2. mongoimport --db usdata --collection cityinfo --file zips.json

```
> use usdata
switched to db usdata
> show collections
cityinfo
```
3.

4.

```
> db.cityinfo.find().limit(10)
{ "_id" : "01001", "city" : "AGAWAM", "loc" : [ -72.622739, 42.070206 ], "pop" : 15338, "state" : "MA" }
{ "_id" : "01002", "city" : "CUSHMAN", "loc" : [ -72.51565, 42.377017 ], "pop" : 36963, "state" : "MA" }
{ "_id" : "01005", "city" : "BARRE", "loc" : [ -72.108354, 42.409698 ], "pop" : 4546, "state" : "MA" }
{ "_id" : "01007", "city" : "BELCHERTOWN", "loc" : [ -72.410953, 42.275103 ], "pop" : 10579, "state" : "MA" }
{ "_id" : "01008", "city" : "BLANDFORD", "loc" : [ -72.936114, 42.182949 ], "pop" : 1240, "state" : "MA" }
{ "_id" : "01010", "city" : "BRIMFIELD", "loc" : [ -72.188455, 42.116543 ], "pop" : 3706, "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" : "01013", "city" : "CHICOPEE", "loc" : [ -72.607962, 42.162046 ], "pop" : 23396, "state" : "MA" }
{ "_id" : "01020", "city" : "CHICOPEE", "loc" : [ -72.576142, 42.176443 ], "pop" : 31495, "state" : "MA" }
>
```

5.

```
> db.cityinfo.find({_id: /9503/}, {loc: 0})
{ "_id" : "19503", "city" : "BALLY", "pop" : 973, "state" : "PA" }
{ "_id" : "39503", "city" : "GULFPORT", "pop" : 26830, "state" : "MS" }
{ "_id" : "49503", "city" : "GRAND RAPIDS", "pop" : 32876, "state" : "MI" }
{ "_id" : "79503", "city" : "AVOCA", "pop" : 248, "state" : "TX" }
{ "_id" : "89503", "city" : "RENO", "pop" : 23955, "state" : "NV" }
{ "_id" : "95030", "city" : "MONTE SERENO", "pop" : 25881, "state" : "CA" }
{ "_id" : "95032", "city" : "LOS GATOS", "pop" : 18189, "state" : "CA" }
{ "_id" : "95035", "city" : "MILPITAS", "pop" : 50907, "state" : "CA" }
{ "_id" : "95037", "city" : "MORGAN HILL", "pop" : 31309, "state" : "CA" }
{ "_id" : "99503", "city" : "ANCHORAGE", "pop" : 12534, "state" : "AK" }
```

6.

```
> db.cityinfo.aggregate([{$match: {state: {$in: ["WA", "CA", "OR", "HI", "AK"]}}
}, {$group: {_id: {city: "$city", state: "$state"}, total_pop: {$sum: "$pop"}}},
{$match:{total_pop: {$gte: 23000, $lte: 150000}}}])
{ "_id" : { "city" : "FAIRBANKS", "state" : "AK" }, "total_pop" : 31379 }
{ "_id" : { "city" : "WASILLA", "state" : "AK" }, "total_pop" : 24619 }
{ "_id" : { "city" : "WALLA WALLA", "state" : "WA" }, "total_pop" : 34993 }
{ "_id" : { "city" : "KENNEWICK", "state" : "WA" }, "total_pop" : 59822 }
{ "_id" : { "city" : "PASCO", "state" : "WA" }, "total_pop" : 33988 }
{ "_id" : { "city" : "PULLMAN", "state" : "WA" }, "total_pop" : 25909 }
{ "_id" : { "city" : "WIDE HOLLOW", "state" : "WA" }, "total_pop" : 27078 }
{ "_id" : { "city" : "YAKIMA", "state" : "WA" }, "total_pop" : 39091 }
{ "_id" : { "city" : "MONROVIA", "state" : "CA" }, "total_pop" : 39015 }
{ "_id" : { "city" : "LENNOX", "state" : "CA" }, "total_pop" : 28216 }
```

7.

```
> db.cityinfo.find({$or: [{city: "SAN JOSE"}, {city: "NEW YORK"}, {city: "WASHINGTON", state: "DC"}], pop: {$gte: 6000,
$lte: 11000}})
{ "_id" : "10044", "city" : "NEW YORK", "loc" : [ -73.949136, 40.762998 ], "pop" : 8190, "state" : "NY" }
{ "_id" : "20005", "city" : "WASHINGTON", "loc" : [ -77.031236, 38.906731 ], "pop" : 9862, "state" : "DC" }
{ "_id" : "20336", "city" : "WASHINGTON", "loc" : [ -77.014827, 38.839473 ], "pop" : 6311, "state" : "DC" }
{ "_id" : "95119", "city" : "SAN JOSE", "loc" : [ -121.790067, 37.230135 ], "pop" : 9823, "state" : "CA" }
{ "_id" : "95135", "city" : "SAN JOSE", "loc" : [ -121.757228, 37.297539 ], "pop" : 9104, "state" : "CA" }
{ "_id" : "95139", "city" : "SAN JOSE", "loc" : [ -121.766867, 37.225162 ], "pop" : 6912, "state" : "CA" }
```

8.

```
> var zipcodes = cat('zipcode.txt').split('\n')
> for(var i = 0, num_of_zipcode = zipcodes.length; i < num_of_zipcode; i++){db.cityinfo.updateOne({"_id": zipcodes[i]}, {$set: {Details: {county: "Santa Clara", medianIncome: 93500}}});}
{ "acknowledged" : true, "matchedCount" : 0, "modifiedCount" : 0 }
> db.cityinfo.find({_id: {$in: zipcodes}})
{ "_id" : "94022", "city" : "LOS ALTOS", "loc" : [ -122.125754, 37.381432 ], "pop" : 17366, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94024", "city" : "LOS ALTOS", "loc" : [ -122.086205, 37.354745 ], "pop" : 20795, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94028", "city" : "LADERA", "loc" : [ -122.208131, 37.378859 ], "pop" : 6379, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94035", "city" : "MOFFETT FIELD", "loc" : [ -122.051944, 37.41001 ], "pop" : 790, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94040", "city" : "MOUNTAIN VIEW", "loc" : [ -122.087983, 37.385532 ], "pop" : 26969, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94041", "city" : "MOUNTAIN VIEW", "loc" : [ -122.078341, 37.389347 ], "pop" : 13438, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94043", "city" : "MOUNTAIN VIEW", "loc" : [ -122.077468, 37.405567 ], "pop" : 28592, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94086", "city" : "SUNNYVALE", "loc" : [ -122.023771, 37.376407 ], "pop" : 56215, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94087", "city" : "SUNNYVALE", "loc" : [ -122.034859, 37.350214 ], "pop" : 47813, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94089", "city" : "SUNNYVALE", "loc" : [ -122.000637, 37.398255 ], "pop" : 13522, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
```

9.

```
> db.cityinfo.find({Details: {$exists: true}}).limit(10)
{ "_id" : "94022", "city" : "LOS ALTOS", "loc" : [ -122.125754, 37.381432 ], "pop" : 17366, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94024", "city" : "LOS ALTOS", "loc" : [ -122.086205, 37.354745 ], "pop" : 20795, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94028", "city" : "LADERA", "loc" : [ -122.208131, 37.378859 ], "pop" : 6379, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94035", "city" : "MOFFETT FIELD", "loc" : [ -122.051944, 37.41001 ], "pop" : 790, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94040", "city" : "MOUNTAIN VIEW", "loc" : [ -122.087983, 37.385532 ], "pop" : 26969, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94041", "city" : "MOUNTAIN VIEW", "loc" : [ -122.078341, 37.389347 ], "pop" : 13438, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94043", "city" : "MOUNTAIN VIEW", "loc" : [ -122.077468, 37.405567 ], "pop" : 28592, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94086", "city" : "SUNNYVALE", "loc" : [ -122.023771, 37.376407 ], "pop" : 56215, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94087", "city" : "SUNNYVALE", "loc" : [ -122.034859, 37.350214 ], "pop" : 47813, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
{ "_id" : "94089", "city" : "SUNNYVALE", "loc" : [ -122.000637, 37.398255 ], "pop" : 13522, "state" : "CA", "Details" : { "county" : "Santa Clara", "medianIncome" : 93500 } }
```

10.

```
> db.cityinfo.mapReduce(function(){emit(this.city, this.pop);}, function(key, va
lues){return Array.sum(values)}, {out: "city_pop"})
{
        "result" : "city_pop",
        "timeMillis" : 6032,
        "counts" : {
                "input" : 29353,
                "emit" : 29353,
                "reduce" : 6212,
                "output" : 16584
        },
        "ok" : 1
}
> db.city_pop.find()
{ "_id" : "AARON", "value" : 270 }
{ "_id" : "AARONSBURG", "value" : 100 }
{ "_id" : "ABAC", "value" : 27906 }
{ "_id" : "ABBEVILLE", "value" : 23400 }
{ "_id" : "ABBOT VILLAGE", "value" : 1193 }
{ "_id" : "ABBOTSFORD", "value" : 2480 }
{ "_id" : "ABBOTT", "value" : 577 }
{ "_id" : "ABBOTT PARK", "value" : 26542 }
{ "_id" : "ABBOTTSTOWN", "value" : 1777 }
{ "_id" : "ABBYVILLE", "value" : 267 }
```

11.

```
> db.cityinfo.aggregate([{$group: {_id: "$city", city_pop: {$sum: "$pop"}}}])
{ "_id" : "WRANGELL", "city_pop" : 2573 }
{ "_id" : "METLAKATLA", "city_pop" : 1469 }
{ "_id" : "HYDER", "city_pop" : 116 }
{ "_id" : "HYDABURG", "city_pop" : 891 }
{ "_id" : "THORNE BAY", "city_pop" : 744 }
{ "_id" : "KETCHIKAN", "city_pop" : 14308 }
{ "_id" : "SKAGWAY", "city_pop" : 692 }
{ "_id" : "HOONAH", "city_pop" : 1670 }
{ "_id" : "GUSTAVUS", "city_pop" : 258 }
{ "_id" : "NUIQSUT", "city_pop" : 354 }
```

12.

```
> db.cityinfo.explain("executionStats").aggregate([{$group: {_id: "$city", city_pop: {$sum: "$pop"}}}])
{
        "stages" : [
                {
                        "$cursor" : {
                                "query" : {

                                },
                                "fields" : {
                                        "city" : 1,
                                        "pop" : 1,
                                        "_id" : 0
                                },
                                "queryPlanner" : {
                                        "plannerVersion" : 1,
                                        "namespace" : "usdata.cityinfo",
                                        "indexFilterSet" : false,
                                        "parsedQuery" : {

                                        },
                                        "winningPlan" : {
                                                "stage" : "COLLSCAN",
                                                "direction" : "forward"
                                        },
                                        "rejectedPlans" : [ ]
                                },
                                "executionStats" : {
                                        "executionSuccess" : true,
                                        "nReturned" : 29353,
                                        "executionTimeMillis" : 266,
                                        "totalKeysExamined" : 0,
                                        "totalDocsExamined" : 29353,
                                        "executionStages" : {
                                                "stage" : "COLLSCAN",
                                                "nReturned" : 29353,
                                                "executionTimeMillisEstimate" : 30,
                                                "works" : 29355,
                                                "advanced" : 29353,
                                                "needTime" : 1,
                                                "needYield" : 0,
                                                "saveState" : 231,
                                                "restoreState" : 231,
                                                "isEOF" : 1,
                                                "invalidates" : 0,
                                                "direction" : "forward",
                                                "docsExamined" : 29353
                                        }
                                }
                        }
                },
                {
                        "$group" : {
```

```
> db.cityinfo.mapReduce(function(){emit(this.city, this.pop);}, function(key, values){return Array.sum(values)}, {out: "city_pop"}, {verbose: true})
{
        "result" : "city_pop",
        "timeMillis" : 5280,
        "counts" : {
                "input" : 29353,
                "emit" : 29353,
                "reduce" : 6212,
                "output" : 16584
        },
        "ok" : 1
}
>
```

MapReduce uses 5280 timeMillis. Aggregation uses 266 executionTimeMillis. Aggregation is much faster than MapReduce.