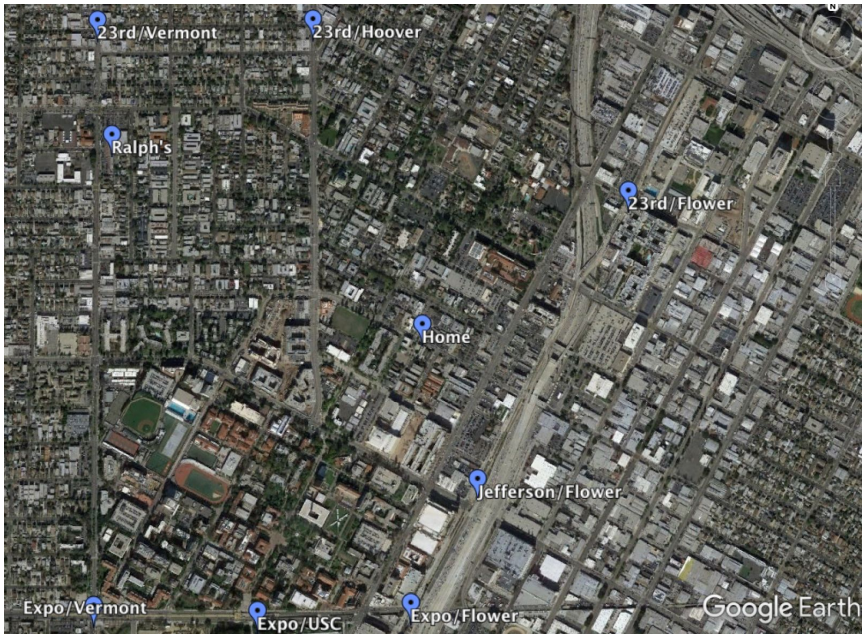
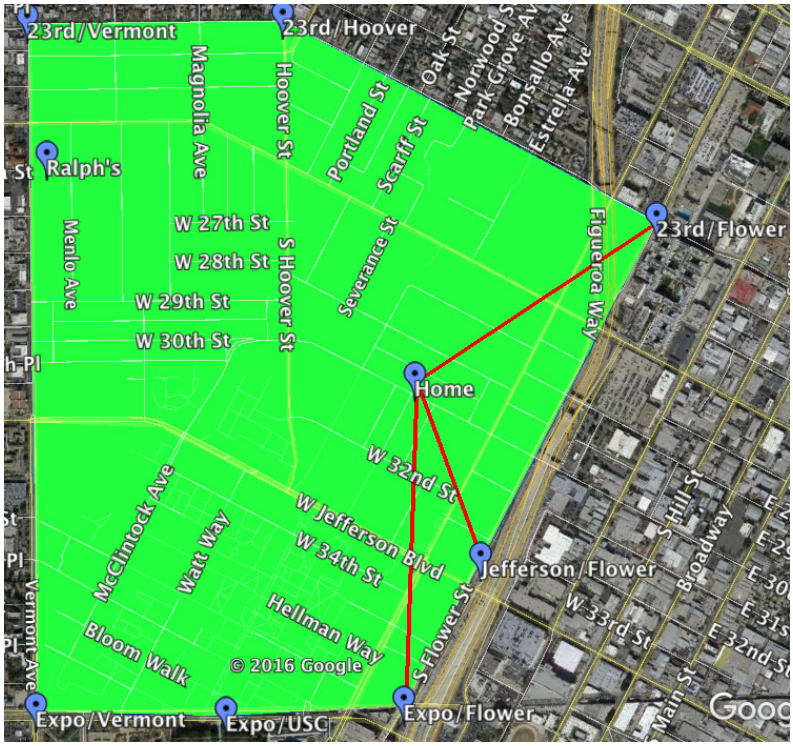
HW 3 Solution & Grading Rubrics (6 points + 1 bonus)
Homework Description: http://cs585-usc.updog.co/s18_mlA0loTx/hw/HW3/index.html
KML file, screenshots and script for spirograph curve uploaded along with this file in *Solution.zip*.

KML file 1 point
No partial credit.

- Should have 9 different GPS locations, not necessarily around LA or USC area.
- Should have convex hull mapped and 3 nearest neighbours connected. If either the convex hull, 1 or more nearest neighbors or 1 or more of the GPS locations are missing, 0 points.
- Location described should match with given coordinates.

Screenshots of results (1 point)
No partial credit.





Selfie pics No points awarded. Points deducted if:

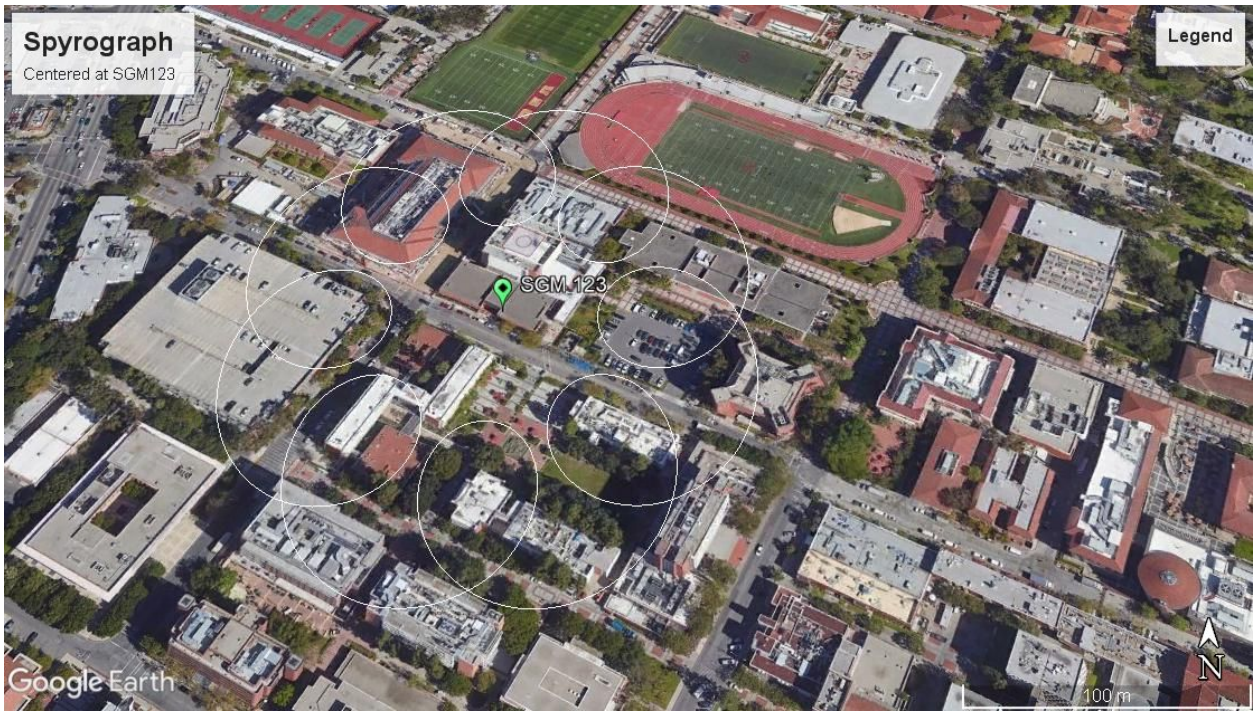
- -2 if 0-4 selfies submitted.
- -1 if 5-8 selfies submitted.
- Locations in selfies do not match those in the KML file.
- Selfie is only a picture of the location. (Since the selfies were required to ensure location was actually visited)

SQL part **2 points** for convex hull and **2 points** for nearest neighbours.
No partial credit for convex hull.

- -1 if **GPS location of points are not hardcoded** in queries **and no create statements** available for both queries (1 each).
- -2 if convex hull generated is not convex :-) (having some points outside the boundary). (Sometimes the convex hull might have some parallax, that is accepted)
- -1 If nearest neighbors are sorted incorrectly (farthest 3 points given)
- -2 if nearest neighbours are incorrect (random points chosen, no sorting done)
- -2 if all the distances computed in separate queries and no sorting done.
- No points deducted for not limiting to top 3, as long as the distances have been sorted in increasing order.

Bonus 1 point
No partial credit.
Points awarded only if all the following are present.

- need to show a Spirograph curve with 8 loops, exactly as shown in the HW3 description page.
- Screenshot with spirograph curve plotted
- KML file (pasted in PDF, is fine)
- Code to generate spirograph curve.



The spirograph curve should be complete, symmetric,

Allowed corner cases:

- Size of spirograph very large/very small.
- If the curve in KML above the ground by some distance.

Queries:

--Creating a new table with name and gps coordinate

CREATE TABLE MyNeighborhood (name VARCHAR(1000), gps GEOMETRY);

--Inserting 9 points in the Map

INSERT INTO MyNeighborhood VALUES
('23rd/Vermont',ST_GeomFromText('POINT(-118.291565 34.035194)')),
('Expo/Vermont',ST_GeomFromText('POINT(-118.291507 34.018334)')),
('Expo/USC',ST_GeomFromText('POINT(-118.285882 34.018196)')),
('Expo/Flower',ST_GeomFromText('POINT(-118.280628 34.018426)')),
('Jefferson/Flower',ST_GeomFromText('POINT(-118.278325 34.021933)')),
('23rd/Flower',ST_GeomFromText('POINT(-118.273055 34.030199)')),
('23rd/Hoover',ST_GeomFromText('POINT(-118.28402 34.035209)')),

('Ralph''s',ST_GeomFromText('POINT(-118.291022 34.03184)')),
('Home',ST_GeomFromText('POINT(-118.280215 34.026354)'));

--Calculating convex hull

```
CREATE TABLE ConvexHull AS (SELECT ST_CONVEXHULL(ST_MULTI(ST_COLLECT(gps))) Hull from MyNeighborhood);
SELECT ST_ASTEXT(Hull) Hull FROM ConvexHull;
```

--Finds 3 closest point

```
SELECT nn.name, ST_ASTEXT(local.gps) as Home, ST_ASTEXT(nn.gps) as Neighbor
FROM MyNeighborhood local, MyNeighborhood nn
WHERE local.name='Home' and nn.name <> 'Home'
ORDER BY ST_Distance(local.gps, nn.gps) ASC LIMIT 3;
```

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