

## Problem Set - Bus Simulation & Visualization

In this assignment you will create a tracker for MBTA buses, route 1. Our goal is to give you some practice with spatial and temporal data.

You can sign up for an MBTA developer key at:  
<https://www.mbta.com/developers/v3-api>

The URL for MBTA route 1 is (replace YOUR\_KEY with the key you get from MBTA):  
[https://api-v3.mbta.com/vehicles?api\\_key=YOUR\\_KEY&filter\[route\]=1&include=trip](https://api-v3.mbta.com/vehicles?api_key=YOUR_KEY&filter[route]=1&include=trip)

### Question 1 - standalone sample data file:

What is the schema of data provided by MBTA? Include a JSON file, call it "sample.json", with the data for one bus only.

```
{
  "id": 4007576,
  "num_cars": null,
  "agency_id": 52,
  "route_id": 4011640,
  "call_name": "209",
  "current_stop_id": null,
  "next_stop": 0,
  "position": [42.38058, -71.12424],
  "heading": 163,
  "speed": 5,
  "segment_id": null,
  "timestamp": 1551370155000,
  "load": null,
  "apc_status": "up"
}
```

Sample Data File  
(Not for MBTA)

### Question 2 - console application:

Write a timer that returns the MBTA data for route 1 every 15 seconds. Name your file "getData.js". Sample output below - not MBTA data.

```
abel@mbp:~/Desktop/Lecture/students/01_fetch/fetch_cli$ node getData.js
Thu Feb 28 2019 10:17:43 GMT-0500 (Eastern Standard Time)
-----
YOUR DATA
-----
Thu Feb 28 2019 10:17:58 GMT-0500 (Eastern Standard Time)
-----
YOUR DATA
-----
Thu Feb 28 2019 10:18:13 GMT-0500 (Eastern Standard Time)
-----
YOUR DATA
-----
Thu Feb 28 2019 10:18:28 GMT-0500 (Eastern Standard Time)
-----
YOUR DATA
-----
```

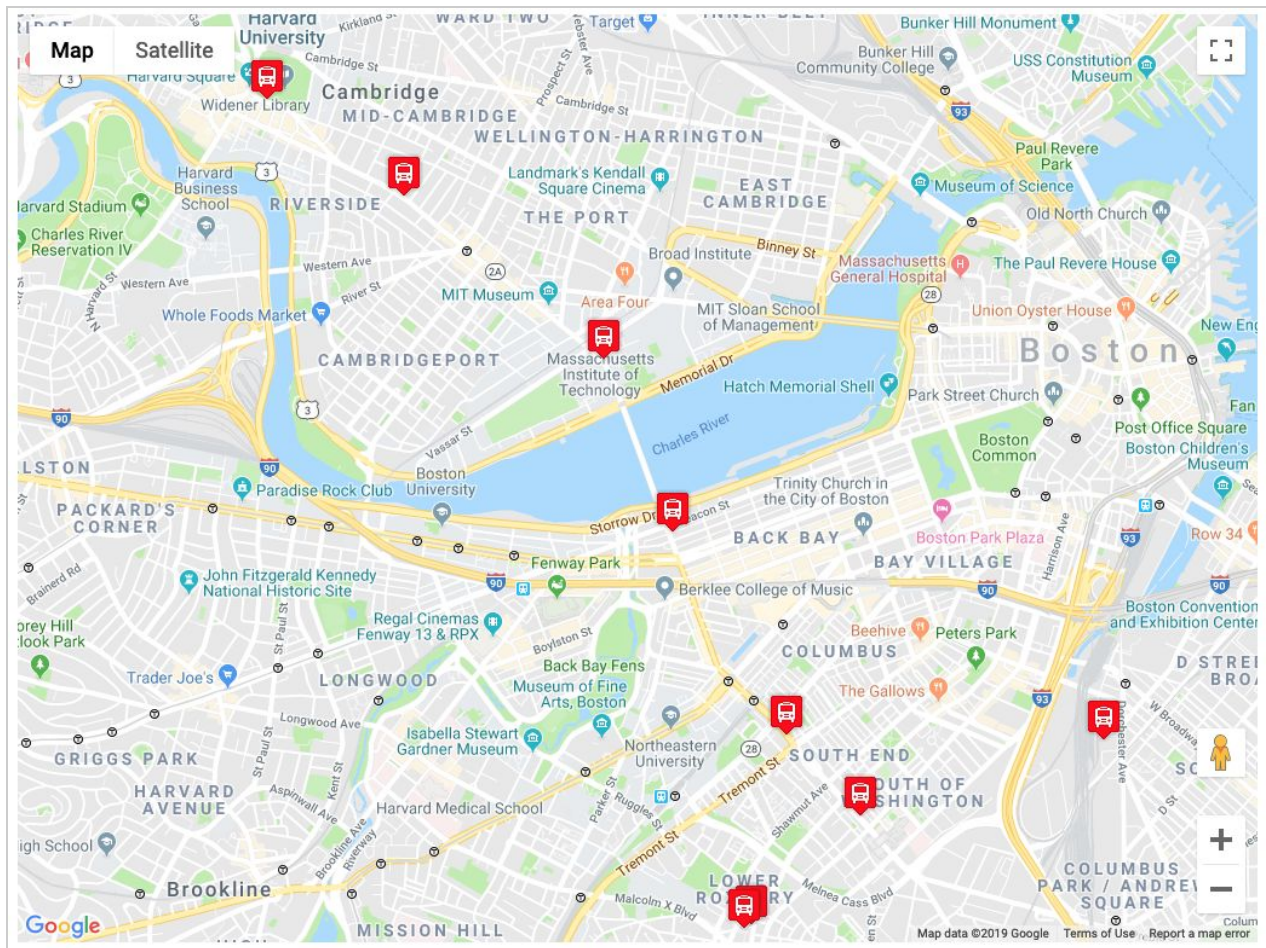
**Question 3 - add markers to map:**

Create a map, place markers for the locations below. Set the center and zoom level so all locations are visible. Name your file "markers.html".

Latitude	Longitude
42.388517	-71.119043
42.373483	-71.118754
42.365337	-71.103534
42.362423	-71.085583

**Question 3 - call once, show buses:**

Make a single call to MBTA route 1. Show the locations of all the buses.





#### Question 4 - track buses:

Use a timer, call MBTA route 1 every 15 seconds, update bus locations on the map.

Use two colors for markers. One for inbound, the other for outbound.

