

CS602 Module2 Assignment

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The following document should not be disseminated outside the purview of its intended purpose.

General Rules for Homework Assignments

- You are strongly encouraged to add comments throughout the program. Doing so will help your instructor to understand your programming logic and grade you more accurately.
- You must work on your assignments individually. You are not allowed to copy the answers from the others.
- Each assignment has a strict deadline. Assignments submitted after the deadline will have a penalty.
- When the term *lastName* is referenced in an assignment, please replace it with your last name.

Download and extract the starter template zip file, CS602_HW2_*lastName***. Rename the folder with your last name. Complete the corresponding JavaScript and View files in this folder.**

Part 1 – net Module (25 Points)

Use the subfolder **part1** and complete the following files. Copy the `zipCodeModule_v2.js` from Module1 assignment. Complete the server application (`server/server.js`) and the client application (`client/client.js`) using the `net` module. The clients communicate with the server using the following commands:

- `lookupByZipCode,<zip>`
- `lookupByCityState,<city>,<state>`
- `getPopulationByState,<state>`

The **server** application listens for client connections and when the client command is received, processes the request by invoking the corresponding function available through the `zipCodeModule`. The server then uses `JSON.stringify` to send the result back to the client.

The **client** application reads commands from the user's console in a loop and sends the commands to the server. When the data is received back from the server, the corresponding result is printed to the console.

Test the application with the server running in one window, and a client running in a separate window.

The sample output of the server and the client application is shown below. You can optionally use the `colors` module for colors in the output.

```
> node server.js
Listening for connections on port 3000
Client connection...
Client connection...
...Received lookupByZipCode,02215
...Received lookupByZipCode,99999
...Received lookupByCityState,BOSTON,MA
...Received lookupByCityState,BOSTON,TX
...Received getPopulationByState,MA
...Received getPopulationByState,TX
...Received lookupByState,MA

> node client.js
Connected to server
Enter Command: lookupByZipCode,02215
...Received
{"_id":"02215","city":"BOSTON","pop":17769,"state":"MA"}
Enter Command: lookupByCityState,BOSTON,MA
...Received
{"city":"BOSTON","state":"MA","data":[{"zip":"02108","pop":3697},
{"zip":"02109","pop":3926},{"zip":"02110","pop":957},{"zip":"02111",
"pop":3759},{"zip":"02113","pop":6698},{"zip":"02114","pop":1024
6},{"zip":"02115","pop":25597},{"zip":"02116","pop":17459},{"zip":
"02199","pop":886},{"zip":"02210","pop":308},{"zip":"02215","pop":
17769}]}
Enter Command: getPopulationByState,MA
...Received
{"state":"MA","pop":6016425}
Enter Command: lookupByState,MA
...Received
"Invalid request"
Enter Command: █
```

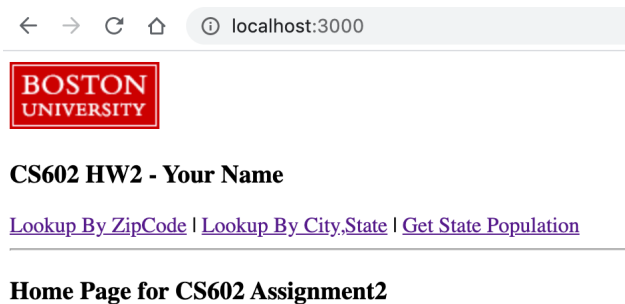
Part 2 – Express, Handlebars & REST Endpoints (75 Points)

Use the subfolder part2 and complete the following files. Copy the `zipCodeModule_v2.js` from Module1 assignment. Complete the Express server application (`server.js`) and the corresponding views to do the following:

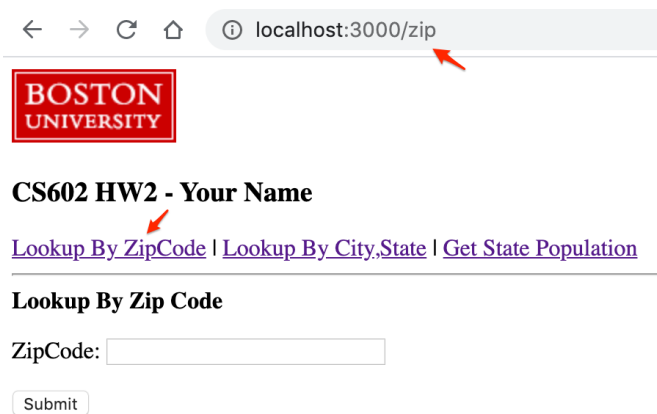
- GET request – `/`
Render the home view with a welcome message.
- GET request – `/zip`
If the request query `id` parameter is present, lookup the corresponding data and render the `lookupByZipView`.
Otherwise, render the `lookupByZipForm`.
- POST request – `/zip`
Lookup the corresponding data for the request body `id` parameter and render the `lookupByZipView`.
- GET request – `/zip/:id`
Should be capable of handling json, xml, and html requests.
Use the named routing `id` parameter and lookup the corresponding data.
For html request, render the `lookupByZipView`.
- GET request – `/city`
If the request query `city` parameter and `state` parameter are present, lookup the corresponding data and render the `lookupByCityStateView`.
Otherwise, render the `lookupByCityStateForm`.
- POST request – `/city`
Lookup the corresponding data for the request body `state` and `city` parameters and render the `lookupByCityStateView`.
- GET request – `/city/:city/state/:state`
Should be capable of handling json, xml, and html requests.
Use the named routing `city` and `state` parameters and lookup the corresponding data.
For html request, render the `lookupByCityStateView`.
- GET request – `/pop`
If the request query `state` parameter is present, lookup the corresponding data and render the `populationView`.
Otherwise, render the `PopulationForm`.
- GET request – `/pop/:state`
Should be capable of handling json, xml, and html requests
Use the named routing `state` parameter and lookup the corresponding data.
For html request, render the `populationView`.

TESTING THE APPLICATION (BROWSER)

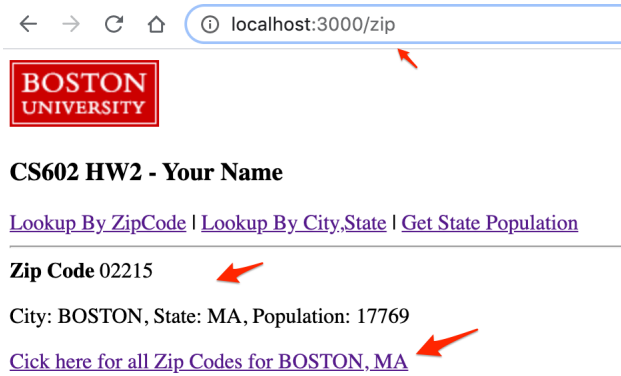
Test the application for html requests using the browser. The default home page can be as shown below.



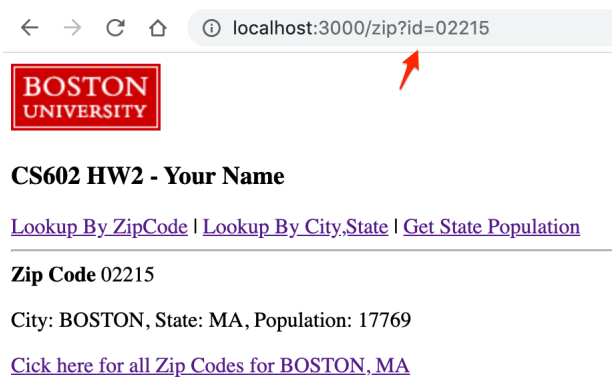
Click the *Lookup By ZipCode* link. The following form is displayed to the user.



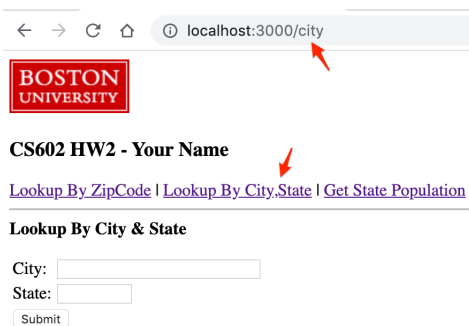
If the user enters, say 02215 for ZipCode and clicks the *Submit* button, the above form is submitted with the POST request. The resulting view is as shown below:



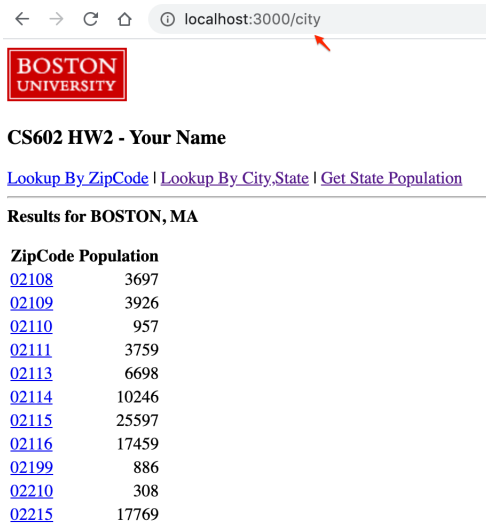
If the user types the direct URL as shown below, the resulting view is as below:



Click the *Lookup By City,State* link. The following form is displayed to the user.



If the user enters, say BOSTON for *City*, MA for *State*, and clicks the *Submit* button, the above form is submitted with the POST request. The resulting view is as shown below:



← → ↻ 🏠 localhost:3000/city

BOSTON UNIVERSITY

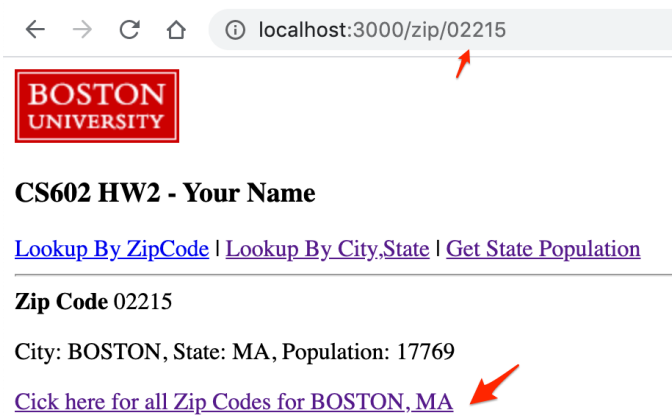
CS602 HW2 - Your Name

[Lookup By ZipCode](#) | [Lookup By City,State](#) | [Get State Population](#)

Results for BOSTON, MA

ZipCode	Population
02108	3697
02109	3926
02110	957
02111	3759
02113	6698
02114	10246
02115	25597
02116	17459
02199	886
02210	308
02215	17769

If the user clicks on a particular zip code in the above view, the result is processed with a GET request as shown below.



← → ↻ 🏠 localhost:3000/zip/02215

BOSTON UNIVERSITY

CS602 HW2 - Your Name

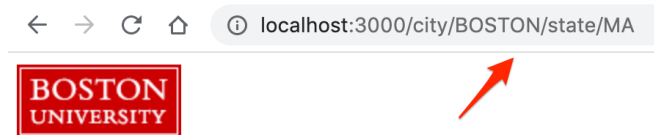
[Lookup By ZipCode](#) | [Lookup By City,State](#) | [Get State Population](#)

Zip Code 02215

City: BOSTON, State: MA, Population: 17769

[Click here for all Zip Codes for BOSTON, MA](#)

In the above view, if the user clicks the last link, the result is processed with a GET request as shown below.



CS602 HW2 - Your Name

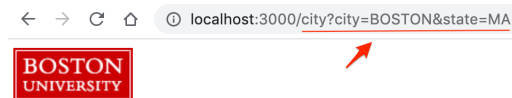
[Lookup By ZipCode](#) | [Lookup By City,State](#) | [Get State Population](#)

Results for BOSTON, MA

ZipCode Population

02108	3697
02109	3926
02110	957
02111	3759
02113	6698
02114	10246
02115	25597
02116	17459
02199	886
02210	308
02215	17769

If the user types the direct URL as shown below, the resulting view is as below:



CS602 HW2 - Your Name

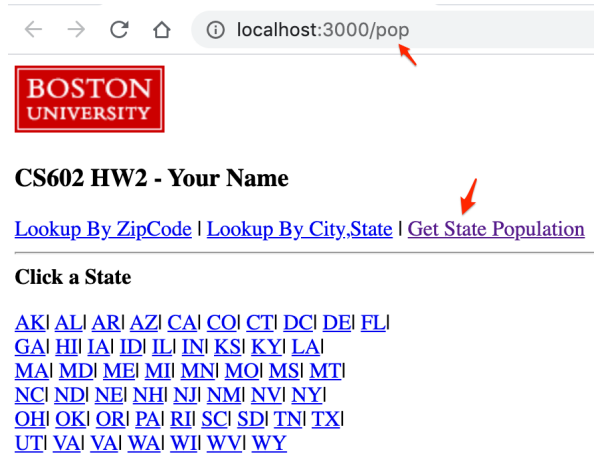
[Lookup By ZipCode](#) | [Lookup By City,State](#) | [Get State Population](#)

Results for BOSTON, MA

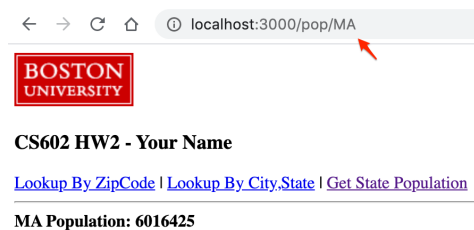
ZipCode Population

02108	3697
02109	3926
02110	957
02111	3759
02113	6698
02114	10246
02115	25597
02116	17459
02199	886
02210	308
02215	17769

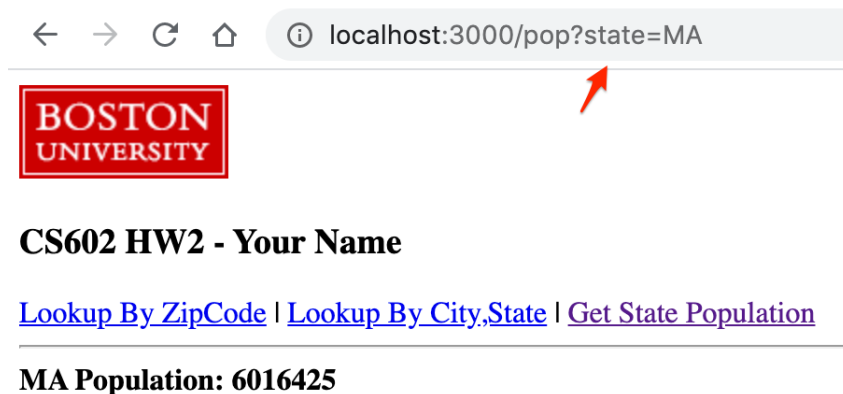
Click the *Get State Population* link. The following page is displayed to the user.



If the user clicks on a state, say MA, in the above view, the result is processed with a GET request as shown below:



If the user types the direct URL as shown below, the resulting view is as below:



TESTING THE APPLICATION (REST Endpoints)

The REST endpoints for JSON and XML data can be tested with **curl** or **Postman**.

The **curl** outputs are shown below (If curl is not installed, see <https://curl.haxx.se/download.html>)

Test the application for the **JSON GET** requests as shown below.

```
> curl -H "Accept:application/json" http://localhost:3000/zip/02215;echo
{"_id":"02215","city":"BOSTON","pop":17769,"state":"MA"}

> curl -H "Accept:application/json" http://localhost:3000/pop/MA;echo
{"state":"MA","pop":6016425}

> curl -H "Accept:application/json" http://localhost:3000/city/BOSTON/state/MA;echo
{"city":"BOSTON","state":"MA","data":[{"zip":"02108","pop":3697}, {"zip":"02109","pop":3926}, {"zip":"02110","pop":957}, {"zip":"02111","pop":3759}, {"zip":"02113","pop":6698}, {"zip":"02114","pop":10246}, {"zip":"02115","pop":25597}, {"zip":"02116","pop":17459}, {"zip":"02199","pop":886}, {"zip":"02210","pop":308}, {"zip":"02215","pop":17769}]}
```

Similarly, test the application for the **XML GET** requests as shown below.

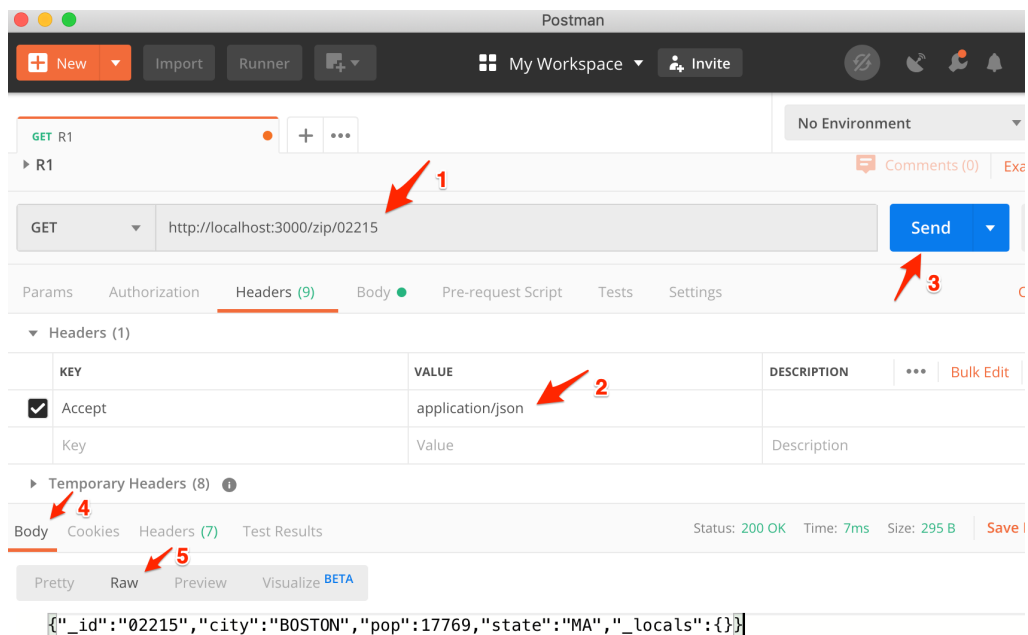
```
> curl -H "Accept:application/xml" http://localhost:3000/zip/02215
<?xml version="1.0"?>
  <zipCode id="02215">
    <city>BOSTON</city>
    <state>MA</state>
    <pop>17769</pop>
  </zipCode>

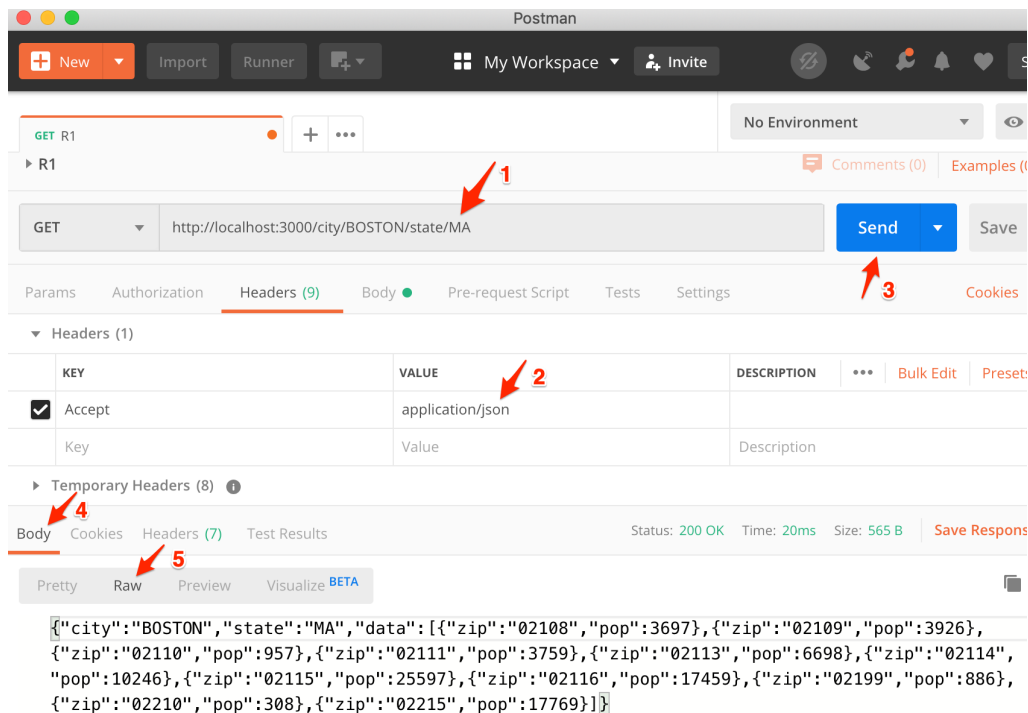
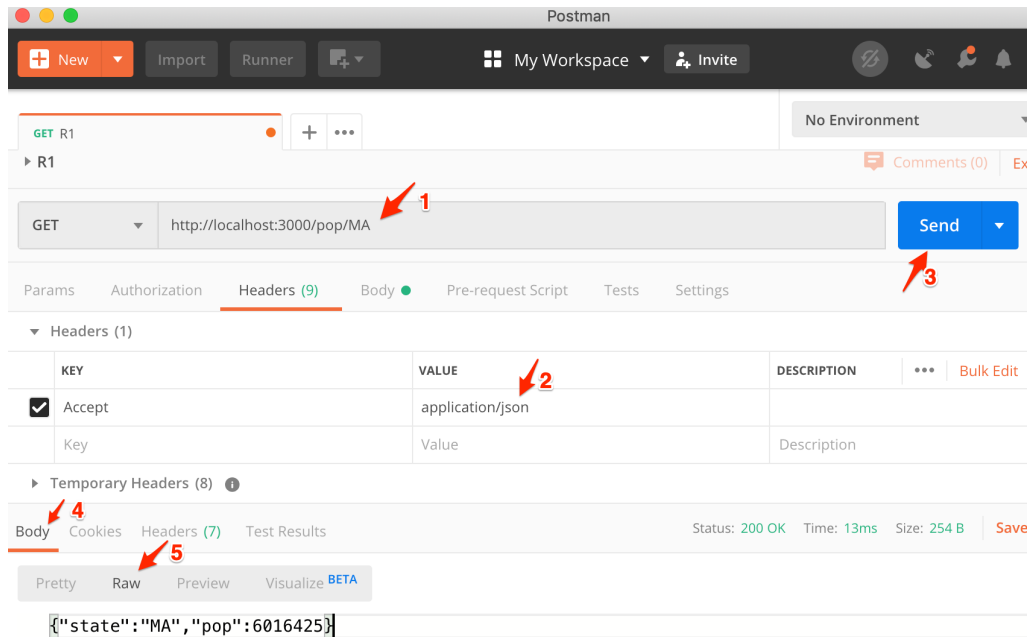
> curl -H "Accept:application/xml" http://localhost:3000/pop/MA
<?xml version="1.0"?>
<state-pop state="MA">
  <pop>6016425</pop>
</state-pop>
```

```
> curl -H "Accept:application/xml" http://localhost:3000/city/BOSTON/state/MA
<?xml version="1.0"?>
<city-state city="BOSTON" state="MA">
  <entry zip="02108" pop="3697" />
  <entry zip="02109" pop="3926" />
  <entry zip="02110" pop="957" />
  <entry zip="02111" pop="3759" />
  <entry zip="02113" pop="6698" />
  <entry zip="02114" pop="10246" />
  <entry zip="02115" pop="25597" />
  <entry zip="02116" pop="17459" />
  <entry zip="02199" pop="886" />
  <entry zip="02210" pop="308" />
  <entry zip="02215" pop="17769" />
</city-state>
```

The **Postman** outputs for **JSON GET** requests are shown below.

(For installation of Postman: <https://www.postman.com/downloads/>)





The **Postman** outputs for **XML GET** requests are shown below.

Postman

New Import Runner My Workspace Invite

GET R1 No Environment

GET http://localhost:3000/zip/02215 Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings

Headers (1)

KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/> Accept	application/xml			
Key	Value	Description		

Temporary Headers (8)

Body Cookies Headers (7) Test Results Status: 200 OK Time: 9ms Size: 344 B Save

Pretty Raw Preview Visualize BETA

```
<?xml version="1.0"?>
<zipCode id="02215">
  <city>BOSTON</city>
  <state>MA</state>
  <pop>17769</pop>
</zipCode>
```

Postman

New Import Runner My Workspace Invite

GET R1 No Environment

GET http://localhost:3000/pop/MA Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings

Headers (1)

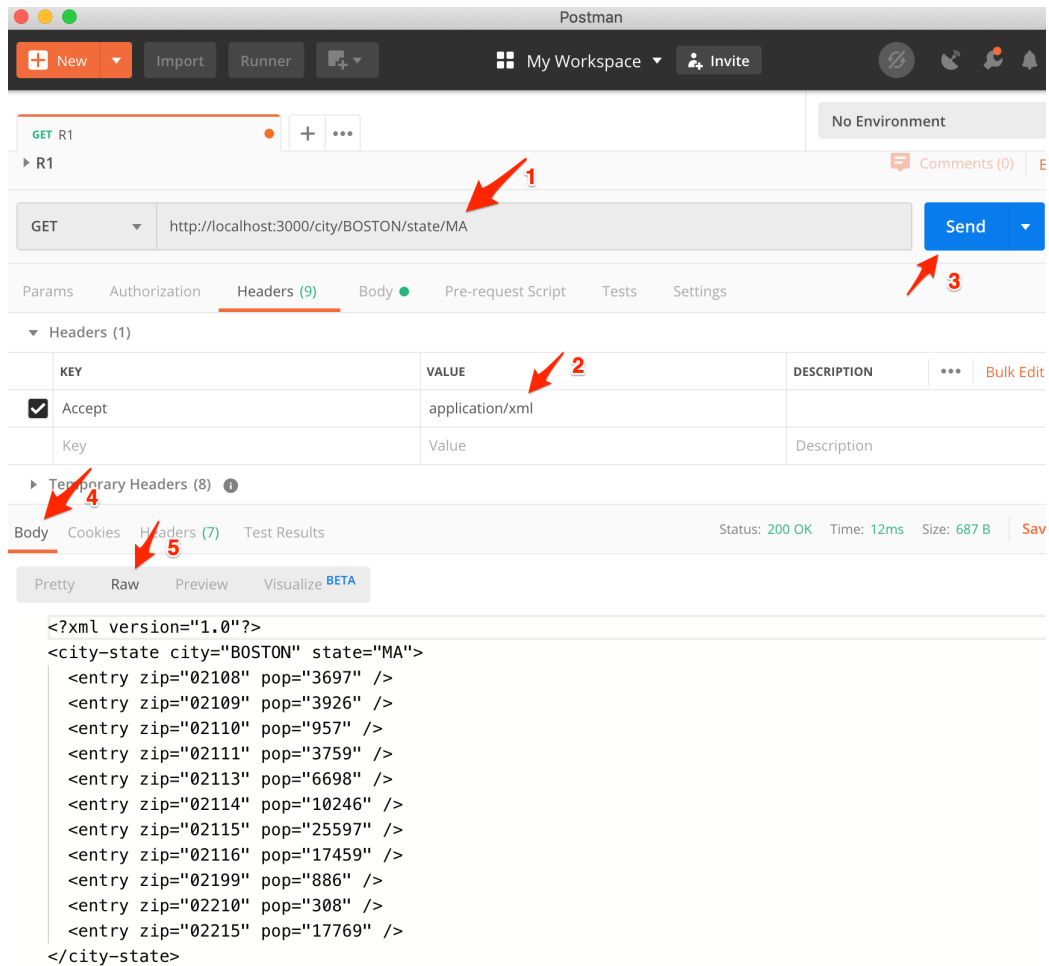
KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/> Accept	application/xml			
Key	Value	Description		

Temporary Headers (8)

Body Cookies Headers (7) Test Results Status: 200 OK Time: 12ms Size: 305 B Save

Pretty Raw Preview Visualize BETA

```
<?xml version="1.0"?>
<state-pop state="MA">
  <pop>6016425</pop>
</state-pop>
```



Submission: Export your CS602_HW2_*lastName* folder containing all the relevant files as a zip file, and upload the zip file to the Assignment section.