Peter Tadrous

CUS 725 - Advanced Database Systems

Week 7 - Homework 6

MongoDB

1. Importing data and viewing all records. It looks like the "_id" field contains the zip codes.
   a. `db.zips.find()`

```
C:\Users\peter\Documents\Programming\Spring2021\CUS 725 - Advanced Database\07 - Week 7\Homework>mongoim
port --db week7 --collection zips  --file zips.json
2021-03-09T21:59:30.059-0500    connected to: mongodb://localhost/
2021-03-09T21:59:30.377-0500    29353 document(s) imported successfully. 0 document(s) failed to import.
```

```
> show dbs
admin   0.000GB
config  0.000GB
local   0.000GB
week7   0.002GB
> use week7
switched to db week7
> show collections
zips
> db.zips.find()
{ "_id" : "01022", "city" : "WESTOVER AFB", "loc" : [ -72.558657, 42.196672 ], "pop" : 1764, "state" : "MA" }
{ "_id" : "01001", "city" : "AGAWAM", "loc" : [ -72.622739, 42.070206 ], "pop" : 15338, "state" : "MA" }
{ "_id" : "01027", "city" : "MOUNT TOM", "loc" : [ -72.679921, 42.264319 ], "pop" : 16864, "state" : "MA" }
{ "_id" : "01028", "city" : "EAST LONGMEADOW", "loc" : [ -72.505565, 42.067203 ], "pop" : 13367, "state" : "MA" }
{ "_id" : "01020", "city" : "CHICOPEE", "loc" : [ -72.576142, 42.176443 ], "pop" : 31495, "state" : "MA" }
{ "_id" : "01030", "city" : "FEEDING HILLS", "loc" : [ -72.675077, 42.07182 ], "pop" : 11985, "state" : "MA" }
{ "_id" : "01032", "city" : "GOSHEN", "loc" : [ -72.844092, 42.466234 ], "pop" : 122, "state" : "MA" }
{ "_id" : "01011", "city" : "CHESTER", "loc" : [ -72.988761, 42.279421 ], "pop" : 1688, "state" : "MA" }
{ "_id" : "01012", "city" : "CHESTERFIELD", "loc" : [ -72.833309, 42.38167 ], "pop" : 177, "state" : "MA" }
{ "_id" : "01033", "city" : "GRANBY", "loc" : [ -72.520001, 42.255704 ], "pop" : 5526, "state" : "MA" }
{ "_id" : "01031", "city" : "GILBERTVILLE", "loc" : [ -72.198585, 42.332194 ], "pop" : 2385, "state" : "MA" }
{ "_id" : "01035", "city" : "HADLEY", "loc" : [ -72.571499, 42.36062 ], "pop" : 4231, "state" : "MA" }
{ "_id" : "01038", "city" : "HATFIELD", "loc" : [ -72.616735, 42.38439 ], "pop" : 3184, "state" : "MA" }
{ "_id" : "01036", "city" : "HAMPDEN", "loc" : [ -72.431823, 42.064756 ], "pop" : 4709, "state" : "MA" }
{ "_id" : "01039", "city" : "HAYDENVILLE", "loc" : [ -72.703178, 42.381799 ], "pop" : 1387, "state" : "MA" }
{ "_id" : "01034", "city" : "TOLLAND", "loc" : [ -72.908793, 42.070234 ], "pop" : 1652, "state" : "MA" }
{ "_id" : "01040", "city" : "HOLYOKE", "loc" : [ -72.626193, 42.202007 ], "pop" : 43704, "state" : "MA" }
{ "_id" : "01053", "city" : "LEEDS", "loc" : [ -72.703403, 42.354292 ], "pop" : 1350, "state" : "MA" }
{ "_id" : "01008", "city" : "BLANDFORD", "loc" : [ -72.936114, 42.182949 ], "pop" : 1240, "state" : "MA" }
{ "_id" : "01050", "city" : "HUNTINGTON", "loc" : [ -72.873341, 42.265301 ], "pop" : 2084, "state" : "MA" }
Type "it" for more
```

2. All records for the city of Tolland.
   a. `db.zips.find({city: "TOLLAND"})`

```
> db.zips.find({ city: "TOLLAND"})
{ "_id" : "01034", "city" : "TOLLAND", "loc" : [ -72.908793, 42.070234 ], "pop" : 1652, "state" : "MA" }
{ "_id" : "06084", "city" : "TOLLAND", "loc" : [ -72.371789, 41.869647 ], "pop" : 10973, "state" : "CT" }
```

3. All records for both Tolland and Berlin.
   a. `db.zips.find({$or: [{city: "TOLLAND"},{city: "BERLIN"}]})`

```
> db.zips.find({$or: [{city: "TOLLAND"},{city:"BERLIN"}]})
{ "_id" : "01034", "city" : "TOLLAND", "loc" : [ -72.908793, 42.070234 ], "pop" : 1652, "state" : "MA" }
{ "_id" : "01503", "city" : "BERLIN", "loc" : [ -71.635634, 42.384438 ], "pop" : 2293, "state" : "MA" }
{ "_id" : "03570", "city" : "BERLIN", "loc" : [ -71.189236, 44.48107 ], "pop" : 12892, "state" : "NH" }
{ "_id" : "06037", "city" : "BERLIN", "loc" : [ -72.770482, 41.620826 ], "pop" : 15755, "state" : "CT" }
{ "_id" : "06084", "city" : "TOLLAND", "loc" : [ -72.371789, 41.869647 ], "pop" : 10973, "state" : "CT" }
{ "_id" : "08009", "city" : "BERLIN", "loc" : [ -74.930808, 39.778839 ], "pop" : 14034, "state" : "NJ" }
{ "_id" : "12022", "city" : "BERLIN", "loc" : [ -73.370186, 42.691893 ], "pop" : 275, "state" : "NY" }
{ "_id" : "15530", "city" : "BERLIN", "loc" : [ -78.963692, 39.918847 ], "pop" : 4459, "state" : "PA" }
{ "_id" : "21811", "city" : "BERLIN", "loc" : [ -75.186557, 38.347514 ], "pop" : 11613, "state" : "MD" }
{ "_id" : "48002", "city" : "BERLIN", "loc" : [ -82.886809, 42.919864 ], "pop" : 1333, "state" : "MI" }
{ "_id" : "54923", "city" : "BERLIN", "loc" : [ -88.949009, 43.976936 ], "pop" : 8132, "state" : "WI" }
{ "_id" : "58415", "city" : "BERLIN", "loc" : [ -98.523342, 46.400834 ], "pop" : 185, "state" : "ND" }
```

4. The record for Tolland, CT.
   a. db.zips.find({city: "TOLLAND", state: "CT"})

```
> db.zips.find({ city: "TOLLAND", state: "CT"})
{ "_id" : "06084", "city" : "TOLLAND", "loc" : [ -72.371789, 41.869647 ], "pop" : 10973, "state" : "CT" }
```

5. Just the zip code and population for Tolland, CT.
   a. db.zips.find({city: "TOLLAND", state: "CT"}, {_id: 1, pop: 1})

```
> db.zips.find({ city: "TOLLAND", state: "CT"}, {_id: 1, pop: 1})
{ "_id" : "06084", "pop" : 10973 }
```

6. Just the zip code for Tolland, CT.
   a. db.zips.find({city: "TOLLAND", state: "CT"}, {_id: 1})

```
> db.zips.find({ city: "TOLLAND", state: "CT"}, {_id: 1})
{ "_id" : "06084" }
```

7. Records where either "loc.0" or "loc.1" = 37.80835.
   a. db.zips.find({$or: [{"loc.0": 37.80835},{"loc.1": 37.80835}]})

```
> db.zips.find({$or: [{"loc.0": 37.80835},{"loc.1": 37.80835}]})
{ "_id" : "40004", "city" : "BARDSTOWN", "loc" : [ -85.461343, 37.80835 ], "pop" : 16176, "state" : "KY" }
```

8. Records where either "loc.0" or "loc.1" is between 42.6 and 42.8.
   a. db.zips.find({$or: [{"loc.0": {$gt: 42.6, $lt: 42.8}},{"loc.1":
      {$gt: 42.6, $lt: 42.8}}]})

```
> db.zips.find({$or: [{"loc.0": {$gt: 42.6, $lt: 42.8}},{"loc.1": {$gt: 42.6, $lt: 42.8}}]})
{ "_id" : "01220", "city" : "ADAMS", "loc" : [ -73.117225, 42.622319 ], "pop" : 9901, "state" : "MA" }
{ "_id" : "01247", "city" : "CLARKSBURG", "loc" : [ -73.10999, 42.69865 ], "pop" : 19054, "state" : "MA" }
{ "_id" : "01267", "city" : "WILLIAMSTOWN", "loc" : [ -73.20364, 42.708883 ], "pop" : 8220, "state" : "MA" }
{ "_id" : "01337", "city" : "LEYDEN", "loc" : [ -72.563439, 42.683784 ], "pop" : 2426, "state" : "MA" }
{ "_id" : "01301", "city" : "LEYDEN", "loc" : [ -72.601847, 42.601222 ], "pop" : 18968, "state" : "MA" }
{ "_id" : "01339", "city" : "HAWLEY", "loc" : [ -72.880162, 42.621802 ], "pop" : 1325, "state" : "MA" }
{ "_id" : "01338", "city" : "BUCKLAND", "loc" : [ -72.764124, 42.615174 ], "pop" : 16, "state" : "MA" }
{ "_id" : "01340", "city" : "COLRAIN", "loc" : [ -72.726508, 42.67905 ], "pop" : 2050, "state" : "MA" }
{ "_id" : "01346", "city" : "HEATH", "loc" : [ -72.839101, 42.685347 ], "pop" : 174, "state" : "MA" }
{ "_id" : "01344", "city" : "ERVING", "loc" : [ -72.416638, 42.604957 ], "pop" : 635, "state" : "MA" }
{ "_id" : "01367", "city" : "ROWE", "loc" : [ -72.925776, 42.695289 ], "pop" : 630, "state" : "MA" }
{ "_id" : "01370", "city" : "SHELBURNE FALLS", "loc" : [ -72.739059, 42.602203 ], "pop" : 4525, "state" : "MA" }
{ "_id" : "01360", "city" : "NORTHFIELD", "loc" : [ -72.450995, 42.688705 ], "pop" : 2829, "state" : "MA" }
{ "_id" : "01376", "city" : "TURNERS FALLS", "loc" : [ -72.54701, 42.606521 ], "pop" : 7100, "state" : "MA" }
{ "_id" : "01430", "city" : "ASHBURNHAM", "loc" : [ -71.92666, 42.649614 ], "pop" : 5433, "state" : "MA" }
{ "_id" : "01431", "city" : "ASHBY", "loc" : [ -71.817369, 42.674462 ], "pop" : 2649, "state" : "MA" }
{ "_id" : "01450", "city" : "GROTON", "loc" : [ -71.558371, 42.612351 ], "pop" : 7504, "state" : "MA" }
{ "_id" : "01350", "city" : "MONROE", "loc" : [ -72.960156, 42.723885 ], "pop" : 97, "state" : "MA" }
{ "_id" : "01469", "city" : "TOWNSEND", "loc" : [ -71.689646, 42.652511 ], "pop" : 6112, "state" : "MA" }
{ "_id" : "01463", "city" : "PEPPERELL", "loc" : [ -71.593392, 42.668888 ], "pop" : 10178, "state" : "MA" }
Type "it" for more
> it
{ "_id" : "01475", "city" : "WINCHENDON", "loc" : [ -72.047524, 42.678943 ], "pop" : 8805, "state" : "MA" }
{ "_id" : "01474", "city" : "W TOWNSEND", "loc" : [ -71.74057, 42.670404 ], "pop" : 2452, "state" : "MA" }
{ "_id" : "01810", "city" : "ANDOVER", "loc" : [ -71.156481, 42.64956 ], "pop" : 29161, "state" : "MA" }
{ "_id" : "01830", "city" : "HAVERHILL", "loc" : [ -71.072057, 42.785605 ], "pop" : 22445, "state" : "MA" }
{ "_id" : "01826", "city" : "DRACUT", "loc" : [ -71.318592, 42.676422 ], "pop" : 25594, "state" : "MA" }
{ "_id" : "01827", "city" : "DUNSTABLE", "loc" : [ -71.495201, 42.673917 ], "pop" : 2166, "state" : "MA" }
{ "_id" : "01832", "city" : "HAVERHILL", "loc" : [ -71.109519, 42.779154 ], "pop" : 16860, "state" : "MA" }
{ "_id" : "01840", "city" : "LAWRENCE", "loc" : [ -71.16381, 42.707958 ], "pop" : 2728, "state" : "MA" }
{ "_id" : "01844", "city" : "METHUEN", "loc" : [ -71.181031, 42.728019 ], "pop" : 39664, "state" : "MA" }
{ "_id" : "01843", "city" : "LAWRENCE", "loc" : [ -71.160506, 42.691053 ], "pop" : 22285, "state" : "MA" }
{ "_id" : "01841", "city" : "LAWRENCE", "loc" : [ -71.166997, 42.711545 ], "pop" : 45555, "state" : "MA" }
{ "_id" : "01835", "city" : "BRADFORD", "loc" : [ -71.08549, 42.758597 ], "pop" : 12078, "state" : "MA" }
{ "_id" : "01834", "city" : "GROVELAND", "loc" : [ -71.027018, 42.753027 ], "pop" : 5214, "state" : "MA" }
{ "_id" : "01833", "city" : "GEORGETOWN", "loc" : [ -70.982239, 42.728067 ], "pop" : 6384, "state" : "MA" }
{ "_id" : "01850", "city" : "LOWELL", "loc" : [ -71.305078, 42.656035 ], "pop" : 15434, "state" : "MA" }
{ "_id" : "01845", "city" : "NORTH ANDOVER", "loc" : [ -71.109004, 42.682583 ], "pop" : 22792, "state" : "MA" }
{ "_id" : "01852", "city" : "LOWELL", "loc" : [ -71.298331, 42.634413 ], "pop" : 33379, "state" : "MA" }
```

9. Records where "loc.1" is greater than 60. These look like they are all located in Arkansas.
   a. `db.zips.find({"loc.1": {$gt: 60}})`

```
> db.zips.find({"loc.1": {$gt: 60}})
{ "_id" : "99501", "city" : "ANCHORAGE", "loc" : [ -149.876077, 61.211571 ], "pop" : 14436, "state" : "AK" }
{ "_id" : "99502", "city" : "ANCHORAGE", "loc" : [ -150.093943, 61.096163 ], "pop" : 15891, "state" : "AK" }
{ "_id" : "99503", "city" : "ANCHORAGE", "loc" : [ -149.893844, 61.189953 ], "pop" : 12534, "state" : "AK" }
{ "_id" : "99504", "city" : "ANCHORAGE", "loc" : [ -149.74467, 61.203696 ], "pop" : 32383, "state" : "AK" }
{ "_id" : "99506", "city" : "ELMENDORF AFB", "loc" : [ -149.812667, 61.251531 ], "pop" : 7907, "state" : "AK" }
{ "_id" : "99505", "city" : "FORT RICHARDSON", "loc" : [ -149.675454, 61.275256 ], "pop" : 7979, "state" : "AK" }
{ "_id" : "99507", "city" : "ANCHORAGE", "loc" : [ -149.828912, 61.153543 ], "pop" : 20128, "state" : "AK" }
{ "_id" : "99508", "city" : "ANCHORAGE", "loc" : [ -149.810085, 61.205959 ], "pop" : 29857, "state" : "AK" }
{ "_id" : "99515", "city" : "ANCHORAGE", "loc" : [ -149.897401, 61.119381 ], "pop" : 17094, "state" : "AK" }
{ "_id" : "99517", "city" : "ANCHORAGE", "loc" : [ -149.936111, 61.190136 ], "pop" : 15192, "state" : "AK" }
{ "_id" : "99518", "city" : "ANCHORAGE", "loc" : [ -149.886571, 61.154862 ], "pop" : 8116, "state" : "AK" }
{ "_id" : "99516", "city" : "ANCHORAGE", "loc" : [ -149.779998, 61.10541 ], "pop" : 18356, "state" : "AK" }
{ "_id" : "99552", "city" : "AKIAK", "loc" : [ -161.199325, 60.890632 ], "pop" : 285, "state" : "AK" }
{ "_id" : "99551", "city" : "AKIACHAK", "loc" : [ -161.39233, 60.891854 ], "pop" : 481, "state" : "AK" }
{ "_id" : "99554", "city" : "ALAKANUK", "loc" : [ -164.60228, 62.746967 ], "pop" : 1186, "state" : "AK" }
{ "_id" : "99558", "city" : "ANVIK", "loc" : [ -160.130441, 62.830913 ], "pop" : 296, "state" : "AK" }
{ "_id" : "99557", "city" : "CHUATHBALUK", "loc" : [ -157.758502, 61.691648 ], "pop" : 352, "state" : "AK" }
{ "_id" : "99559", "city" : "ATMAUTLUAK", "loc" : [ -161.824053, 60.832389 ], "pop" : 7188, "state" : "AK" }
{ "_id" : "99561", "city" : "CHEFORNAK", "loc" : [ -164.210294, 60.153746 ], "pop" : 320, "state" : "AK" }
{ "_id" : "99563", "city" : "CHEVAK", "loc" : [ -164.776457, 61.583982 ], "pop" : 0, "state" : "AK" }
Type "it" for more
> it
{ "_id" : "99567", "city" : "CHUGIAK", "loc" : [ -149.453736, 61.409802 ], "pop" : 6910, "state" : "AK" }
{ "_id" : "99568", "city" : "CLAM GULCH", "loc" : [ -151.422628, 60.201603 ], "pop" : 133, "state" : "AK" }
{ "_id" : "99572", "city" : "COOPER LANDING", "loc" : [ -149.823514, 60.476692 ], "pop" : 252, "state" : "AK" }
{ "_id" : "99574", "city" : "CHENEGA BAY", "loc" : [ -147.943316, 60.102558 ], "pop" : 96, "state" : "AK" }
{ "_id" : "99575", "city" : "CROOKED CREEK", "loc" : [ -158.002483, 61.818072 ], "pop" : 1, "state" : "AK" }
{ "_id" : "99573", "city" : "COPPER CENTER", "loc" : [ -144.97793, 61.91581 ], "pop" : 1389, "state" : "AK" }
{ "_id" : "99577", "city" : "EAGLE RIVER", "loc" : [ -149.508515, 61.311357 ], "pop" : 18429, "state" : "AK" }
{ "_id" : "99578", "city" : "EEK", "loc" : [ -162.032341, 60.215058 ], "pop" : 254, "state" : "AK" }
{ "_id" : "99581", "city" : "EMMONAK", "loc" : [ -164.131298, 62.827404 ], "pop" : 0, "state" : "AK" }
{ "_id" : "99585", "city" : "MARSHALL", "loc" : [ -161.7394, 61.837087 ], "pop" : 530, "state" : "AK" }
{ "_id" : "99588", "city" : "GLENNALLEN", "loc" : [ -145.661684, 62.103895 ], "pop" : 1024, "state" : "AK" }
{ "_id" : "99586", "city" : "SLANA", "loc" : [ -143.568393, 62.654744 ], "pop" : 394, "state" : "AK" }
{ "_id" : "99590", "city" : "GRAYLING", "loc" : [ -159.404907, 63.372013 ], "pop" : 0, "state" : "AK" }
{ "_id" : "99602", "city" : "HOLY CROSS", "loc" : [ -159.825092, 62.192584 ], "pop" : 277, "state" : "AK" }
{ "_id" : "99604", "city" : "HOOPER BAY", "loc" : [ -165.891045, 61.537157 ], "pop" : 1443, "state" : "AK" }
{ "_id" : "99607", "city" : "KALSKAG", "loc" : [ -160.3261, 61.541006 ], "pop" : 172, "state" : "AK" }
```

10. All documents for cities in Kentucky, sorted by city name.
    a. `db.zips.find({state: "KY"}).sort({city: 1})`

```
> db.zips.find({state: "KY"}).sort({city:1})
{ "_id" : "42601", "city" : "AARON", "loc" : [ -85.199114, 36.812827 ], "pop" : 270, "state" : "KY" }
{ "_id" : "42202", "city" : "ADAIRVILLE", "loc" : [ -86.858523, 36.691385 ], "pop" : 2481, "state" : "KY" }
{ "_id" : "41201", "city" : "ADAMS", "loc" : [ -82.702437, 37.991375 ], "pop" : 2540, "state" : "KY" }
{ "_id" : "42120", "city" : "ADOLPHUS", "loc" : [ -86.263596, 36.677486 ], "pop" : 1976, "state" : "KY" }
{ "_id" : "41529", "city" : "AFLEX", "loc" : [ -82.307961, 37.689943 ], "pop" : 802, "state" : "KY" }
{ "_id" : "40801", "city" : "AGES BROOKSIDE", "loc" : [ -83.235294, 36.840734 ], "pop" : 164, "state" : "KY" }
{ "_id" : "42602", "city" : "ALBANY", "loc" : [ -85.140677, 36.68569 ], "pop" : 6419, "state" : "KY" }
{ "_id" : "42501", "city" : "ALCALDE", "loc" : [ -84.604362, 37.073853 ], "pop" : 28546, "state" : "KY" }
{ "_id" : "41001", "city" : "ALEXANDRIA", "loc" : [ -84.394329, 38.940605 ], "pop" : 11858, "state" : "KY" }
{ "_id" : "41601", "city" : "ALLEN", "loc" : [ -82.636272, 37.566182 ], "pop" : 1768, "state" : "KY" }
{ "_id" : "42204", "city" : "ALLENSVILLE", "loc" : [ -87.024442, 36.694744 ], "pop" : 842, "state" : "KY" }
{ "_id" : "42020", "city" : "ALMO", "loc" : [ -88.308666, 36.712805 ], "pop" : 1509, "state" : "KY" }
{ "_id" : "42603", "city" : "ALPHA", "loc" : [ -85.092405, 36.779735 ], "pop" : 2163, "state" : "KY" }
{ "_id" : "41306", "city" : "ALTRO", "loc" : [ -83.395749, 37.356346 ], "pop" : 436, "state" : "KY" }
{ "_id" : "42122", "city" : "ALVATON", "loc" : [ -86.363213, 36.86296 ], "pop" : 2934, "state" : "KY" }
{ "_id" : "41801", "city" : "AMBURGEY", "loc" : [ -83.000483, 37.26716 ], "pop" : 329, "state" : "KY" }
{ "_id" : "40223", "city" : "ANCHORAGE", "loc" : [ -85.561151, 38.253688 ], "pop" : 19766, "state" : "KY" }
{ "_id" : "41759", "city" : "ANCO", "loc" : [ -83.032125, 37.233926 ], "pop" : 1442, "state" : "KY" }
{ "_id" : "41121", "city" : "ARGILLITE", "loc" : [ -82.809442, 38.432228 ], "pop" : 467, "state" : "KY" }
{ "_id" : "41568", "city" : "ARGO", "loc" : [ -82.073522, 37.530336 ], "pop" : 471, "state" : "KY" }
Type "it" for more
```