Problem Set 5 - Bus Simulation & Visualization

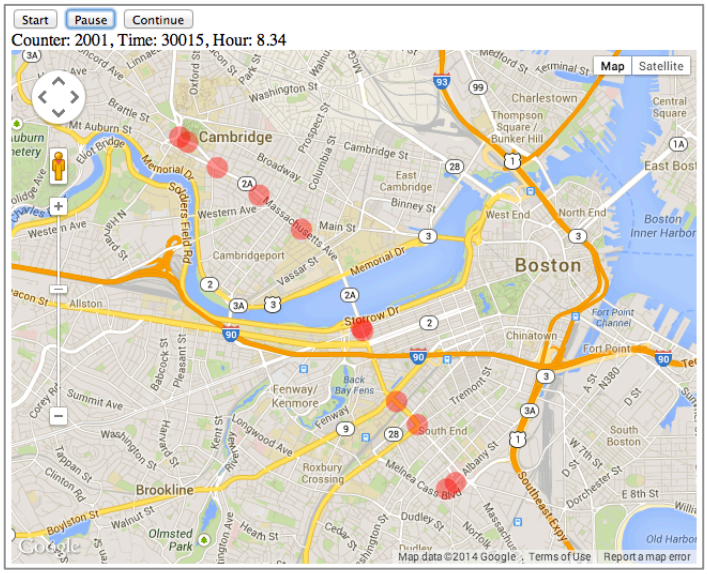
This homework assignment asks you to simulate the MBTA buses for route 1. The goal of this problem set is to get you started working with spatial and temporal data. You will need to create a simulation and visualization of route 1 buses using data from March 7th, 2012. We will provide the data for you.

You can work in pairs for this homework set.

The key deliverables you will need for this p-set are:

- Use bus data from March 7th, 2012
- Select the google maps view that encompasses all of Route 1
- Create a timer that ticks every 15 milliseconds
- Create three buttons with following functionality:
    - Start the simulation
    - Pause the simulation
    - Continue the simulation
- Analyze the data to draw the bus locations correctly on the google maps view
- Draw the bus locations for every timer tick for 24 hours starting at midnight.
- Display the current time (on March 7th, 2012) and the number of timer clicks since the start of the simulation

Your end result should look like this:



Some steps to get you started are:

1. Select the appropriate google map as your background
2. Write the code to process the raw bus location data

3. Write the function for the simulation time step
4. Write the code to visualize (draw) the buses for each time step
5. Style your Map

Optional: once you get going, there are many more things you can do. For example:

1. Color code bus numbers
2. Display the number of buses running at any one time
3. Display a direction arrow
4. Detect congestion
5. What is the best of time of the day to take the bus?
6. What is the worst time of the day to take the bus?
7. Create a slide bar to move back and forward in time.

For the optional section, if you would like more data, see: http://agriculture.mit.edu/data

---

The Raw Data Format


```
{"id":"1",
"vehicleId":"2190",
"routeTag":"1",
"dirTag":"1_0_var0",
"lat":"42.3567839",
"lon":"-71.0923276",
"secsSinceReport":"4",
"predictable":"true",
"heading":"340",
"speedKmHr":"0.0",
"time":"1331052517318",
"secondsPastMidnight":"42517",
"utc":"3/6/2012 4:48:37 PM",
"local":"3/6/2012 11:48:37 AM",
"epoch":"1331052517",
"lastTime":"1331052517318"}
```


Referencing the data

```
<script type="text/javascript" src="03_07_2012.js"></script>
```

Reference Videos:

Problem set Guide
http://player.vimeo.com/video/121960561

Demo of the running simulation
http://player.vimeo.com/video/87962579

Map basics
http://player.vimeo.com/video/87965564

Map Overlay
http://player.vimeo.com/video/87966916

Timers
http://player.vimeo.com/video/87964292