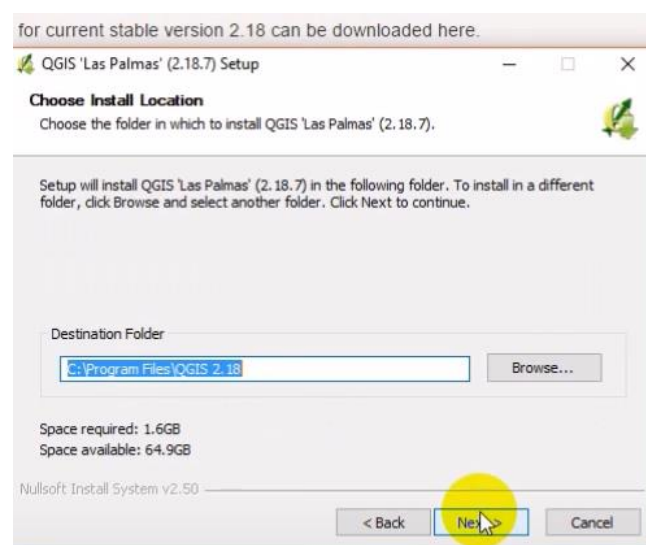


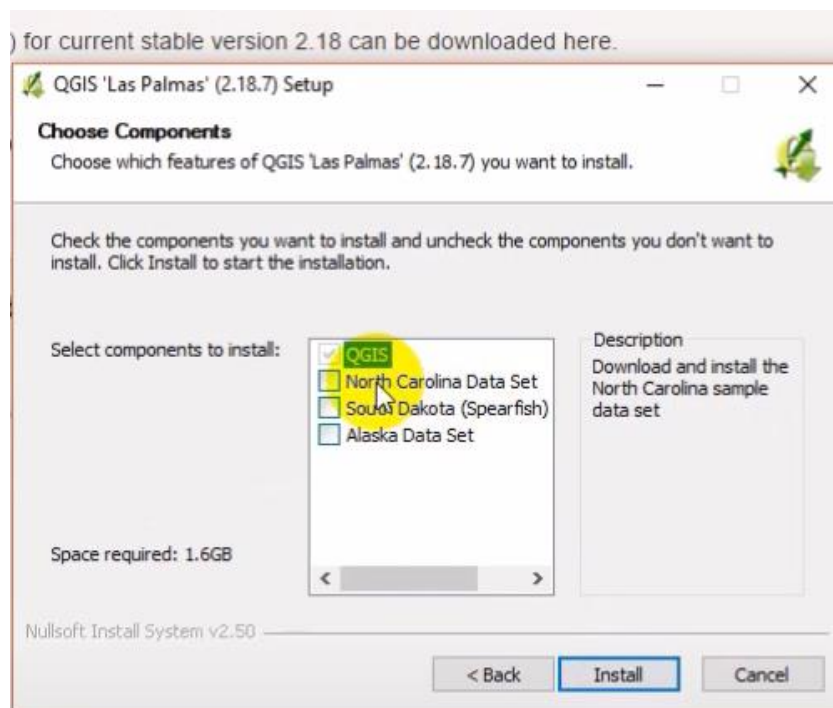
PRACTICAL NO.0 : INSTALLATION OF QGIS

Step 1 -> Download QGIS from it's official website
www.qgis.org

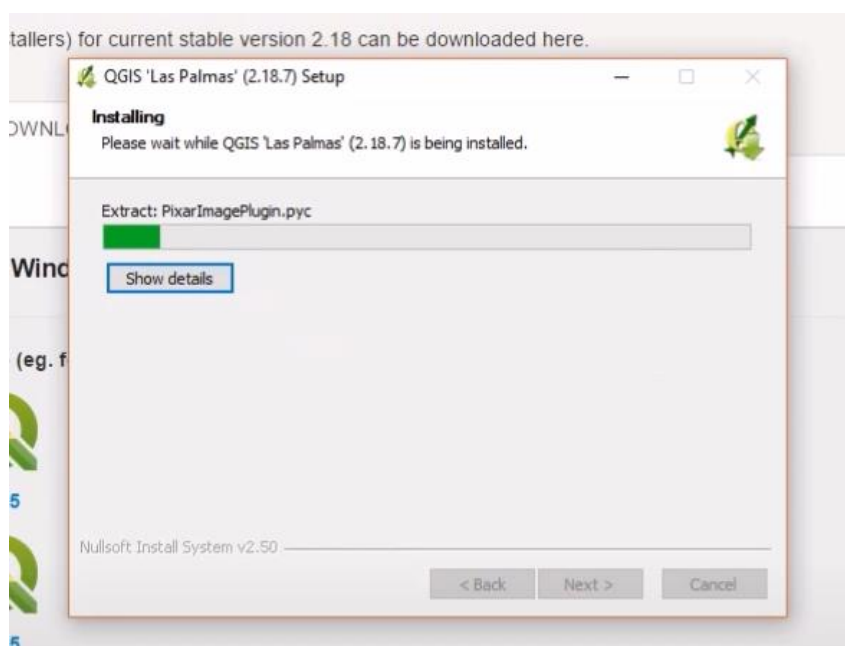


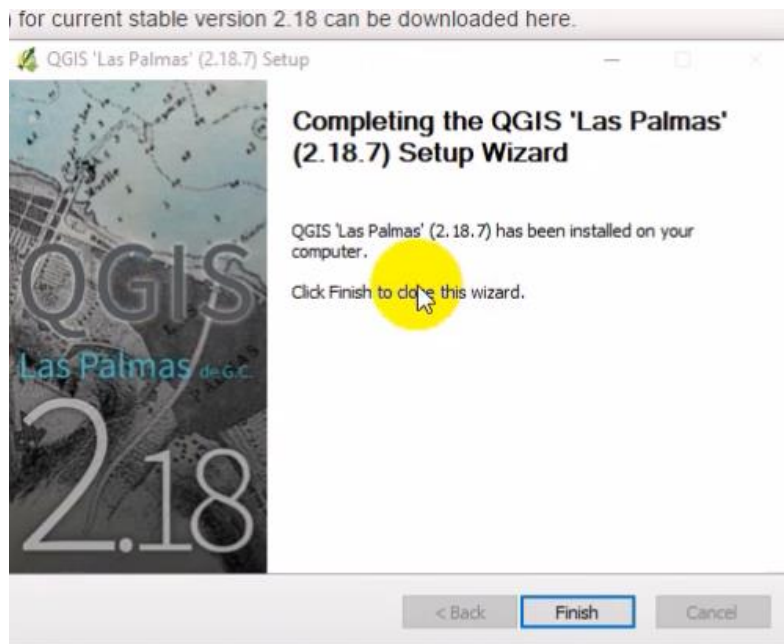
Step 2 -> Just click on next and then click on install .





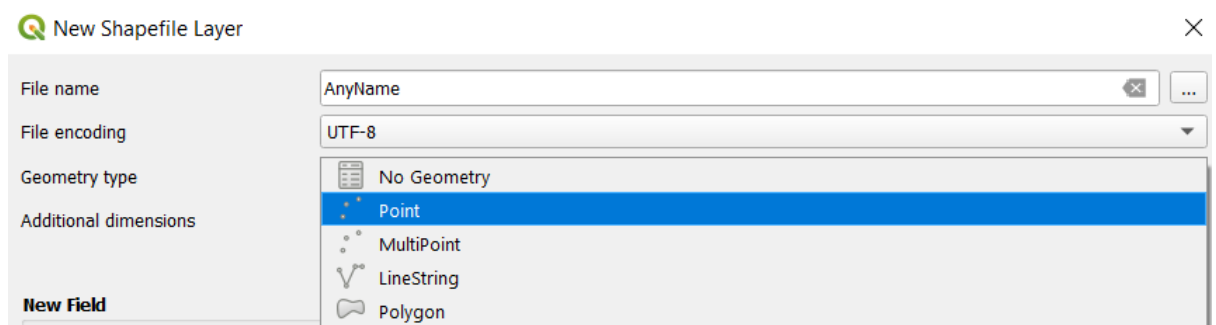
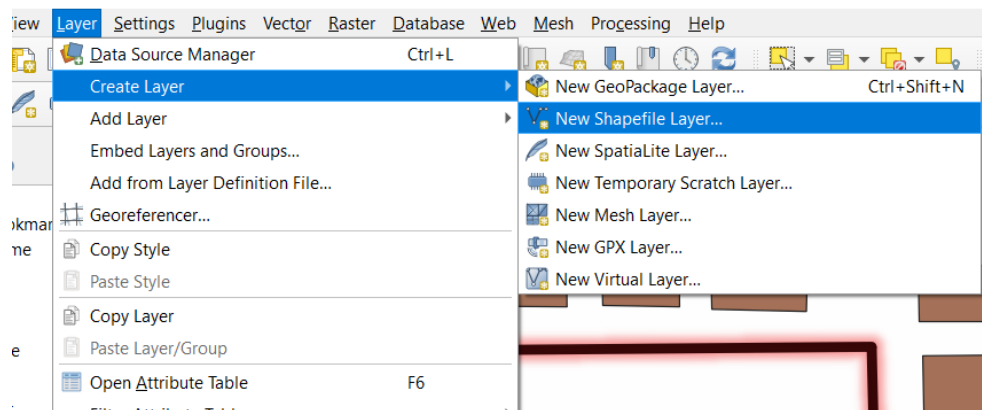
Step 3 -> Then click on finish , and QGIS is installed .





PRACTICAL NO.1 : Create a map of your surrounding area using vector data model (points, lines and polygons).

- Vector data model uses geometric objects like points, lines, and areas to represent simple spatial features.
- Point (particular area , cities in countries)
- Line (streets, canals)
- Polygon (timber stand , land parcels and water bodies)



New Shapefile Layer

File name: AnyName.shp

File encoding: UTF-8

Geometry type: Point

Additional dimensions: ☒ None ☐ Z (+ M values) ☐ M values

CRS: EPSG:4326 - WGS 84

New Field

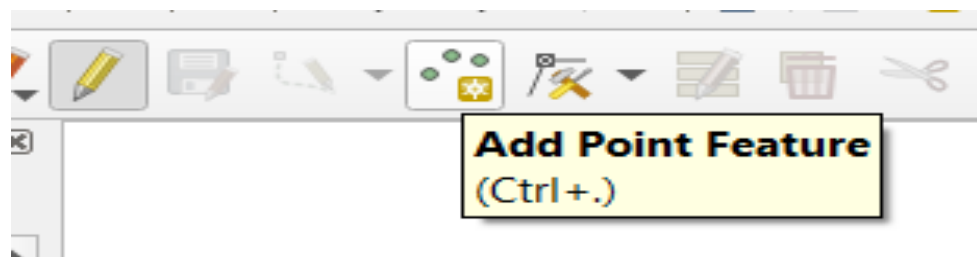
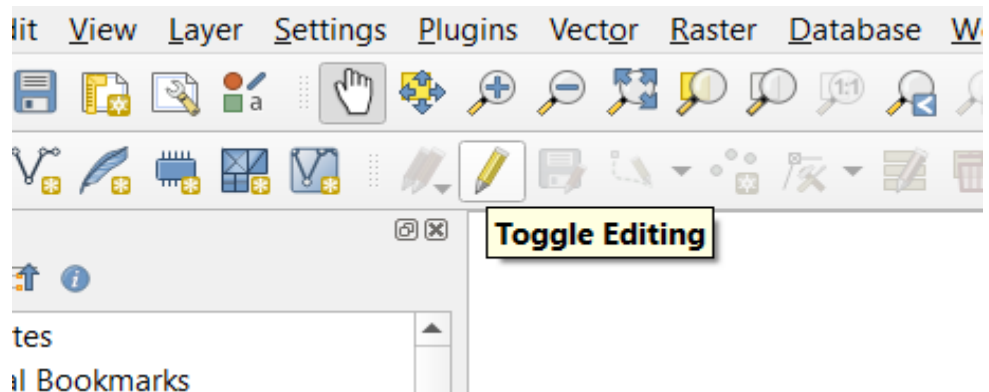
Name: AnyName

Type: abc Text (string)

Length: 80 Precision:

Fields List

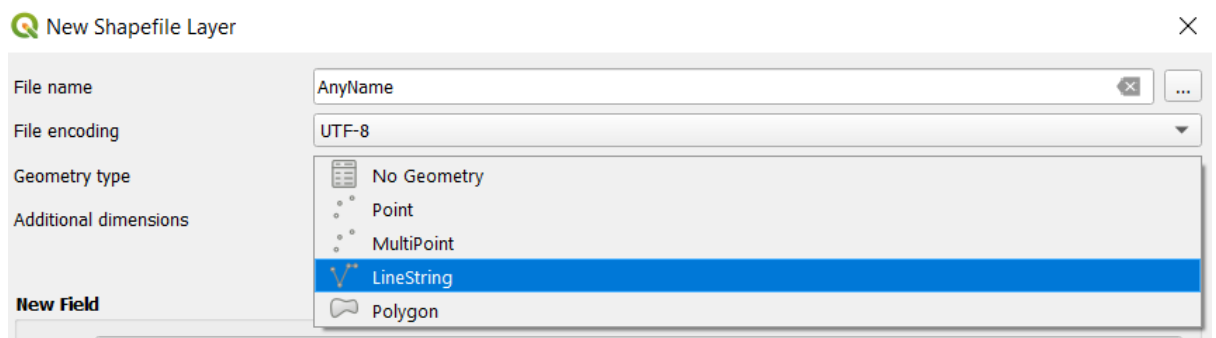
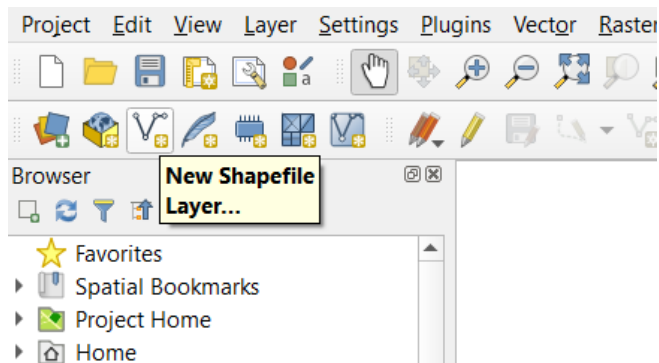
Name	Type	Length	Precision
id	Integer	10	



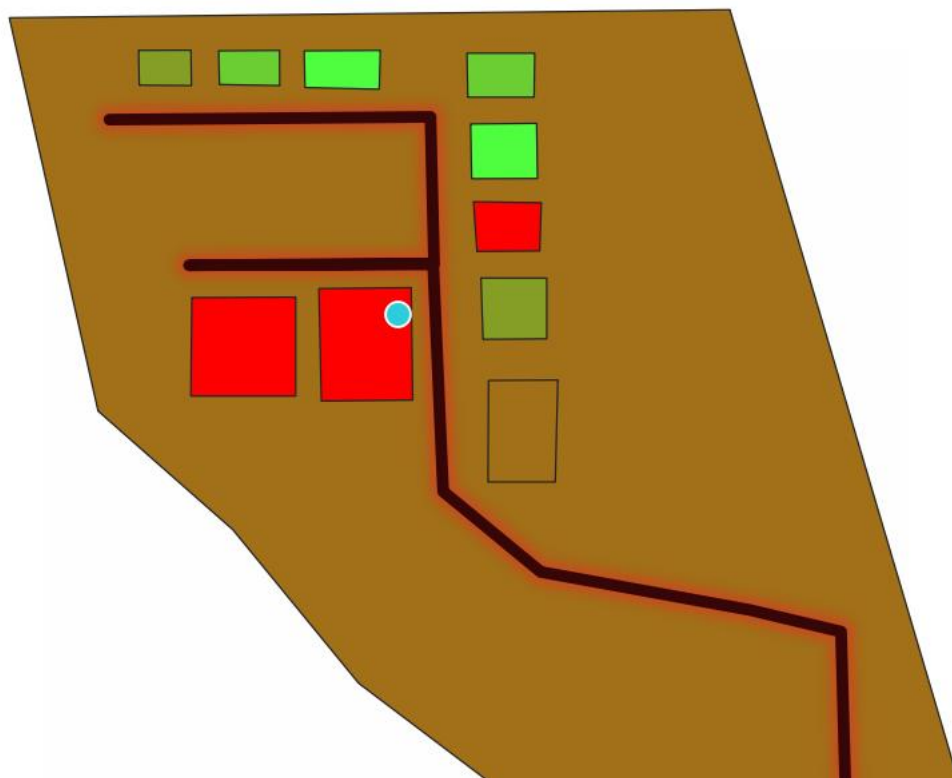
AnyName - Feature Attributes

id: 123

AnyName: Any Name

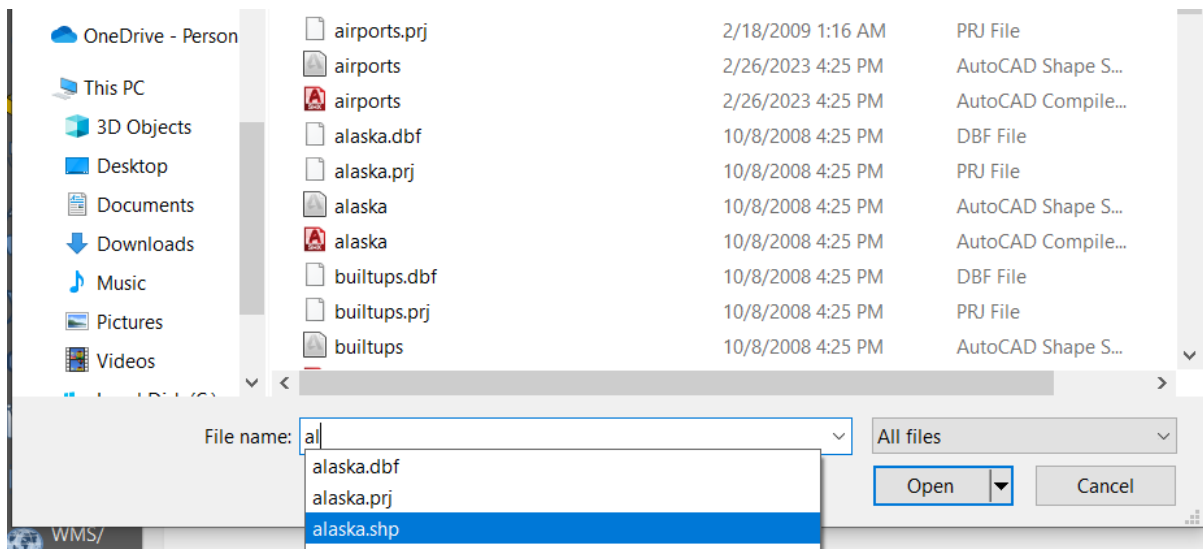
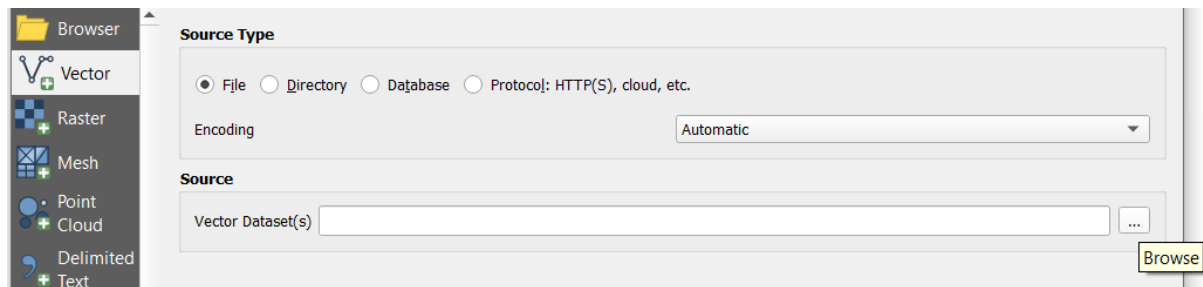
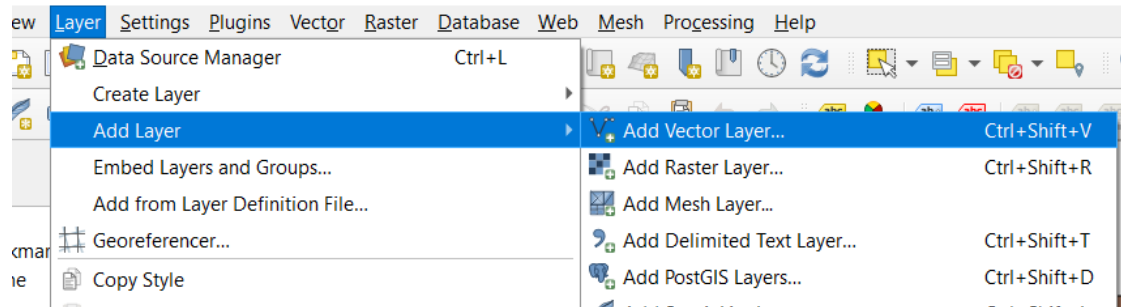


Follow the same steps above for Polygon, and then you can create your own surrounding area like the below diagram.

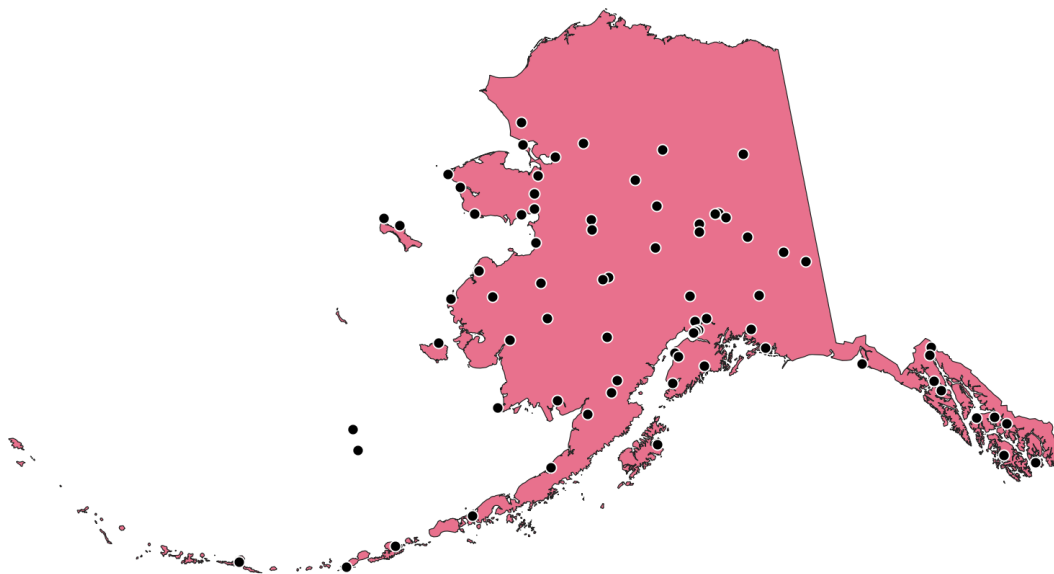
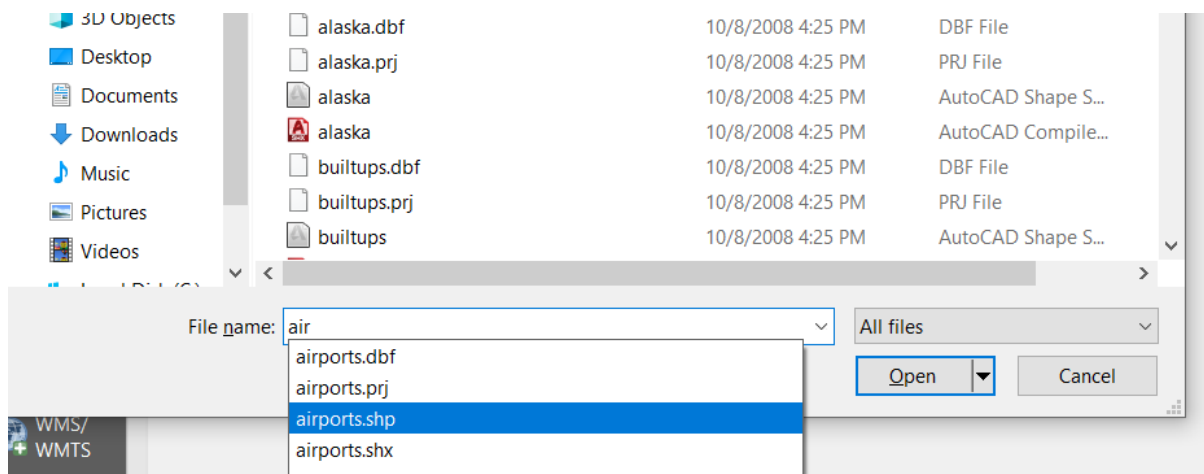


PRACTICAL NO.2 : Create Georelational Data Model for your map.

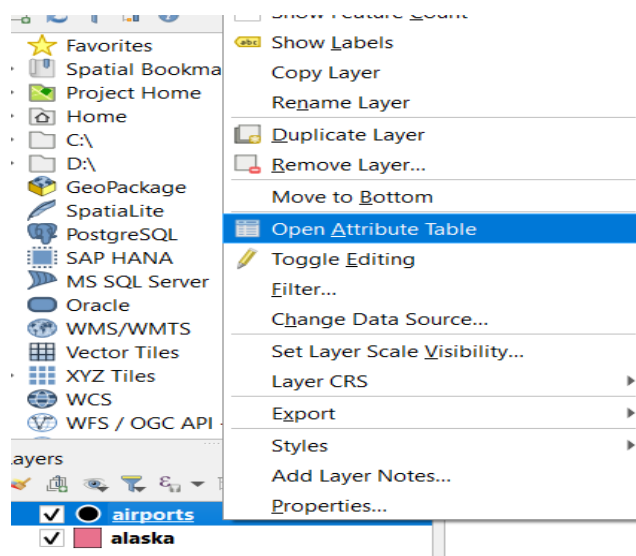
A **georelational data model** is a geographic data model that represents geographic features as an interrelated set of spatial and attribute data.



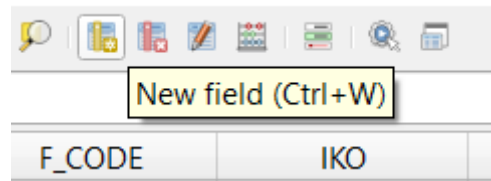
Then click on Add. After alaska , add airport.shp file .



Right click on Airports layer and click on Open Attribute table.



Then click on the pencil at top right corner and click on New field in the same lane.



After filling the Name field click on OK then you can see this kind of null table below.

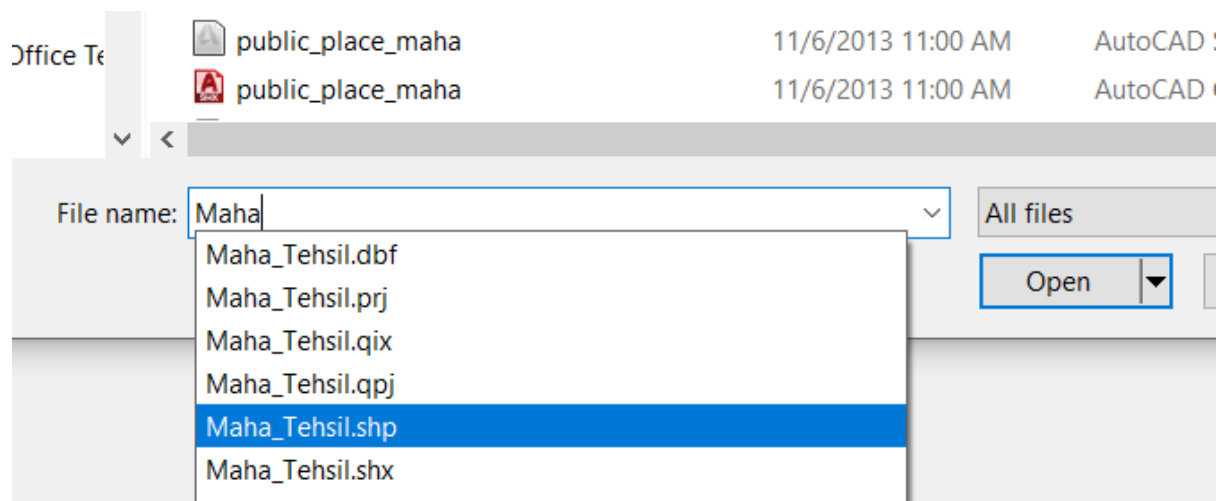
NA3	ELEV	F_CODE	IKO	NAME	USE	Test
157	0	Airport/Airfield	PA	NOATAK	Other	NULL
229	0	Airport/Airfield	PA	AMBLER	Other	NULL
186	0	Airport/Airfield	PABT	BETTLES	Other	NULL
150	0	Airport/Airfield	PAOT	RALPH WIEN M...	Civilian/Public	NULL
173	0	Airport/Airfield	PA	SELAWIK	Other	NULL
193	0	Airport/Airfield	PA	INDIAN MOUN...	Other	NULL
177	0	Airport/Airfield	PA	BUCKLAND	Other	NULL
146	0	Airport/Airfield	PATC	TIN CITY LRRS	Other	NULL
150	0	Airport/Airfield	PA	GRANITE MOU...	Other	NULL

PRACTICAL NO. 3: Fire Spatial Queries(contains, within, touches, overlap ,intersect, crosses and is disjoint).

Spatial query refers to the process of retrieving a data subset from a map layer by working directly with the map features. In a spatial database, data are stored in attribute tables and feature/spatial tables.

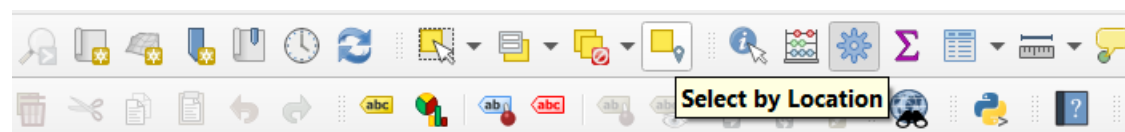
query 1->Find out the road segments in Maharashtra where road cross over the river.

Step1: Add vector layer of MahaTehsil.shp

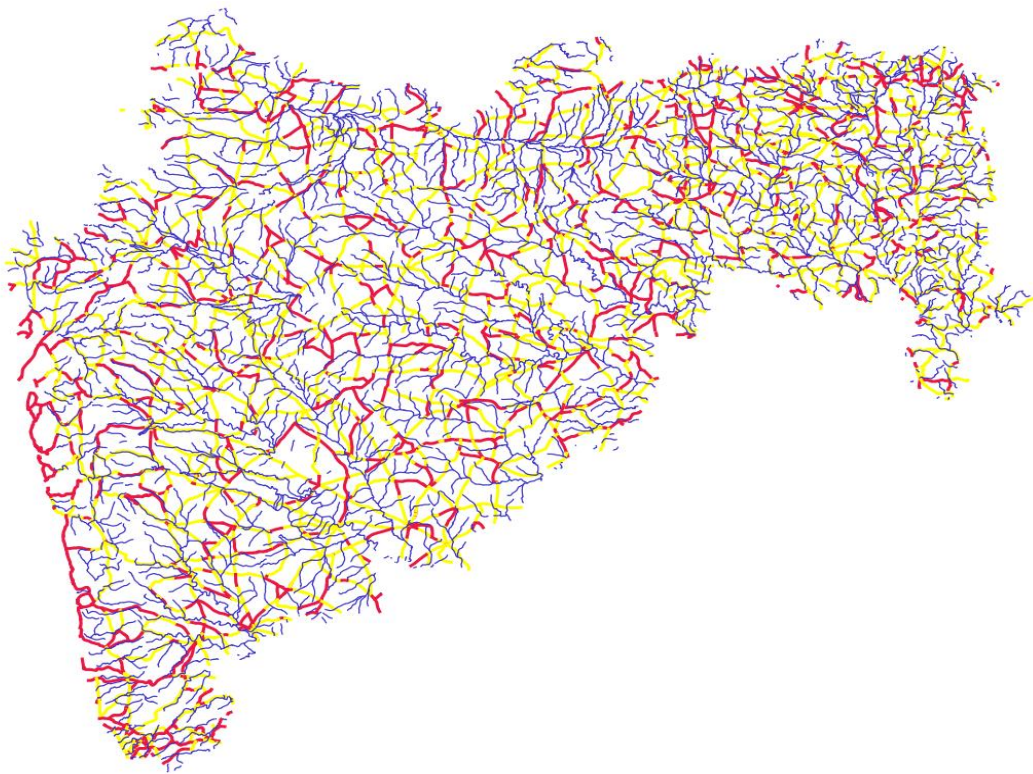
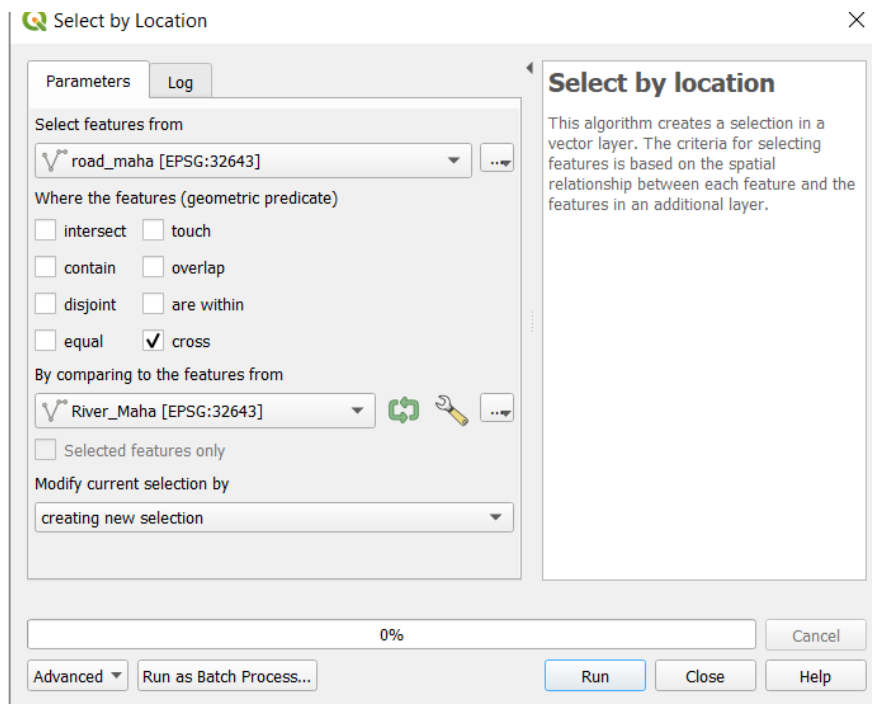


Step 2 : Then add River_Maha.shp and road_maha.shp like the above one .

Step 3: Simply click on Select By Location in the toolbox.



Step 4: Click on Run Button after selecting the road.shp and river.shp also click on cross as shown in the below diagram.



query 2 -> Find out the river channels that are not flowing through Ahmednagar District .

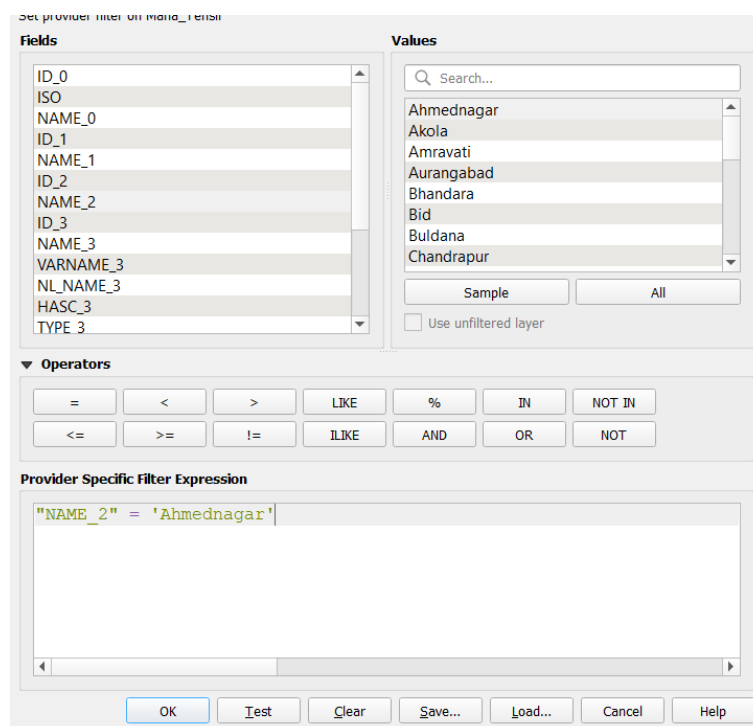
Deselect the selected features from the attribute table .For deselect, right click on the River layer and open the attribute table.



Step 1: Right Click on Maha_Tehsil layer, then click on Filter.

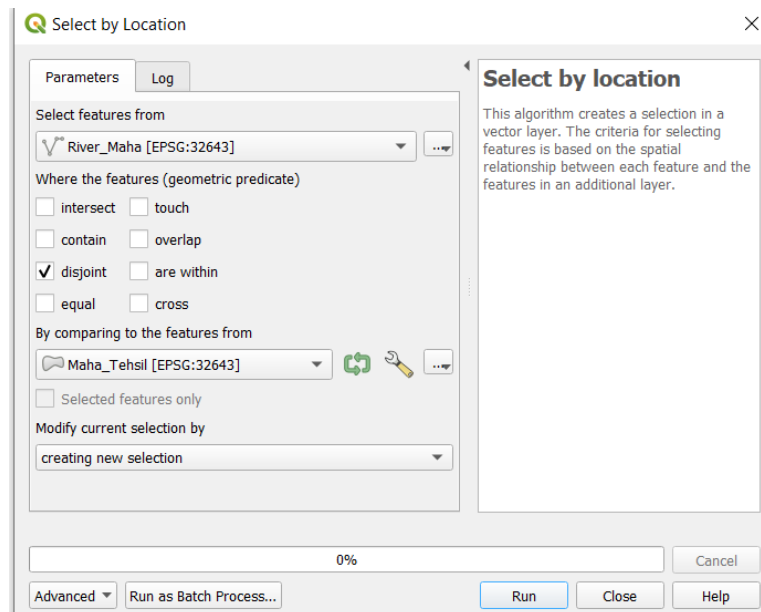
Then Double click on "Name_2" in fields and then click on "=" symbol in the operators .

Click on "Sample" button in values and double-click on "Ahmednagar".

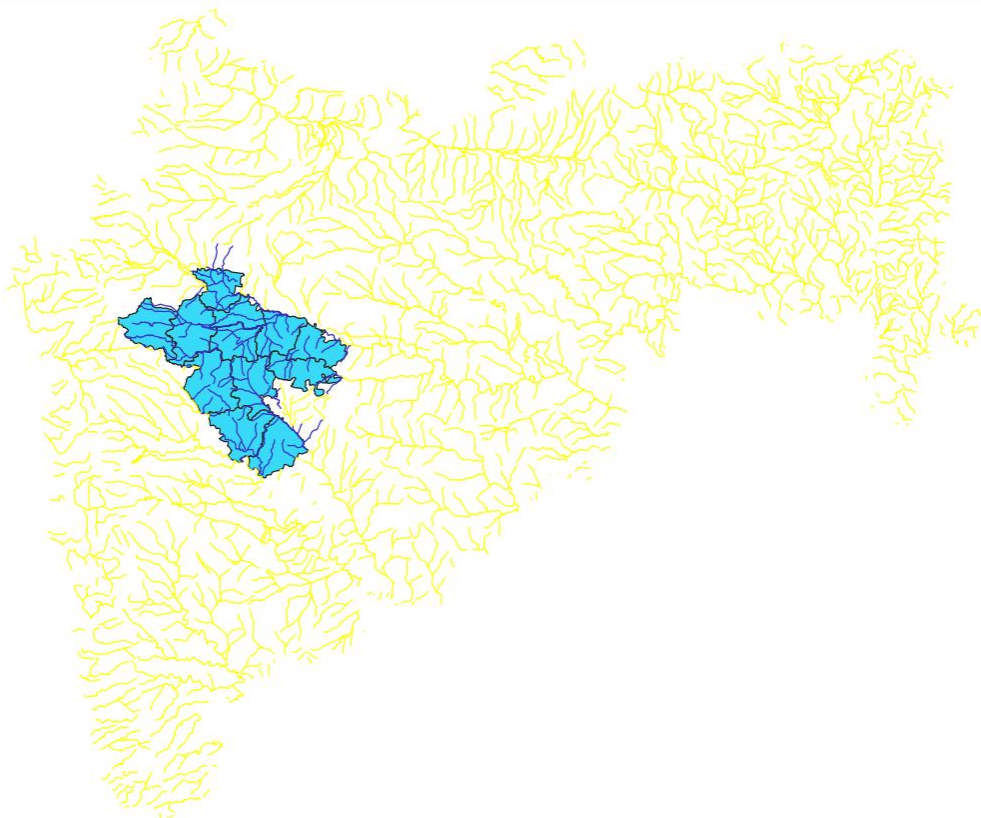


Then click on OK.

Step 3: Deselect the road layer and now click on Select By Location

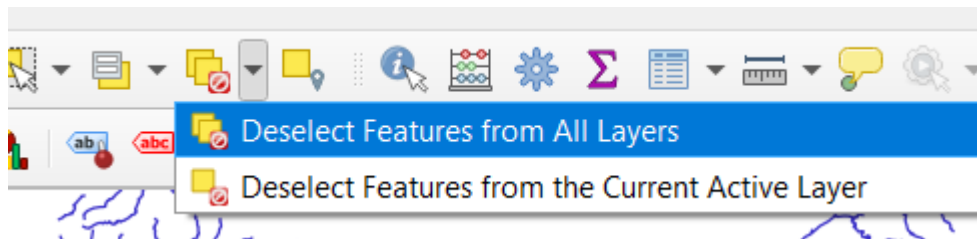


Then follow the above diagram and click on Run Button.



query 3 -> Find out the public places that are within Greater Mumbai .

First Deselect the feature and also remove filter from maha_tehsil layer.

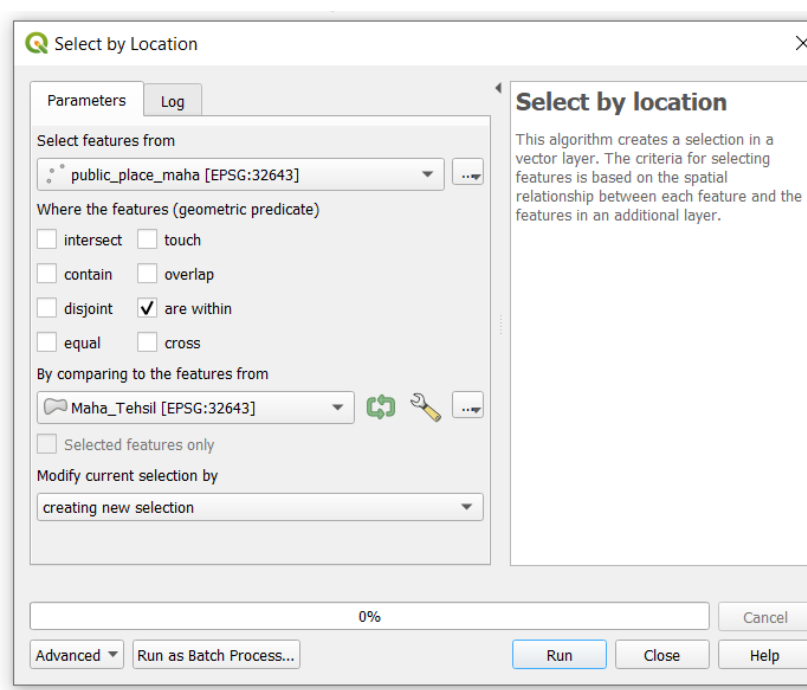


Step 1: Add public_place_maha.shp file and deselect the river layer

Step 2: Then right click on Maha_tehsil and click on filter again .

Step 3 : Add Greater Bombay from sample and click on “OK”

Step 4: Now again Click on select By Location and follow the steps according to the diagram



Now Click on Run.

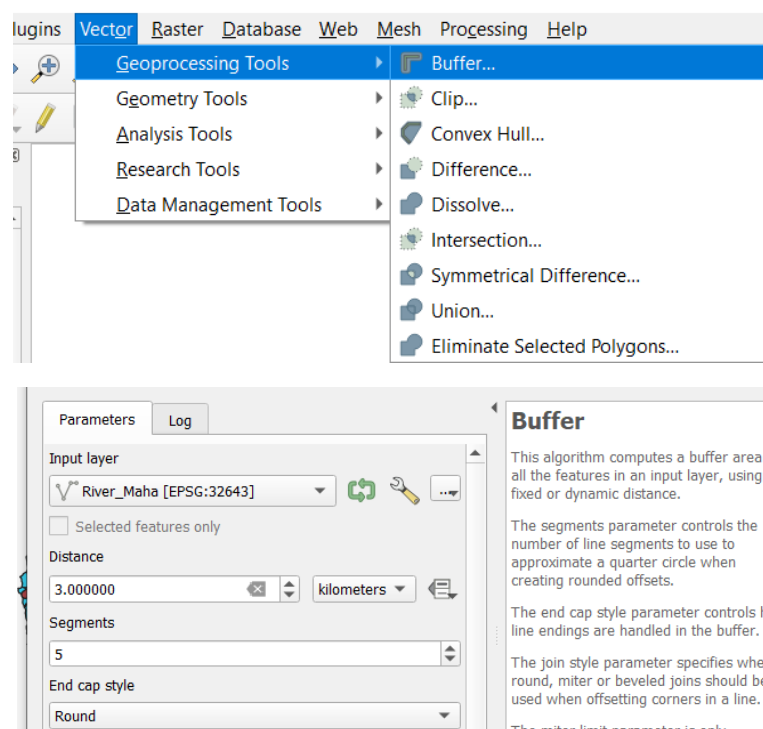


query 4 -> Find out the schools in Maharashtra that could be affected by floods ? Let assume that flood zone is at about 3km from the river bank .

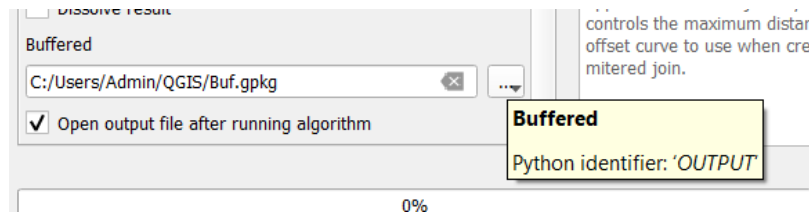
First Deselect the feature and also remove filter from maha_tehsil layer.

Step 1 : Add school_col_maha.shp layer and deselect public_place layer.

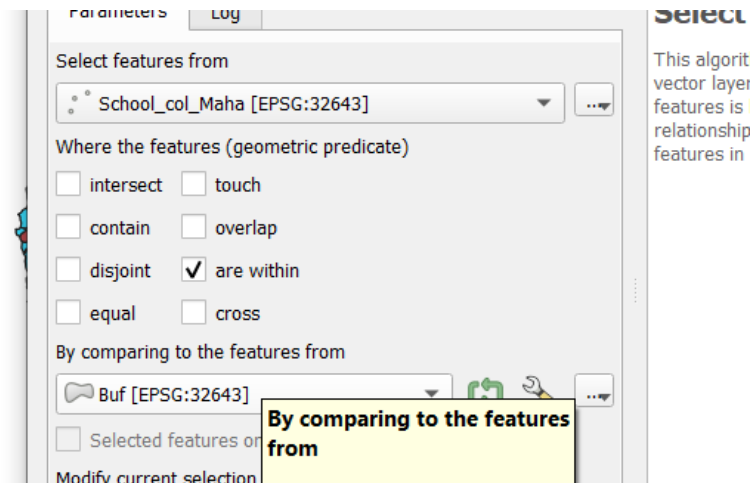
Step 2: Create a Buffer using river layer , for that click on vector menu and follow the steps in below diagram.



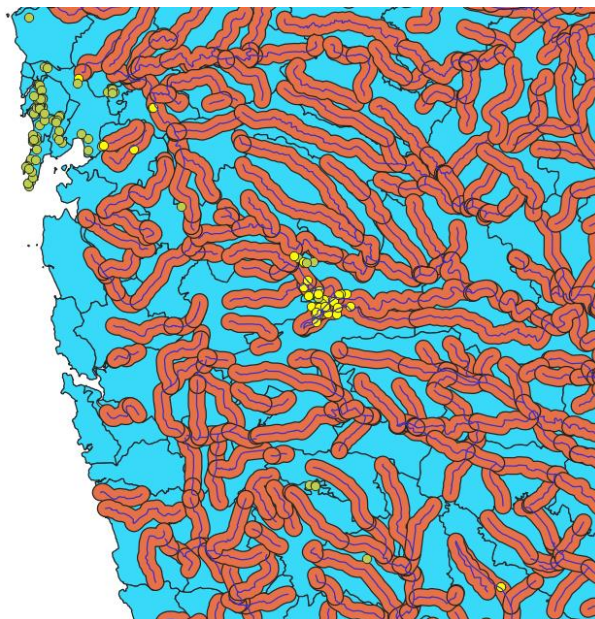
Scroll down , click on browse and save the file where you want to save .
Then click on Run button.



Step 3: Now click on Select By Location , and do the follow as per diagram.



Now click on RUN button.

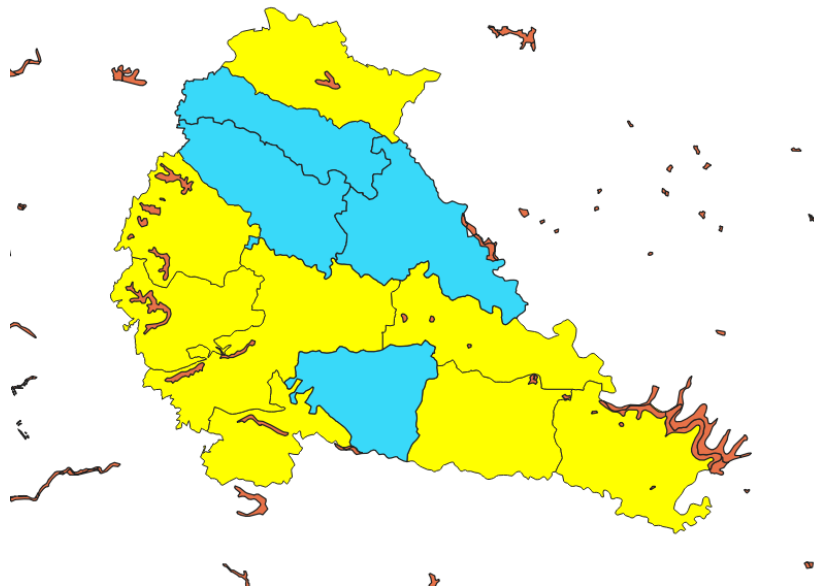
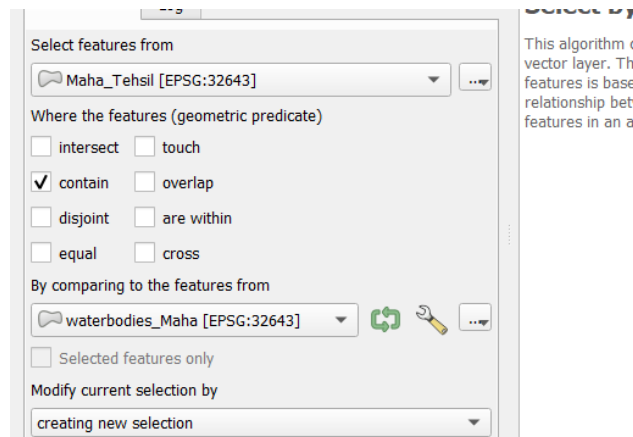


query 5 -> find out the tehsils in the Pune which contains water bodies such as lakes and Dams?

First Deselect the feature and buffer,river layer.

Step 1 : add waterbodies layer and filter the maha_tehsil layer to Pune

Step 2 : click the select by location and do the follow as per diagram.



Practical NO.4 : Fire Queries using Query Builder,To analyse data using analysis tools.

THEORY:

(About Attribute Data and Data Analysis)

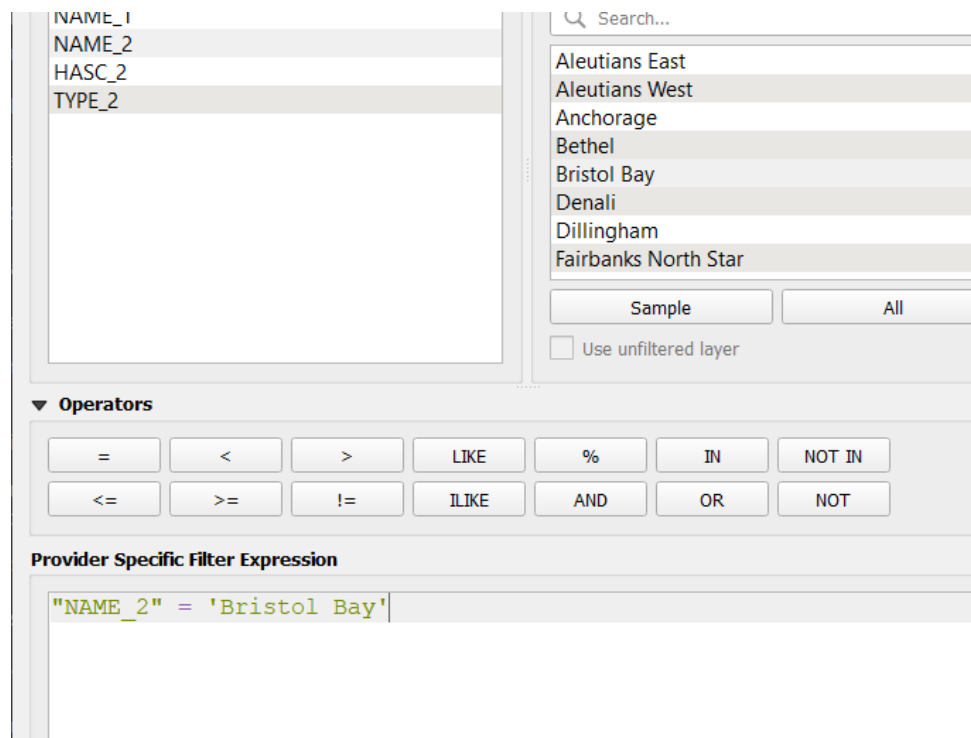
Attribute data describes the characteristics of spatial features. For vector data, the amount of attribute data to be associated with a spatial feature can vary significantly. A road segment may only have the attributes of length and speed limit, where as a polygon may have dozens of properties, interpretations and performance data.

Artistic Microscopic

Step 1 : Add regions.shp from shapefiles and then double-click on the layer .

Step 2 : Then click on source and click on Query Builder at the left bottom corner.

Step 3 : Now click on the “Name_2” and click on = symbol from operators.Then click on “sample” button.



Select any of the name and then click on “and” symbol from operations .

Step 4 : Now click on “Type_2” from fields and then “Sample” and click on any one of them .

Set provider filter on regions

Fields

- NAME_1
- NAME_2
- HASC_2
- TYPE_2

Values

- Borough
- Census Area
- City And Borough
- Municipality

Sample All

☐ Use unfiltered layer

Operators

= < > LIKE % IN NOT IN

<= >= != ILIKE AND OR NOT

Provider Specific Filter Expression

"NAME_2" = 'Bristol Bay' AND "TYPE_2" = 'City And Borough'

Now , Click on OK and then in Next window click on Apply and click on OK.

Source

Symbology

Labels

Masks

3D View

Diagrams

Fields

Attributes Form

Joins

Auxiliary Storage

Actions

Display

Rendering

Temporal

Variables

Elevation

Metadata

Data source encoding: ISO-8859-1

Assigned Coordinate Reference System (CRS)

Albers

Changing this option does not modify the original data source or perform any reprojection of features. Rather, it can be used to override the layer's CRS within this project if it could not be detected or has been incorrectly detected.

The Processing "Reproject Layer" tool should be used to reproject features and permanently change a data source's CRS.

Geometry

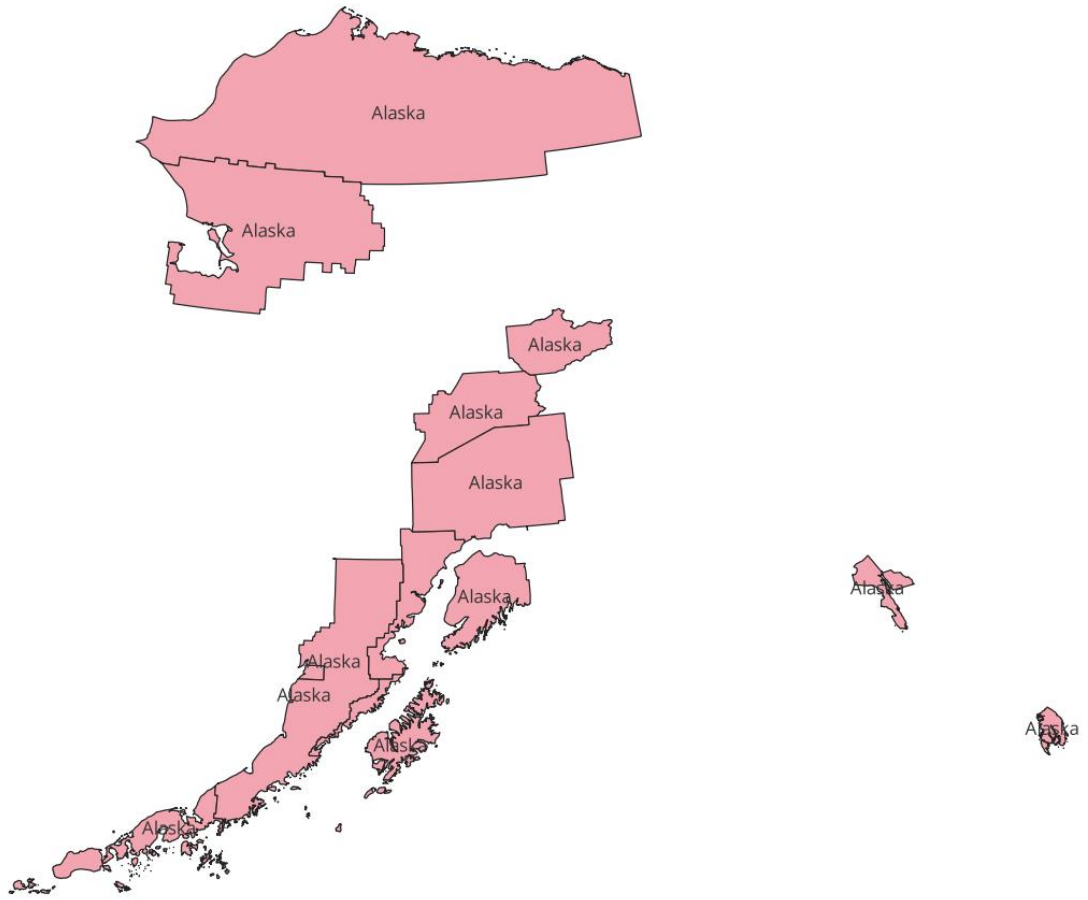
Create Spatial Index Update Extents

Provider Feature Filter

"NAME_1" = 'Alaska' AND "TYPE_2" = 'Borough'

Query Builder

Style OK Cancel Apply Help



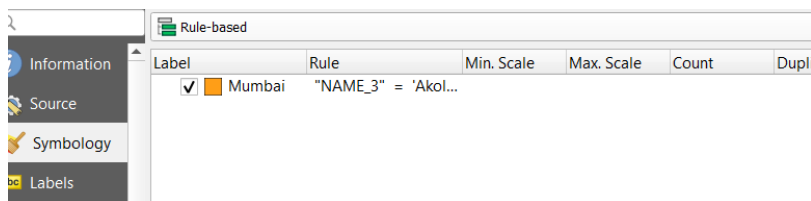
Practical NO.5 : Perform Vector Classification

Classifying vector data allows you to assign different symbols to features (different objects in the same layer), depending on their attributes. This allows someone who uses the map to easily see the attributes of various features.

Rule-Based-

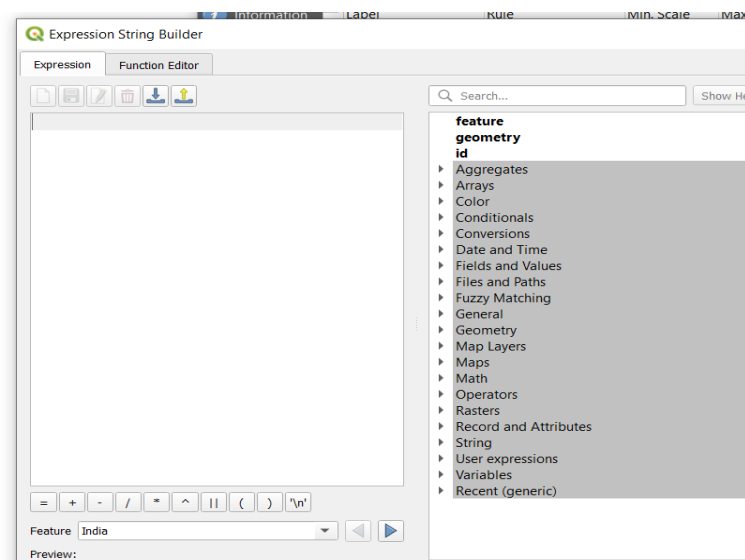
Step 1: Add Maha_tehsil.shp and then double-click on that layer .

Step 2 : Now click on Symbology and at the top click on Rule-based.



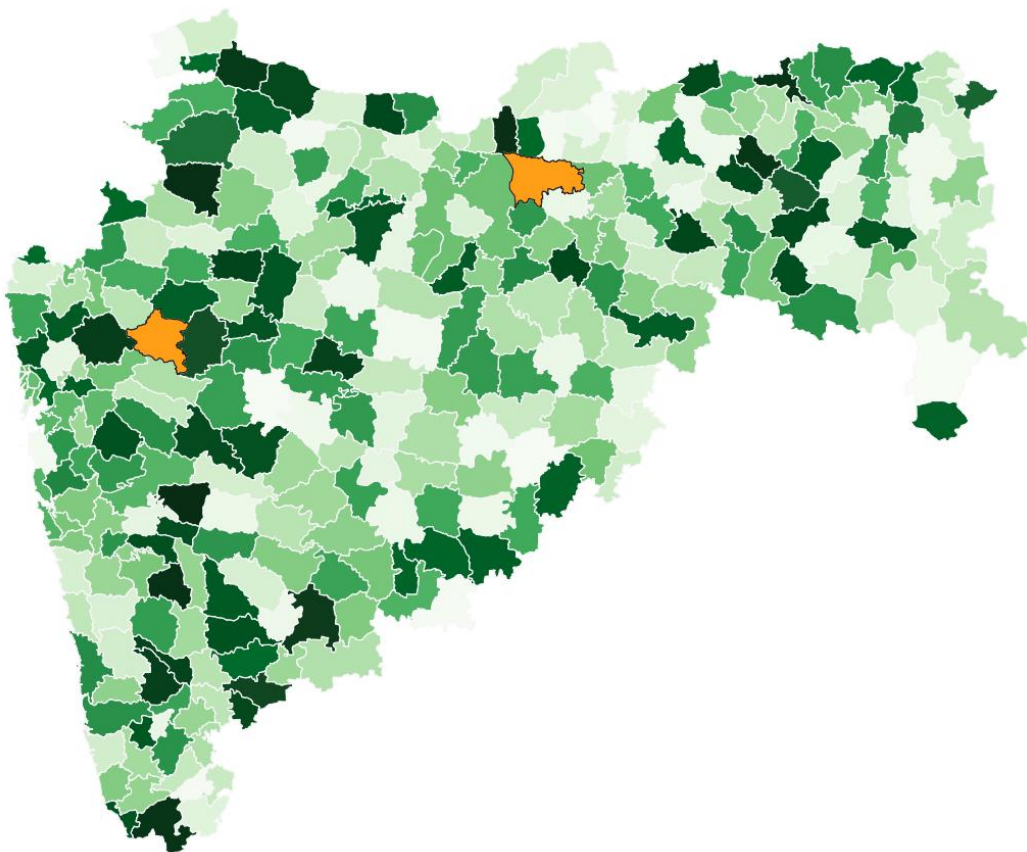
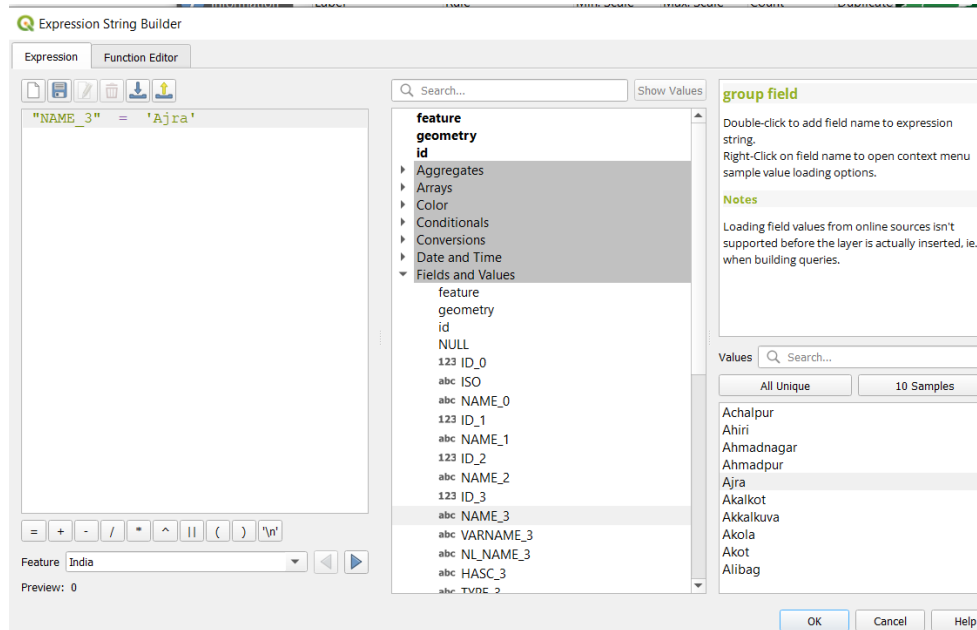
Step 3 : Then Click on Add symbol at the bottom then add any name to the label .

Step 4 : Click on “E” symbol , then Expression String Builder will open .



Step 5 : Now expand fields and values in geometry id and then double-click on “Name_3” , also on “=” symbol .

Then click on “Samples” on left side and choose any of the name , double-click on it and then click on OK



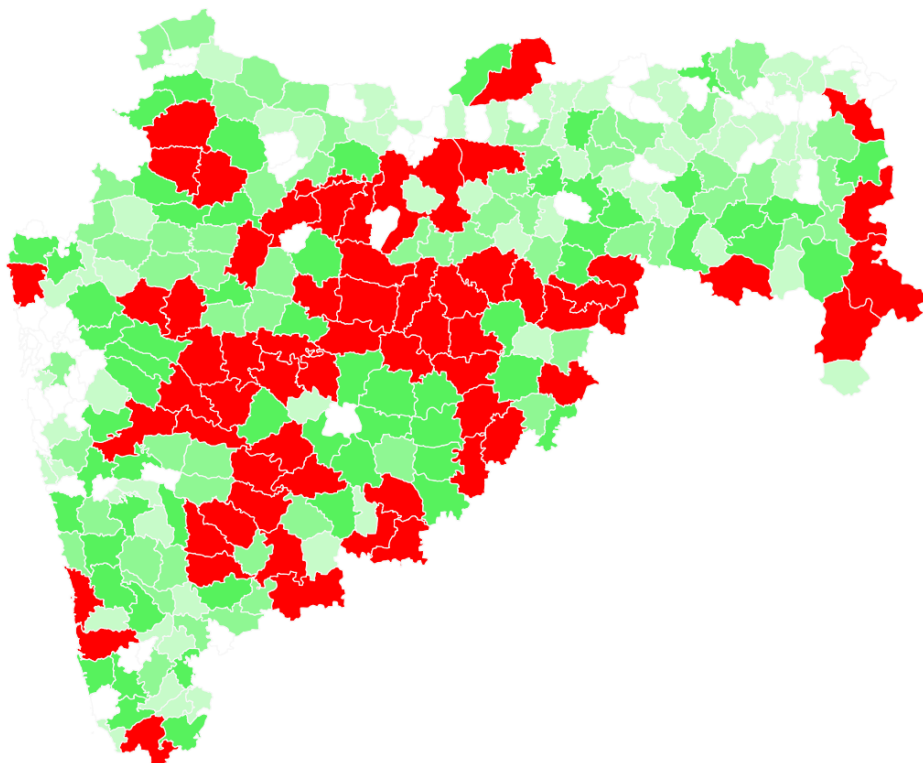
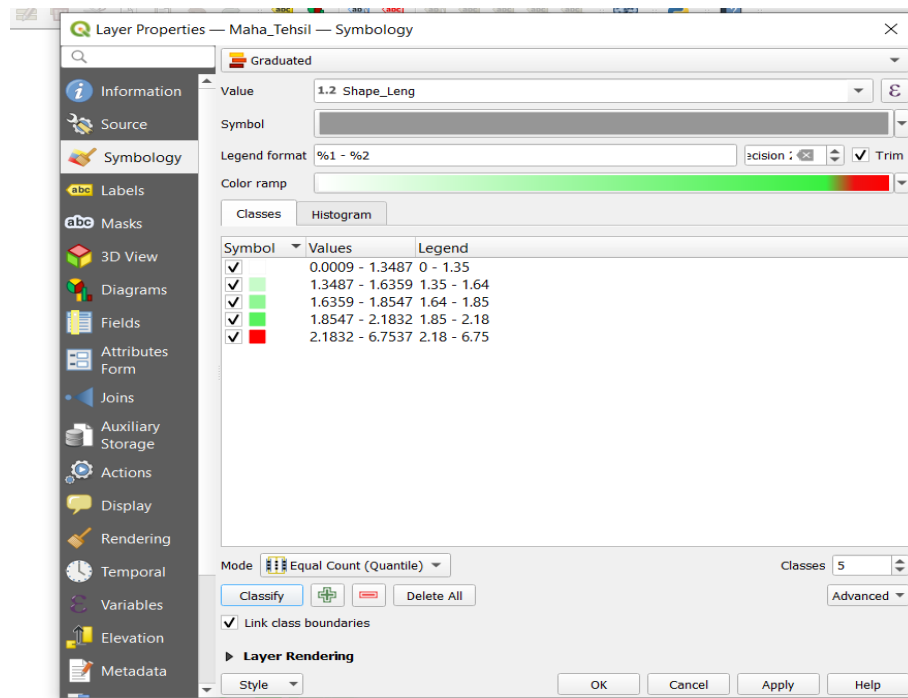
Graduated –

Step 1: Double-click on Maha_tehsil layer .

Step 2 : Now click on Symbology and at the top click on Graduated.

Step 3 : Click on shape_length in values

Step 4 : Choose any color and click on classify , then click on OK



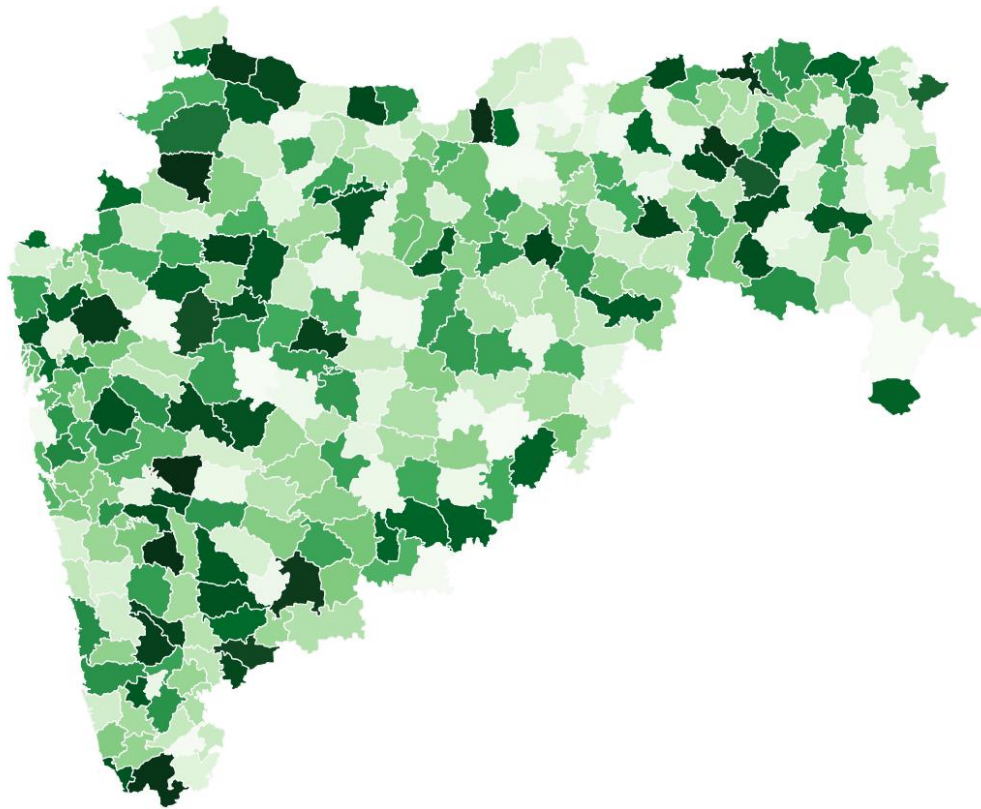
Categorised-

Step 1: Double-click on Maha_tehsil layer

Step 2 : Now click on Symbology and at the top click on Categorised.

Step 3 : Click on Name_3 in values.

Step 4 : Choose any color and click on “classify” , then click on OK .

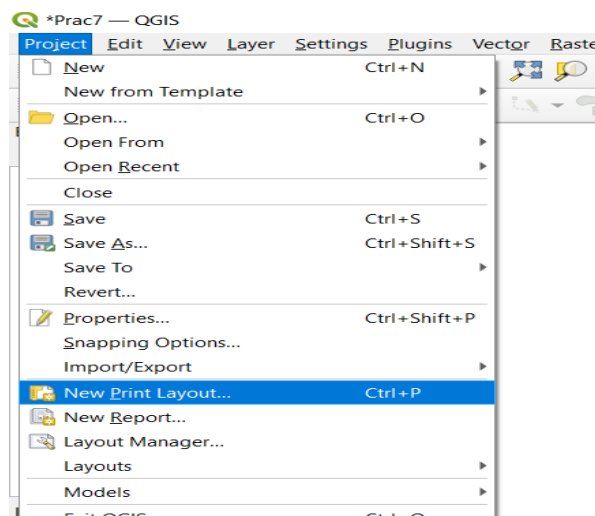


Practical NO.6 : Map Composer

Map Composition is the process of bringing together the various symbols on a map so that they work together to form a desired Gestalt, or whole effect.

Step 1 : Add Maha_tehsil.shp file .

Step 2 : Click on project and then New Print Layer.



Step 3: Give any name , then click OK

Step 4 : Now Click on “Add item” in menu bar, then click on Add map . Draw a Box in the blank page . Then you will see the map



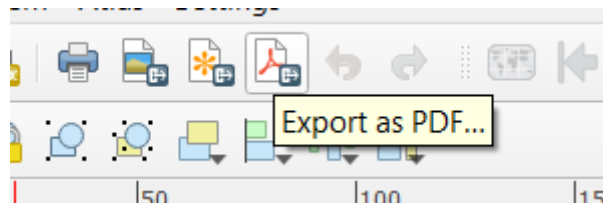
Step 5 : Adjust the map and then again click on “Add Item”. Add Label . Give any name to label then again drag the cursor like Map.



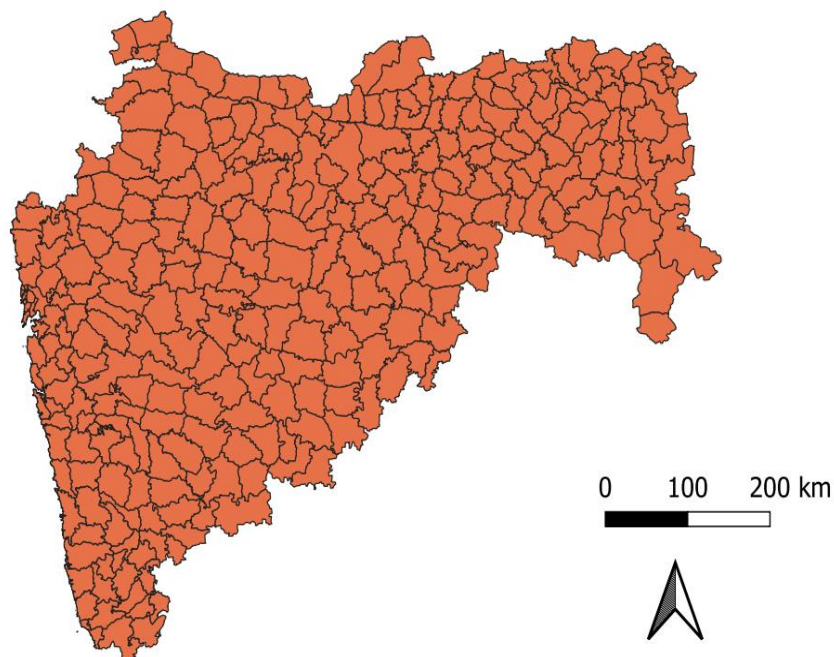
Step 6: Adjust the name and set font accordingly using item properties on left and then again add Scale bar from Add item.

Step 7 : Drag as other items done , then add north arrow from Add Item , and follow the same steps .

Step 8 : Click on Export as pdf below the settings menu and save the file .



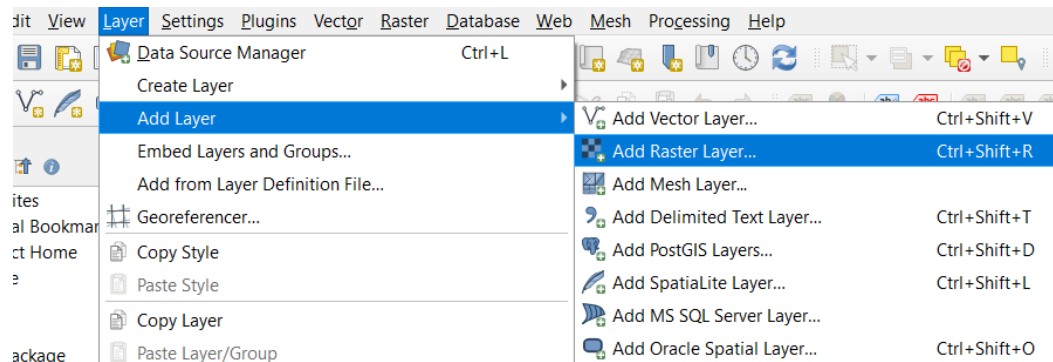
Maharashtra



Practical NO.7 : Raster Data Analysis

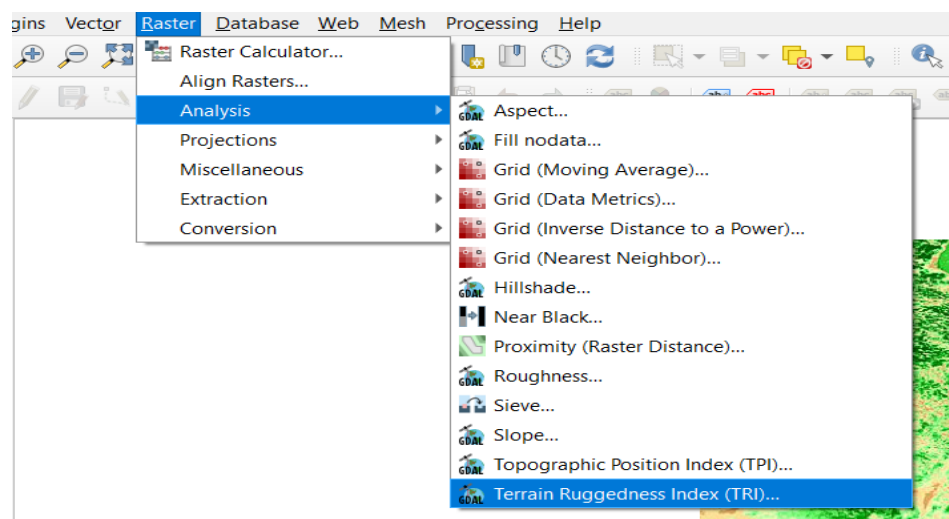
A common use of raster data in a GIS is as a background display for other feature layers.

Step 1 : Add Raster layer from layers menu.



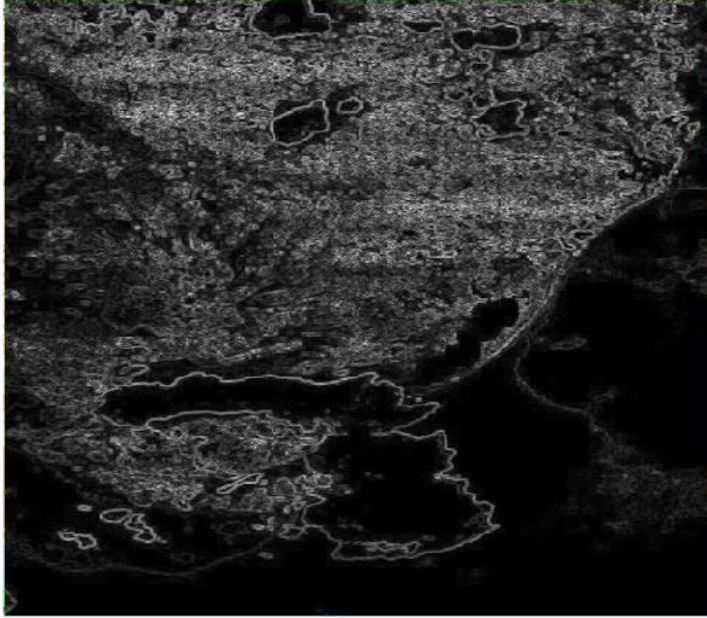
Step 2 : Add any tif file .

Step 3 :



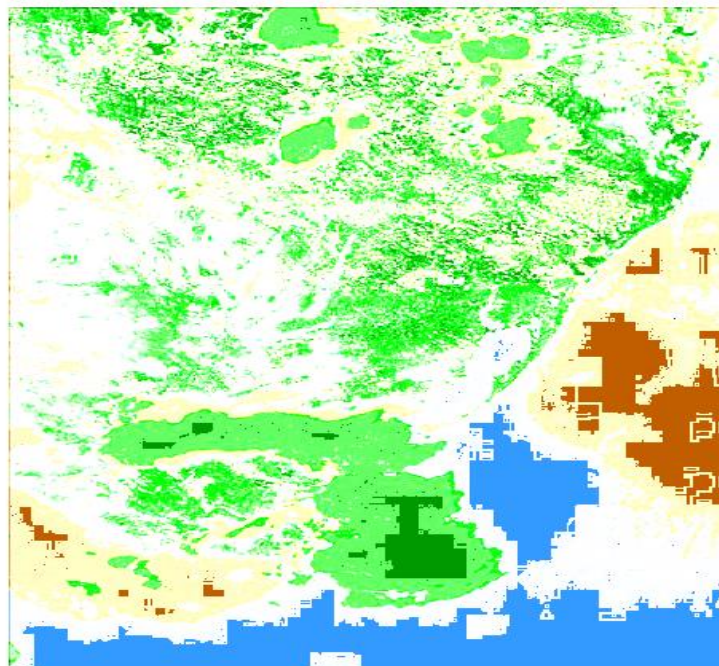
Then click on OK.

Terrain Ruggedness Index :



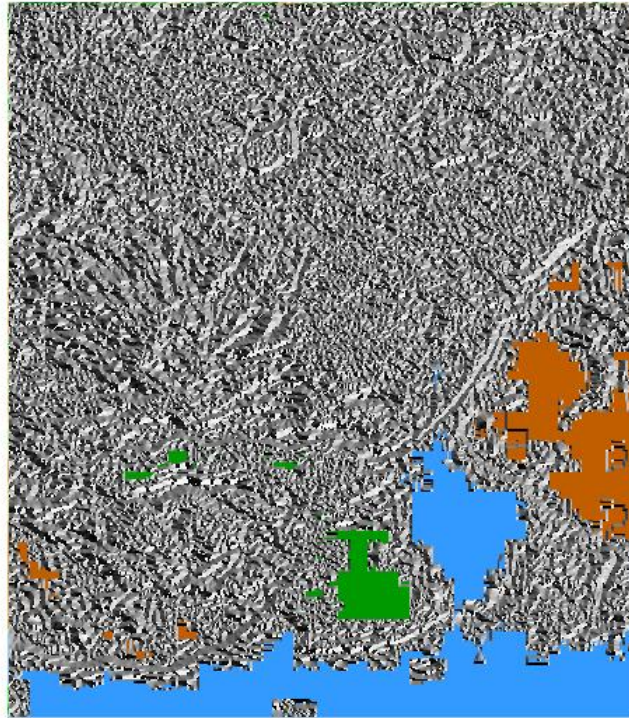
Slope :

Follow the same step but click slope in Analysis.



Aspect :

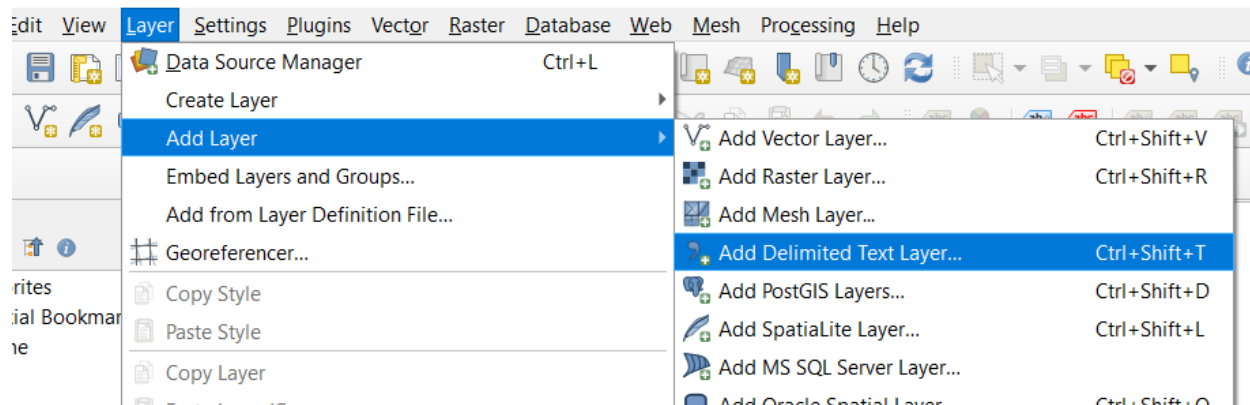
Follow the same step but click Aspect in Analysis.



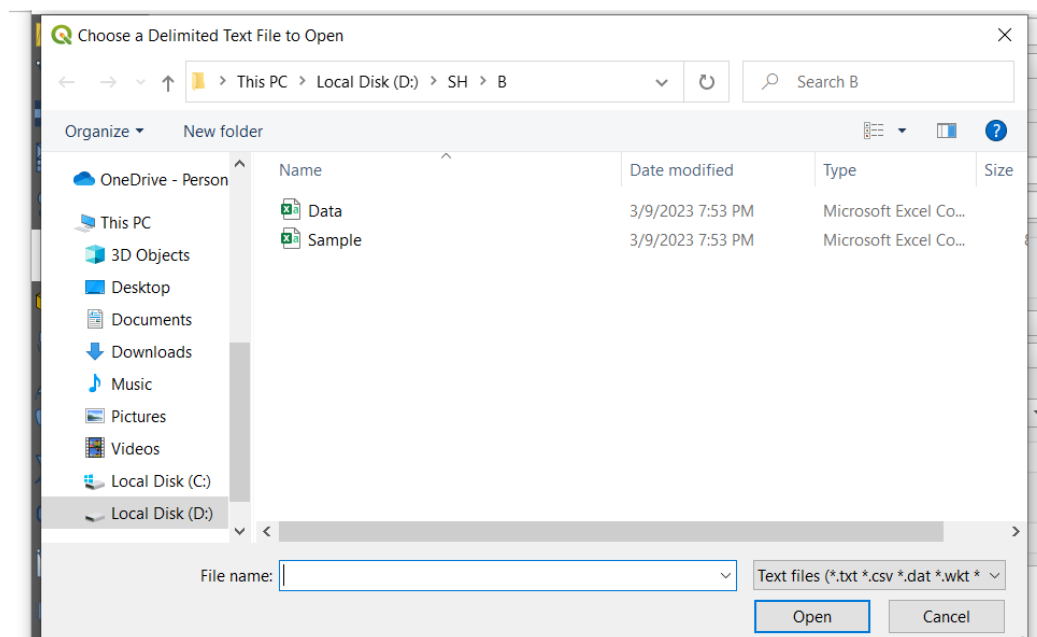
Practical NO.8 : Importing CSV File, Using Plugins.

Step 1: Download CSV file.

Step 2: Add delimited text layer.

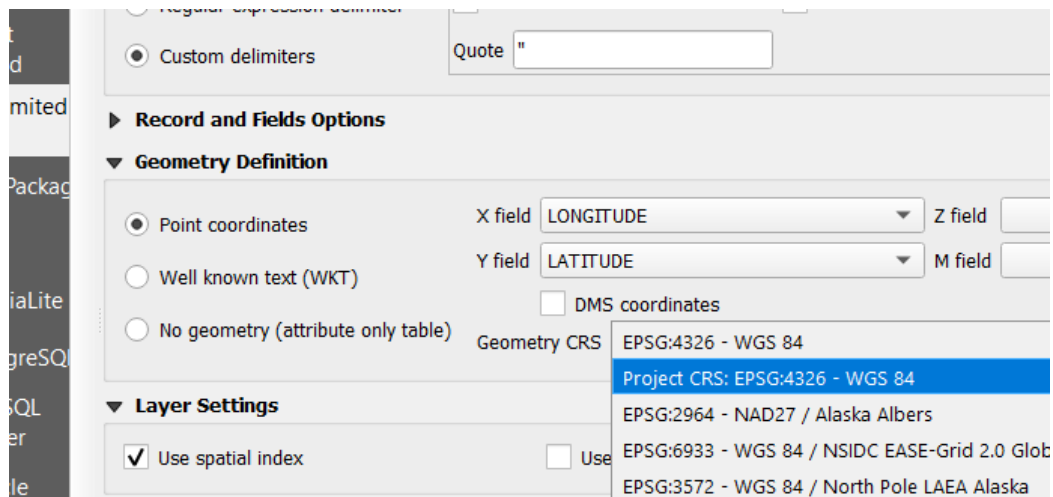


Step 3: Browse Sampe.csv file.



Step 4 : Then click on custom delimiters.

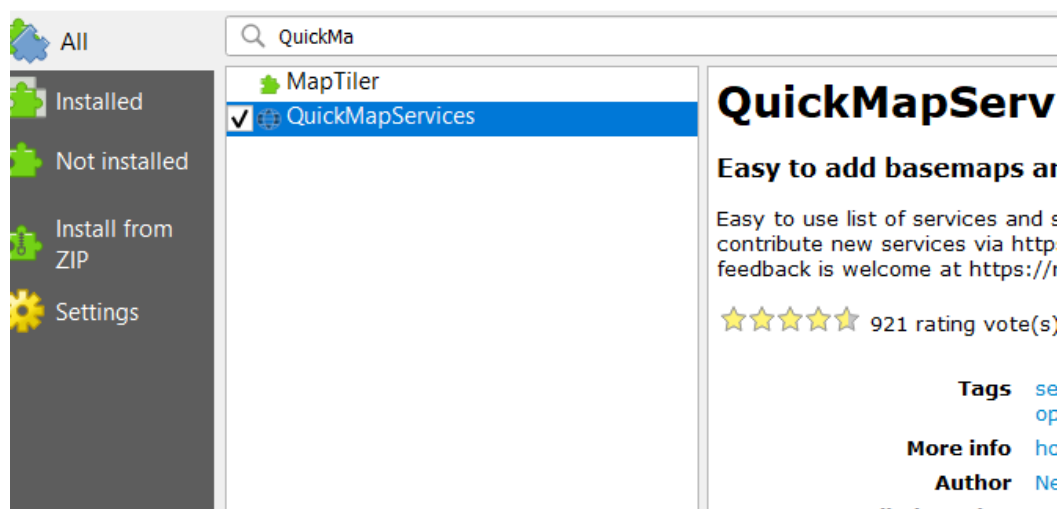
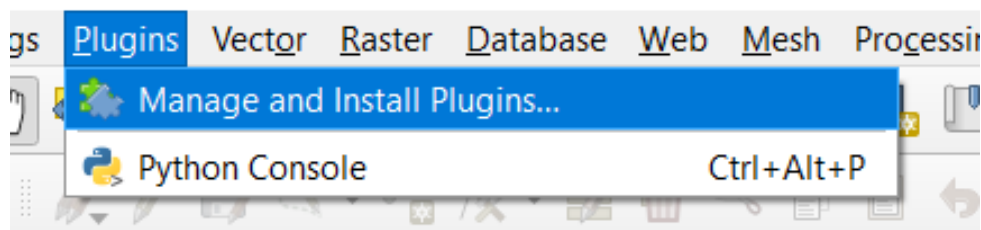
Step 5: In Geometry definition ,click on Point coordinates and then click on Project CRS : EPSG:4326-WGS 84



Step 6: Click on Use spatial index in layer setting and click on add.

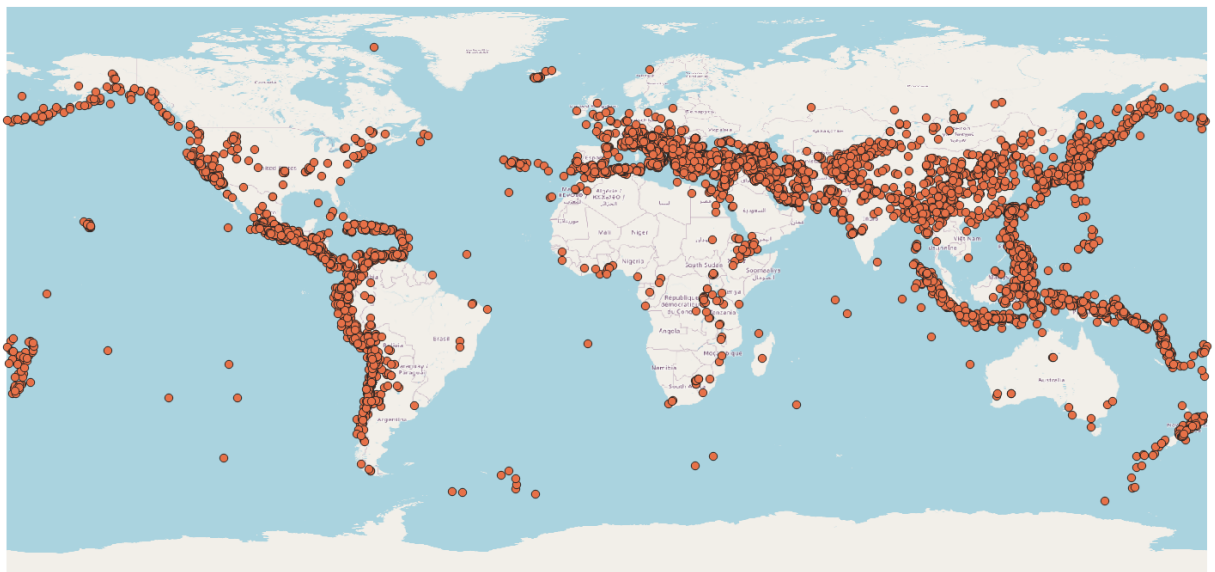
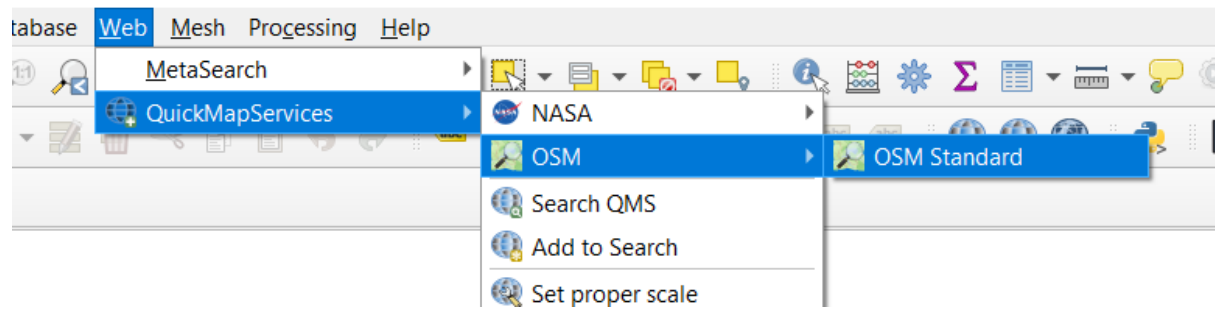
Step 7: Now click on Plugins -> Manage and install package.

Step 8: Then search for QuickMapServices and install the package.



Step 9: Then Click on Web and click on QuickMapServices.

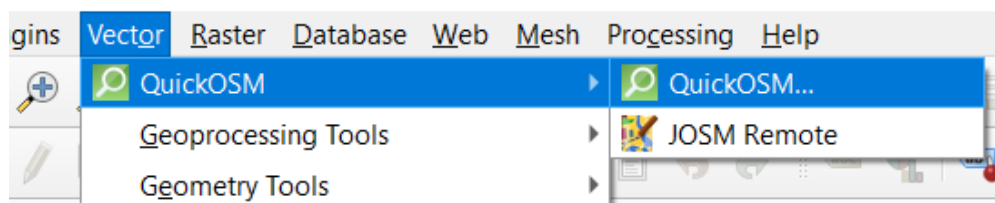
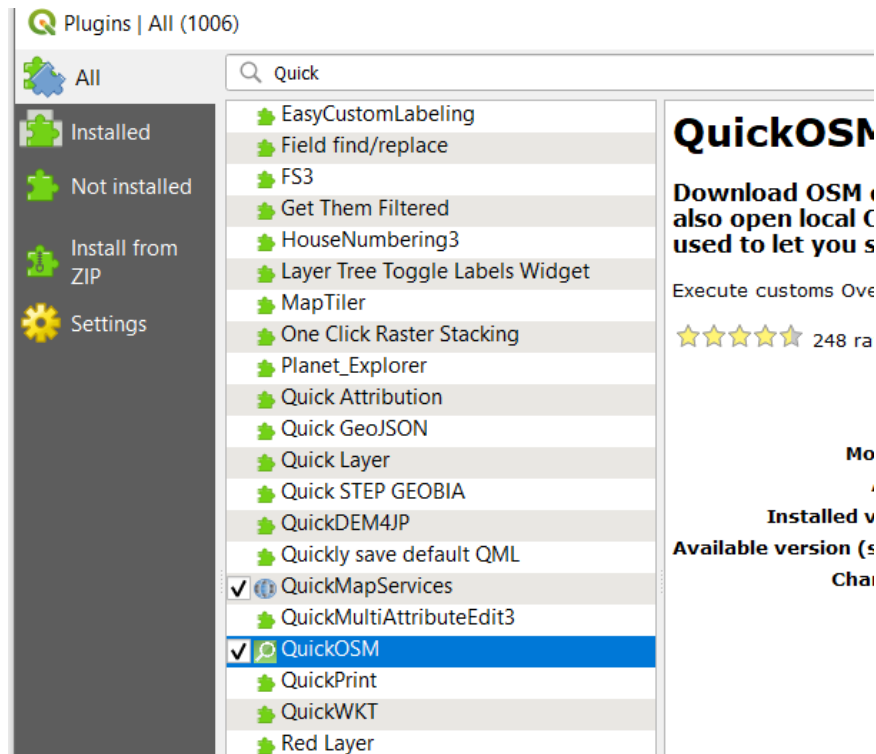
Step 10: Inside it click on OSM -> OSM standard.



Practical NO.9 Searching and downloading Open Street Map.

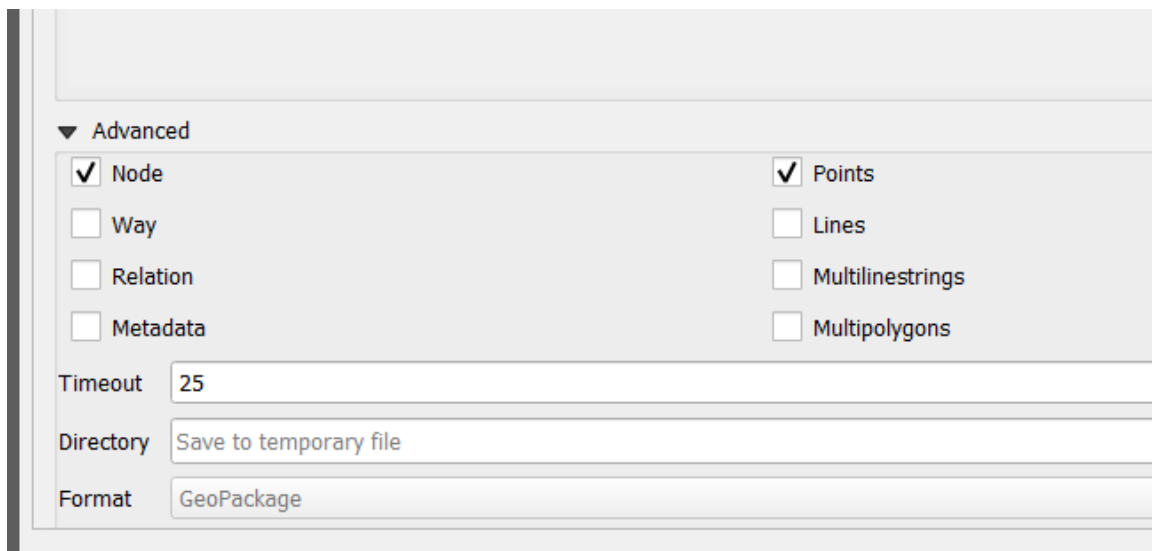
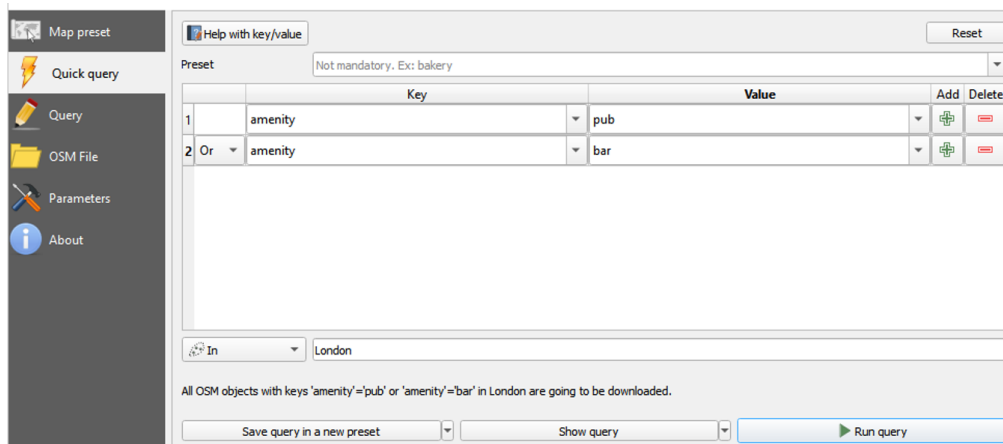
Step 1: Search and install the QuickOSM plugin from the QGIS official Plugin.

Step 2: Go to Vector tab and click on QuickOSM.

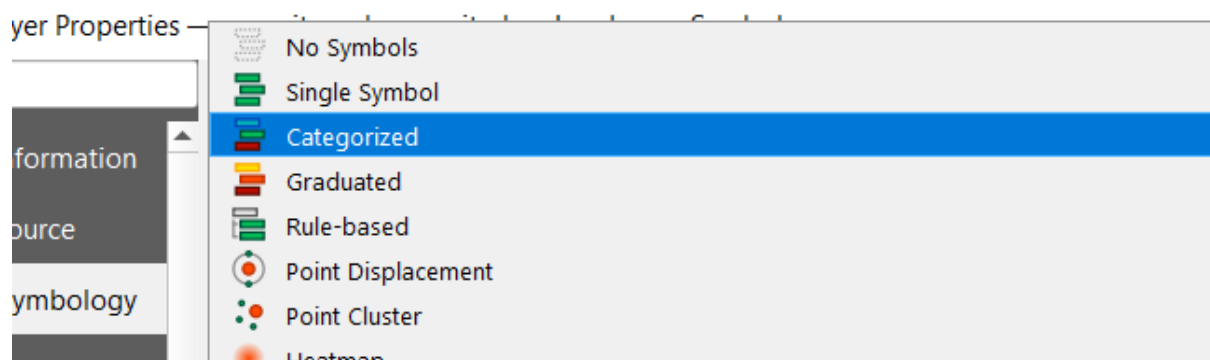


Step 3: In Quick query tab, you can set a filter to select subset. The attributes of the map features in the OSM database are stored as Tags. Tags are represented with a key and a value. The key is a topic and value is a specific form. See the OSM Map Features wiki page for a comprehensive list of tags for various types of features.

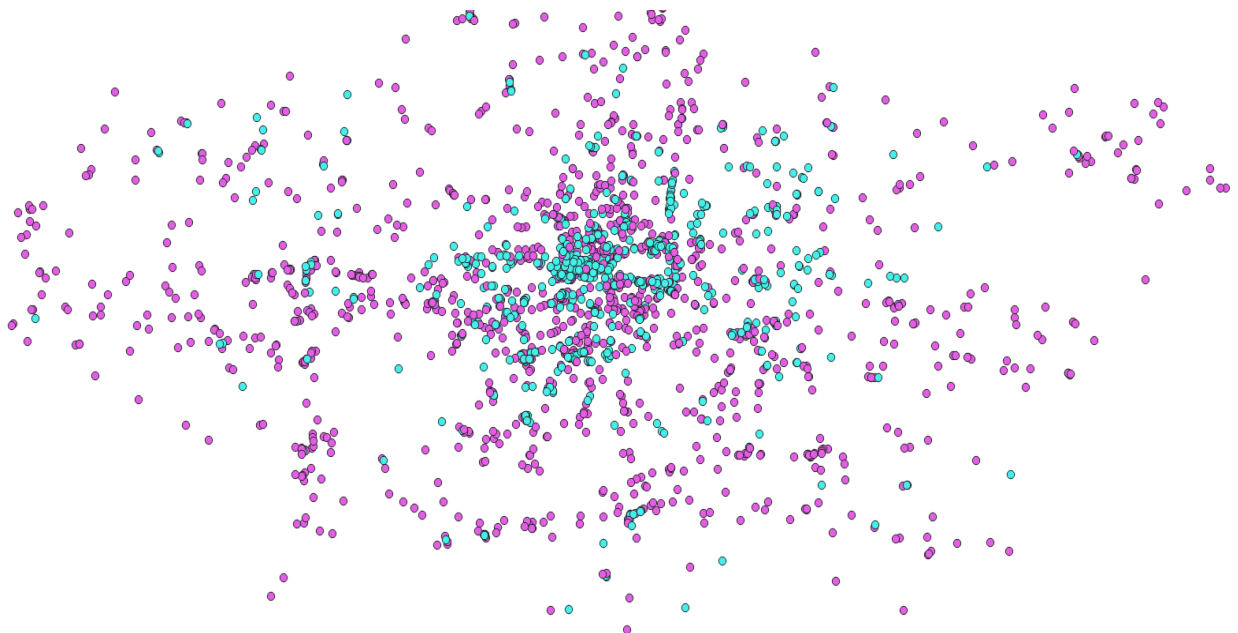
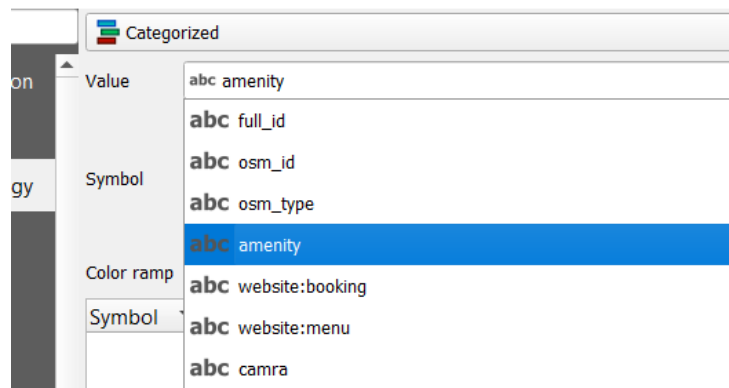
Step 4: Bars are represented using the tag amenity: bar and pubs with tag amenity:pub.



Step 5: Now right click on the layer and go to properties. Then make it from single-symbol to categorized In Symbology.



Step 6: Click on amenity in Value and then click on classify

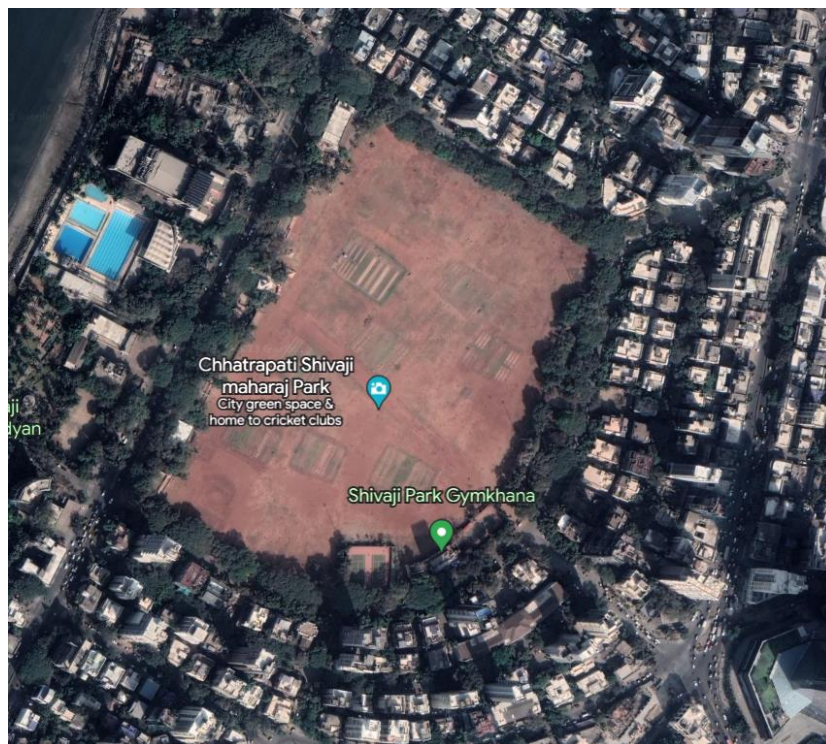


Practical NO.10: Digitizing In GIS.

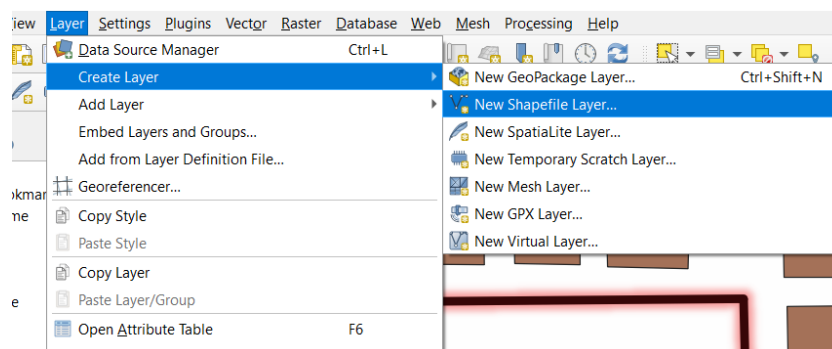
Digitizing in GIS is the process of converting geographic data either from a hardcopy or a scanned image into vector data by tracing the features.

Step 1 : Add raster layer from layers menu.

Step 2 : Browse the file of screenshot that you have saved and click on OK.



Step 3 : Draw the polygon using shapefile from layers .



File name: aaa.dbf

File encoding: UTF-8

Geometry type: Polygon

Additional dimensions:

New Field

Name:

Type: abc Text (string)

Length: 80 Precision:

Add to Fields List

Fields List

Name	Type	Length	Precision
id	Integer	10	
Sahu	String	80	

Step 4 : Draw the polygon according to the map like Practical 1.



Step 5 : Draw lines and points also in the same way and remove the raster layer after drawing.

