

#Within 100-meter buffer from water sources waste dumping is not allowed. Identify possible waste dumping sites.

##Draw the flowchart

##Develop a python program to perform this task

#Add water sources layer

from qgis.core import QgsVectorLayer, QgsField

file\_name = "C:\\spatial\_data\\data\\water\_sources.shp"

water\_sources = QgsVectorLayer(file\_name,"water\_sources", "ogr")

QgsProject.instance().addMapLayer(water\_sources)

#-----

#100m buffer for water sources

features = water\_sources.getFeatures()

print(type(features))

buffers = []

for feature in features:

    buffers.append(feature.geometry().buffer(0.1,5))

union\_geometry = QgsGeometry.unaryUnion(buffers)

#Create a QgsVectorLayer from the union geometry

```
buffer_layer = QgsVectorLayer("Polygon?crs=EPSG:4326","Union Geometry", "memory")
pr = buffer_layer.dataProvider()
buffer_layer.startEditing()

#Define the attributes (if needed)
fields = [QgsField("id", QVariant.Int)]
pr.addAttributes (fields)

#Add a feature with the union geometry
feature = QgsFeature()
feature.setGeometry(union_geometry)
feature.setAttributes([1])
pr.addFeatures([feature])
buffer_layer.commitChanges()

# Specify the path to save the shapefile (replace with your desired file path)
output_shapefile_path = "C:\\spatial_data\\Result\\water_sources_buffer.shp"

# Use QgsVectorFileWriter to save the layer as a shapefile
error = QgsVectorFileWriter.writeAsVectorFormat(buffer_layer,
"C:\\spatial_data\\Result\\water_sources_buffer.shp", "UTF-8", buffer_layer.crs(), "ESRI Shapefile")

#Add water_sources_buffer
from qgis.core import QgsVectorLayer, QgsField

file_name = "C:\\spatial_data\\Result\\water_sources_buffer.shp"

water_sources_buffer = QgsVectorLayer(file_name,"water_sources_buffer", "ogr")
```

```
QgsProject.instance().addMapLayer(water_sources_buffer)
```

```
#-----
```

```
#Add waste_dumping_sites
```

```
from qgis.core import QgsVectorLayer, QgsField
```

```
file_name = "C:\spatial_data\data\waste_dumping_sites.shp"
```

```
waste_dumping_sites = QgsVectorLayer(file_name,"waste_dumping_sites", "ogr")
```

```
QgsProject.instance().addMapLayer(waste_dumping_sites)
```

```
#-----
```

```
#file_name = "C:\spatial_data\data\waste_dumping_sites.shp"
```

```
#-----
```

```
#Like Union Geometry
```

```
waste_dumping_sites = QgsVectorLayer(file_name,"possible waste dumping sites", "ogr")
```

```
is_within = QgsField("is_within", QVariant.String)
```

```
waste_dumping_sites.startEditing()
```

```
waste_dumping_sites.dataProvider().addAttributes([is_within])
```

```
waste_dumping_sites.updateFields()
```

```
#Like within union geometry
```

```
waste_dumping_sites_features = waste_dumping_sites.getFeatures()
```

```
for wf in waste_dumping_sites_features:
```

```
    contains = union_geometry.contains(wf.geometry())
```

```
waste_dumping_sites.changeAttributeValue(wf.id(),waste_dumping_sites.fields().indexOfName(  
"is_within"), f"{str(contains)}")
```

```
# Commit the changes
```

```
waste_dumping_sites.commitChanges()
```

```
QgsProject.instance().addMapLayer(buffer_layer)
```

```
QgsProject.instance().addMapLayer(waste_dumping_sites)
```

```
#-----
```