**First Milestone Report**

**Course Information:**

Course code : CSE 6331

Course Section : 002

Course Name : Adv topics in Database systems

Course focus : Spatial, Temporal and spatial-temporal databases

**Project Team Information:**

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Team member 2 : Kumar, Niraj

1. Provide proof of loading the data to SDBMS and describe how you loaded

the data. Also show screenshot of the tables showing the first 10 rows in

each table.

**Steps to load the data into spatial GUI:**

* 1. Open spatial GUI app

Graphical user interface, application

Description automatically generated

* 1. Click on Load Shapefile icon located on the top

Graphical user interface, application

Description automatically generated

* 1. Select the shape file to be uploaded
     1. For county\_boundary shape file:

Graphical user interface, text, application

Description automatically generated

* + 1. For DFW\_WAZE\_shap\_file shape file:

Graphical user interface, application, Word

Description automatically generated

* + 1. For roads\_2017\_u shape file:

Graphical user interface, text, application

Description automatically generated

* 1. First 10 rows of the tables are:
     1. For county\_boundary shape file:

Table

Description automatically generated

* + 1. For DFW\_WAZE\_shap\_file shape file:

Table

Description automatically generated

* + 1. Calendar

       Description automatically generatedFor roads\_2017\_u shape file:

1. Analysis of the given dataset. Provide documentation to show that you

studied each table and understand what kind of attributes and information

exists in each table.

* + 1. For county\_boundary shape file:

|  |  |
| --- | --- |
| pk\_uid | Unique ID - primary key |
| objectid | Each geometry polygon has unique ID |
| fips\_st\_cn | Federal Information Processing Standards County Code |
| cmptrl\_cnt | The data holds Texas comptroller value |
| cnty\_nm | County Name |
| dps\_cnty\_n | DPS County Number |
| txdot\_ cnty | Texas Department of Transportation County Number |
| txdot\_ dist | Texas Department of Transportation District Number |
| gid | Geometry ID |
| shape\_are | Shape Area |
| shape\_len | Shape length |
| geometry | Geometry Object |

* + 1. For DFW\_WAZE\_shap\_file shape file:

|  |  |
| --- | --- |
| pk\_uid | Unique ID - primary key |
| event\_type | Type of Event that occurred |
| facility\_n | Facility ID number |
| direction | Direction in which event occurred |
| article\_co | between? |
| from\_loc\_p | Starting Position of event |
| to\_loc poi | End location of event |
| create tim | Event Create time |
| last\_updat | Last Updated time of event |
| close Time | End time of event |
| event\_desc | Event Description |
| city | City where event occurred |
| county | County where event occurred |
| state | State where event occurred |
| update\_num | how many times the event has been updated |
| day | Day of the Event occurred |
| geometry | Geometry Object |

* + 1. For roads\_2017\_u shape file

|  |  |
| --- | --- |
| pk\_uid | Unique ID - primary key |
| class | Class of Road to which the roads belong |
| objectid | Each geometry Multiline has unique ID |
| prefix | Prefix of Road name |
| name | Road Name |
| type | Type of Road |
| suffix | Suffix of road name |
| full\_name | Full Name of Road |
| road\_class | Class Number of Road to which the roads belong |
| city\_l | which city the road is located in |
| county\_l | which county the road is located in |
| state | which state the road is located in |
| postal\_l | Postal Area Name |
| zip\_l | Zip Code |
| one\_way | Whether road is one way, both ways, or blocked? |
| speed | Speed limit allowed in that road |
| geometry | Geometry Object |

1. Make a list of the spatial functions available in the Spatial DBMS to answer queries in category (2) (Spatial and spatio-temporal queries)

The following is the list of spatial functions available in spatial DBMS to answer queries in category(2)

* 1. AREA()
  2. TOUCHES()
  3. WITHIN()
  4. INTERSECTS()
  5. DIMENSION()
  6. ASTEXT()
  7. LENGTH()
  8. CENTRIOD()

1. Provide the result to each query in the requested format. Also provide the

SQL statement for each query.

***Query category: Spatial***

1. (Number) What is the total area of Tarrant county?

**SELECT** **AREA**(C.GEOMETRY) **AS** AREA **FROM** COUNTY\_BOUNDARY **AS** C

**WHERE** CNTY\_NM = 'Tarrant'



Result:

1. (List of counties -Text ) Which counties are located around Dallas county (share a

boundary with Dallas county)?

**SELECT** C1.PK\_UID,C1.CNTY\_NM **FROM** County\_boundary **AS** C1, County\_boundary **AS** C2

**WHERE** **TOUCHES**(C1.GEOMETRY,C2.GEOMETRY) = 1

**AND** C2.CNTY\_NM = 'Dallas'

Table

Description automatically generated

Result:

1. (Number) What is the total length of MATLOCK RD that is located in Tarrant county?

**SELECT** **sum**(**length**(r.geometry)) **as** TOTAL\_LENGTH\_MATLOCK\_RD **FROM** roads\_2017\_u r

**where** r.full\_name = 'MATLOCK RD'

**and** county\_l = 'TARRANT'



Result:

1. Return the list of all roads that are totally inside Tarrant county boundary.

Note: some roads has more than one record, you need to do group by to return each road

name only once.

**SELECT** **DISTINCT** r.full\_name **FROM** County\_boundary c,roads\_2017\_u r

**WHERE** **WITHIN**(r.geometry,c.geometry) = 1

**AND** r.county\_l = 'TARRANT'

Or

**SELECT** r.full\_name **FROM** County\_boundary c,roads\_2017\_u r

**WHERE** **WITHIN**(r.geometry,c.geometry) = 1

**AND** r.county\_l = 'TARRANT'

**GROUP** **BY** r.full\_name

Table

Description automatically generated with medium confidenceResult :

1. (XY coordinate) Return the co-ordinates of the center point of Dallas county as text.

**SELECT** **astext**(**Centroid**(geometry)) **FROM** county\_boundary

**WHERE** cnty\_nm = 'Dallas'

Graphical user interface, text, application

Description automatically generated

Result:

1. (Number) Returns the dimension of the geometric object of Hood county?

**SELECT** **dimension(**geometry**)** **FROM** county\_boundary

**WHERE** cnty\_nm = 'Hood'

Text

Description automatically generated with low confidenceResult :

1. (List of roads) Return the names of the roads with class ‘PRIMARY HIGHWAY’ in

Tarrant county.

**SELECT** **DISTINCT** full\_name **from** roads\_2017\_u

**WHERE** class = 'PRIMARY HIGHWAY'

**AND** county\_l = 'TARRANT'

Graphical user interface, application

Description automatically generatedResult:

1. (List) Return all the roads that intersect with ‘S COOPER ST’ in Arlington

**SELECT** **DISTINCT** r1.full\_name **FROM** roads\_2017\_u r1, roads\_2017\_u r2

**WHERE** **INTERSECTS**(r1.geometry,r2.geometry) = 1

**AND** r2.full\_name = 'S COOPER ST'

**AND** r1.full\_name != 'S COOPER ST'

**AND** r1.city\_l = 'ARLINGTON'

**AND** r2.city\_l = 'ARLINGTON'

Graphical user interface, application

Description automatically generatedResult:

1. (County name and size) Return the name of the largest county in size?

**SELECT** cnty\_nm, **max(Area**(geometry)**)** **FROM** county\_boundary

Text, whiteboard

Description automatically generatedResult:

***Query category: Non-spatial***

1. (list) List the unique event types from WAZE data set.

**SELECT** **DISTINCT** EVENT\_TYPE **FROM** DFW\_WAZE\_shap\_file

Text, table

Description automatically generated with medium confidence

**Result:**

1. (bar chart- only the result from the 2nd row to the 6th row) Return the WAZE event type

and total of each type that happened in Arlington on 12/08/2018 order from the largest.

**SELECT** event\_type,**count**(event\_type)**as** total **FROM** DFW\_WAZE\_shap\_file

**WHERE** city = 'Arlington'

**AND** create\_tim **LIKE** '2018-12-08 %'

**AND** close\_time **LIKE** '2018-12-08 %'

**GROUP** **BY** event\_type

**order** **by** total **DESC**

**LIMIT** 1,5

Graphical user interface, text, application, table

Description automatically generated with medium confidence

Result:

1. (bar chart – only the result from the 1st row to the 3rd row) Return the WAZE event type

and total of each type that happened in Dallas on 12/25/2018 between 10:00:00 and

12:00:00 order from the largest.

**SELECT** event\_type,**count**(event\_type)**as** total **FROM** DFW\_WAZE\_shap\_file

**WHERE** city = 'Dallas'

**AND** create\_tim **BETWEEN** '2018-12-25 10:00:00' **AND** '2018-12-25 12:00:00'

**AND** close\_time **BETWEEN** '2018-12-25 10:00:00' **AND** '2018-12-25 12:00:00'

**GROUP** **BY** event\_type

**order** **by** total **DESC**

**LIMIT** 0,3

Graphical user interface, text, application

Description automatically generated

Result:

1. (Table with event type and total) Retrieve total of each WAZE events that happened on

the third Sunday in Dallas city.

**SELECT** EVENT\_TYPE,**COUNT**(EVENT\_TYPE) **FROM** DFW\_WAZE\_shap\_file

**WHERE** DAY = 'Sunday'

**AND** city = 'Dallas'

**AND** **DATE**(CREATE\_TIM) **BETWEEN** '2018-12-14' **AND** '2018-12-21'

**GROUP** **BY** EVENT\_TYPE

Graphical user interface, text, application

Description automatically generated

Result:

***Query category: Spatio-temporal***

1- (streets name) Return the street name and location of event with event type “accident”

that happened in Tarrant county on 12/09/2018 between 6:00 and 19:00?

**SELECT** **DISTINCT** facility\_n,**astext(**geometry**)** **FROM** DFW\_WAZE\_shap\_file

**WHERE** event\_type = 'accident'

**and** county = 'Tarrant'

**and** create\_tim **between** '2018-12-09 06:00:00' **and** '2018-12-09 19:00:00'

**and** close\_time **between** '2018-12-09 06:00:00' **and** '2018-12-09 19:00:00'

Graphical user interface, application

Description automatically generated

Result:

2- (Number ) Retrieve the number of traffic jams in Collin county on 12/27/2018 between

7:00:00 and 15:00:00.

**SELECT** **count**(event\_type) **FROM** DFW\_WAZE\_shap\_file

**WHERE** event\_type = 'traffic jam'

**and** county = 'Collin'

**and** create\_tim **between** '2018-12-27 07:00:00' **and** '2018-12-27 15:00:00'

**and** close\_time **between** '2018-12-27 07:00:00' **and** '2018-12-27 15:00:00'

Graphical user interface, text, application

Description automatically generated

Result: