Expression ? 🔹	
Function List	Selected Function Help	-
Search	Field	
 namepar namealt diffascii nameascii adm0cap capalt capin worldcity megacity sov0name sov_a3 adm0name 	Double click to add field name to expression string. Right-Click on field name to open context menu Field Values 0 1	
adm0_a3	 Load all unique values Load 10 sample values 	1
Operators = + - / * ^ Expression		_
"adm0cap" = 1		
	E Select Add to selection Remove from selection	
Output preview: 0	Select within selection	

14. Click on Close and return to the main QGIS window. Now you will see a smaller subset of the points selected. This is the result of the second query and shows all places from the dataset that are country capitals as well as have population greater than 10,00,000.



15. Let's save these results to a separate layer. Right-click on the layer and select Save Selection As.



16. Keep the format selection as **ESRI Shapefile** and enter the output name as **large_capital_cities.shp**. Check the box next to Add saved file to map and click OK.

ø	Save vector layer as	? ×					
Format	ESRI Shapefile	-					
Save as	l/Downloads/large_capital_cities.shp	Browse					
Encoding	System	-					
CDC	Layer CRS	-					
URS	WGS 84	Browse					
Symbology exp	ort No symbology	-					
Scale	1:50000	▲ ▼					
OGR creation	options						
Data source							
Layer							
Skip attribute creation							
	OK Cancel	Help					

17. The newly created shapefile will be automaticlally loaded into QGIS. Turn off the populated places layer by un-checking the box next to it. Now, you will see only the features from the newly created layer containing capital cities of the world that have population greater than 10,00,000.

