

Population w/Binary Search

Objective: To add Binary Search to our Population database program.

Background:

We have created the program Population to sort a large dataset in numerous ways. In our original program we did a Linear Search for the data because the data does not need to be sorted. Linear Search is very inefficient. Binary Search is a much better search algorithm, but the data must first be sorted.

Assignment:

Modify your **Population.java** file so the search option does a Binary Search. Originally you had option 6 to search for a city.

6. All cities matching a name sorted by population

Change this option to read:

6. Binary Search all cities matching a name sorted by Population

For this option sort the data by population descending and by city name ascending, then implement a Binary Search for the city name.

Here is a sample run output:

```
% java Population
```

```
1. Fifty least populous cities in USA (Selection Sort)
2. Fifty most populous cities in USA (Merge Sort)
3. First fifty cities sorted by name (Insertion Sort)
4. Last fifty cities sorted by name descending (Merge Sort)
5. Fifty most populous cities in named state
6. Binary Search all cities matching a name sorted by Population
9. Quit
```

```
31765 cities in database
```

```
1. Fifty least populous cities in USA (Selection Sort)
2. Fifty most populous cities in USA (Merge Sort)
3. First fifty cities sorted by name (Insertion Sort)
4. Last fifty cities sorted by name descending (Merge Sort)
5. Fifty most populous cities in named state
6. Binary Search all cities matching a name sorted by Population
9. Quit
```

```
Enter selection (1, 9) -> 6
```

```
Enter city name -> Berkeley
```

```
City Berkeley by Population
```

State	City	Type	Population
1: California	Berkeley	city	122,324
2: New Jersey	Berkeley	township	41,747
3: Missouri	Berkeley	city	8,920
4: Illinois	Berkeley	village	5,130

1. Fifty least populous cities in USA (Selection Sort)
2. Fifty most populous cities in USA (Merge Sort)
3. First fifty cities sorted by name (Insertion Sort)
4. Last fifty cities sorted by name descending (Merge Sort)
5. Fifty most populous cities in named state
6. Binary Search all cities matching a name sorted by Population
9. Quit

Enter selection (1, 9) -> 9

Thanks for using Population!