

Jamal Ashby
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HW #3

17. Find all the states with a total population less than 10 million.

- `db.zipcodes.aggregate([{ $group: { _id: "$state", totalPop: { $sum: "$pop" } } }, { $match: { totalPop: { $lt: 10*1000*1000 } } }])`

```
Command Prompt - mongo
> db.zipcodes.aggregate( [{ $group: { _id: "$state", totalPop: { $sum: "$pop" } } }, { $match: { totalPop: { $lt: 10*1000*1000 } } } ] )
{ "_id" : "ME", "totalPop" : 1226648 }
{ "_id" : "WV", "totalPop" : 1793146 }
{ "_id" : "ND", "totalPop" : 638272 }
{ "_id" : "DE", "totalPop" : 666168 }
{ "_id" : "KS", "totalPop" : 2475285 }
{ "_id" : "SC", "totalPop" : 3486783 }
{ "_id" : "AK", "totalPop" : 544698 }
{ "_id" : "AR", "totalPop" : 2358725 }
{ "_id" : "IA", "totalPop" : 2776420 }
{ "_id" : "RI", "totalPop" : 1003218 }
{ "_id" : "GA", "totalPop" : 6478216 }
{ "_id" : "MD", "totalPop" : 4781379 }
{ "_id" : "HI", "totalPop" : 1108229 }
{ "_id" : "AL", "totalPop" : 4040587 }
{ "_id" : "WI", "totalPop" : 4891769 }
{ "_id" : "WA", "totalPop" : 4866692 }
{ "_id" : "MT", "totalPop" : 798948 }
{ "_id" : "UT", "totalPop" : 1722850 }
{ "_id" : "MA", "totalPop" : 6016425 }
{ "_id" : "TN", "totalPop" : 4876457 }
Type "it" for more
> it
{ "_id" : "NE", "totalPop" : 1578139 }
{ "_id" : "MI", "totalPop" : 9295297 }
{ "_id" : "NJ", "totalPop" : 7730188 }
{ "_id" : "ID", "totalPop" : 1006749 }
{ "_id" : "DC", "totalPop" : 606900 }
{ "_id" : "CT", "totalPop" : 3287116 }
{ "_id" : "WY", "totalPop" : 453528 }
{ "_id" : "MO", "totalPop" : 5118648 }
{ "_id" : "KY", "totalPop" : 3675484 }
{ "_id" : "CO", "totalPop" : 3293755 }
{ "_id" : "AZ", "totalPop" : 3665228 }
{ "_id" : "NC", "totalPop" : 6628637 }
{ "_id" : "VT", "totalPop" : 562758 }
{ "_id" : "LA", "totalPop" : 4217595 }
{ "_id" : "OR", "totalPop" : 2842321 }
{ "_id" : "OK", "totalPop" : 3145585 }
{ "_id" : "NM", "totalPop" : 1515069 }
{ "_id" : "SD", "totalPop" : 695397 }
{ "_id" : "NV", "totalPop" : 1201833 }
{ "_id" : "VA", "totalPop" : 6181479 }
Type "it" for more
>
```

9. List the average population size for each state.

- `db.zipcodes.aggregate([{ $group: { _id: { state: "$state", city: "$city" }, pop: { $sum: "$pop" } } }, { $group: { _id: "$_id.state", avgCityPop: { $avg: "$pop" } } }])`

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```
Command Prompt - mongo
> db.zipcodes.aggregate( [ { $group: { _id: { state: "$state", city: "$city" }, pop: { $sum: "$pop" } } }, { $group: { _id: "$_id.state", avgCityPop: { $avg: "$pop" } } } ] )
{ "_id" : "ME", "avgCityPop" : 3006.4901960784314 }
{ "_id" : "WV", "avgCityPop" : 2771.4775888717154 }
{ "_id" : "ND", "avgCityPop" : 1645.0309278350514 }
{ "_id" : "KS", "avgCityPop" : 3819.884259259259 }
{ "_id" : "AK", "avgCityPop" : 2976.4918032786886 }
{ "_id" : "OH", "avgCityPop" : 12700.839578454332 }
{ "_id" : "SC", "avgCityPop" : 11139.626190803068 }
{ "_id" : "DE", "avgCityPop" : 14481.91304347826 }
{ "_id" : "FL", "avgCityPop" : 27400.958963282937 }
{ "_id" : "IL", "avgCityPop" : 9954.334494773519 }
{ "_id" : "AR", "avgCityPop" : 4175.355239786856 }
{ "_id" : "IA", "avgCityPop" : 3123.0821147356583 }
{ "_id" : "RI", "avgCityPop" : 19292.653846153848 }
{ "_id" : "GA", "avgCityPop" : 11547.62210338681 }
{ "_id" : "MD", "avgCityPop" : 12615.775725593667 }
{ "_id" : "HI", "avgCityPop" : 15831.842857142858 }
{ "_id" : "AL", "avgCityPop" : 7907.2152641878665 }
{ "_id" : "MA", "avgCityPop" : 12258.670025188916 }
{ "_id" : "MT", "avgCityPop" : 7323.00748502994 }
{ "_id" : "MT", "avgCityPop" : 2593.987012987013 }
type "it" for more
> it
{ "_id" : "UT", "avgCityPop" : 9518.508287292818 }
{ "_id" : "NE", "avgCityPop" : 3034.882692307692 }
{ "_id" : "TN", "avgCityPop" : 9656.350495049504 }
{ "_id" : "NY", "avgCityPop" : 13131.680291970803 }
{ "_id" : "MA", "avgCityPop" : 14855.37037037037 }
{ "_id" : "MI", "avgCityPop" : 12087.512353706112 }
{ "_id" : "NJ", "avgCityPop" : 15775.89387755102 }
{ "_id" : "ID", "avgCityPop" : 4320.811150798283 }
{ "_id" : "DC", "avgCityPop" : 383450 }
{ "_id" : "TX", "avgCityPop" : 13775.02108678021 }
{ "_id" : "CT", "avgCityPop" : 14674.625 }
{ "_id" : "CA", "avgCityPop" : 27756.42723880597 }
{ "_id" : "MO", "avgCityPop" : 5672.195338512764 }
{ "_id" : "WY", "avgCityPop" : 3384.5373134328356 }
{ "_id" : "KY", "avgCityPop" : 4767.164721141375 }
{ "_id" : "CO", "avgCityPop" : 9981.075757575758 }
{ "_id" : "AZ", "avgCityPop" : 20591.16853932584 }
{ "_id" : "NC", "avgCityPop" : 10622.815705128205 }
{ "_id" : "LA", "avgCityPop" : 10465.496277915632 }
{ "_id" : "OR", "avgCityPop" : 8262.561046511628 }
type "it" for more
>
```

5. List all the distinct states.

- `db.zipcodes.distinct("state")`

```
Command Prompt - mongo
> db.zipcodes.distinct("state")
[
  "MA",
  "RI",
  "NH",
  "NE",
  "VT",
  "CT",
  "NV",
  "NJ",
  "PA",
  "DE",
  "DC",
  "MD",
  "VA",
  "WV",
  "NC",
  "SC",
  "GA",
  "FL",
  "AL",
  "TN",
  "MS",
  "KY",
  "OH",
  "IN",
  "MI",
  "IA",
  "WI",
  "MN",
  "SD",
  "ND",
  "MT",
  "IL",
  "MO",
  "KS",
  "NE",
  "LA",
  "AR",
  "OK",
  "TX",
  "WY",
  "ID",
  "UT",
  "AZ",

```

7. What is the size of the smallest city (by population) in each state?

- `db.zipcodes.aggregate([{ $group: { _id: { state: "$state", city: "$city" }, pop: { $sum: "$pop" } } }, { $sort: { pop: 1 } }, { $group: { _id: "$_id.state", smallestCityPop: { $first: "$pop" } } }])`

```
Command Prompt - mongo
> db.zipcodes.aggregate( [ { $group: { _id: { state: "$state", city: "$city" }, pop: { $sum: "$pop" } } }, { $sort: { pop: 1 } }, { $group: { _id: "$_id.state", smallestCityPop: { $first: "$pop" } } } ] )
{ "_id" : "NE", "smallestCityPop" : 0 }
{ "_id" : "WV", "smallestCityPop" : 0 }
{ "_id" : "AK", "smallestCityPop" : 0 }
{ "_id" : "KS", "smallestCityPop" : 0 }
{ "_id" : "ND", "smallestCityPop" : 12 }
{ "_id" : "OH", "smallestCityPop" : 38 }
{ "_id" : "SC", "smallestCityPop" : 0 }
{ "_id" : "DE", "smallestCityPop" : 108 }
{ "_id" : "FL", "smallestCityPop" : 0 }
{ "_id" : "IL", "smallestCityPop" : 38 }
{ "_id" : "AR", "smallestCityPop" : 0 }
{ "_id" : "IA", "smallestCityPop" : 15 }
{ "_id" : "RI", "smallestCityPop" : 45 }
{ "_id" : "GA", "smallestCityPop" : 0 }
{ "_id" : "MD", "smallestCityPop" : 32 }
{ "_id" : "HI", "smallestCityPop" : 0 }
{ "_id" : "AL", "smallestCityPop" : 0 }
{ "_id" : "WI", "smallestCityPop" : 2 }
{ "_id" : "WA", "smallestCityPop" : 2 }
{ "_id" : "MT", "smallestCityPop" : 7 }
Type "it" for more
> it
{ "_id" : "UT", "smallestCityPop" : 9 }
{ "_id" : "NE", "smallestCityPop" : 5 }
{ "_id" : "NV", "smallestCityPop" : 0 }
{ "_id" : "TN", "smallestCityPop" : 2 }
{ "_id" : "MA", "smallestCityPop" : 16 }
{ "_id" : "ID", "smallestCityPop" : 0 }
{ "_id" : "MI", "smallestCityPop" : 0 }
{ "_id" : "NJ", "smallestCityPop" : 17 }
{ "_id" : "DC", "smallestCityPop" : 21 }
{ "_id" : "CA", "smallestCityPop" : 0 }
{ "_id" : "TX", "smallestCityPop" : 0 }
{ "_id" : "WY", "smallestCityPop" : 6 }
{ "_id" : "CT", "smallestCityPop" : 25 }
{ "_id" : "MO", "smallestCityPop" : 44 }
{ "_id" : "KY", "smallestCityPop" : 0 }
{ "_id" : "CO", "smallestCityPop" : 0 }
{ "_id" : "AZ", "smallestCityPop" : 2 }
{ "_id" : "LA", "smallestCityPop" : 0 }
{ "_id" : "VT", "smallestCityPop" : 0 }
{ "_id" : "OR", "smallestCityPop" : 0 }
Type "it" for more
>
```

8. What is the name of the smallest city(by population) in each state? Use the reduce function of a group command to find the smallest population.

- `db.zipcodes.aggregate([{ $group: { _id: { state: "$state", city: "$city" }, pop: { $sum: "$pop" } } }, { $sort: { pop: 1 } }, { $group: { _id: "$_id.state", smallestCity: { $first: "$_id.city" }, smallestPop: { $first: "$pop" } } }])`

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```
Command Prompt - mongo
> db.zipcodes.aggregate([{$group:{_id:{state:"$state",city:"$city"},pop:{sum:"$pop"}},{ $sort:{pop:1}},{ $group:{_id:"$_id.state", smallestCity:{ $first: "$_id.city"}, smallestPop:{ $first: "$pop" }}}])
{"_id":"AK","smallestCity":"CHEVAK","smallestPop":0}
{"_id":"KS","smallestCity":"ARNOLD","smallestPop":0}
{"_id":"ND","smallestCity":"TROTTERS","smallestPop":12}
{"_id":"NH","smallestCity":"WEST NOTTINGHAM","smallestPop":27}
{"_id":"SC","smallestCity":"QUINBY","smallestPop":0}
{"_id":"NS","smallestCity":"CHUNKY","smallestPop":0}
{"_id":"DE","smallestCity":"BETHEL","smallestPop":100}
{"_id":"OH","smallestCity":"ISLE SAINT GEORG","smallestPop":38}
{"_id":"IN","smallestCity":"WESTPOINT","smallestPop":145}
{"_id":"AR","smallestCity":"TOMATO","smallestPop":0}
{"_id":"IA","smallestCity":"DOUDS","smallestPop":15}
{"_id":"FL","smallestCity":"CECIL FIELD NAS","smallestPop":0}
{"_id":"IL","smallestCity":"ANCONA","smallestPop":38}
{"_id":"MD","smallestCity":"ANNAPOLIS JUNCTI","smallestPop":32}
{"_id":"HI","smallestCity":"NINOLE","smallestPop":0}
{"_id":"RI","smallestCity":"CLAYVILLE","smallestPop":45}
{"_id":"GA","smallestCity":"FORT STEWART","smallestPop":0}
{"_id":"WI","smallestCity":"GLAW LAKE","smallestPop":2}
{"_id":"WA","smallestCity":"BENGE","smallestPop":2}
{"_id":"AL","smallestCity":"ALLEN","smallestPop":0}
type "it" for more
> it
{"_id":"MT","smallestCity":"MOSBY","smallestPop":7}
{"_id":"UT","smallestCity":"MODENA","smallestPop":9}
{"_id":"NE","smallestCity":"LAKE SIDE","smallestPop":5}
{"_id":"NY","smallestCity":"CHILDWOLD","smallestPop":0}
{"_id":"TN","smallestCity":"ALLRED","smallestPop":2}
{"_id":"MA","smallestCity":"BUCKLAND","smallestPop":16}
{"_id":"ID","smallestCity":"KEUTERVILLE","smallestPop":0}
{"_id":"MT","smallestCity":"LELAND","smallestPop":0}
{"_id":"DC","smallestCity":"PENTAGON","smallestPop":21}
{"_id":"CA","smallestCity":"OREGON HOUSE","smallestPop":0}
{"_id":"TX","smallestCity":"ECLETO","smallestPop":0}
{"_id":"WY","smallestCity":"LOST SPRINGS","smallestPop":6}
{"_id":"NJ","smallestCity":"IMLAYSTOWN","smallestPop":17}
{"_id":"CT","smallestCity":"EAST KILLINGLY","smallestPop":25}
{"_id":"MO","smallestCity":"BENDAVIS","smallestPop":44}
{"_id":"CO","smallestCity":"CHEYENNE MTN AFB","smallestPop":0}
{"_id":"KY","smallestCity":"BROWDER","smallestPop":0}
{"_id":"AZ","smallestCity":"HUALAPAI","smallestPop":2}
{"_id":"OR","smallestCity":"ODELL","smallestPop":0}
{"_id":"VT","smallestCity":"UNIV OF VERMONT","smallestPop":0}
type "it" for more
>
```

10. How many cities does state WA have?

- `db.zipcodes.distinct("city",{ "state":"WA" }).length`

```
Command Prompt - mongo
> db.zipcodes.distinct("city",{ "state":"WA" }).length
397
>
```

1. What is the population of FISHERS ISLAND?

- `db.zipcodes.distinct("pop",{ "city":"FISHERS ISLAND" })`

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```
Command Prompt - mongo
> db.zipcodes.distinct("pop",{"city":"FISHERS ISLAND"})
[ 329 ]
>
```

2. List all the cities in the state "MA".

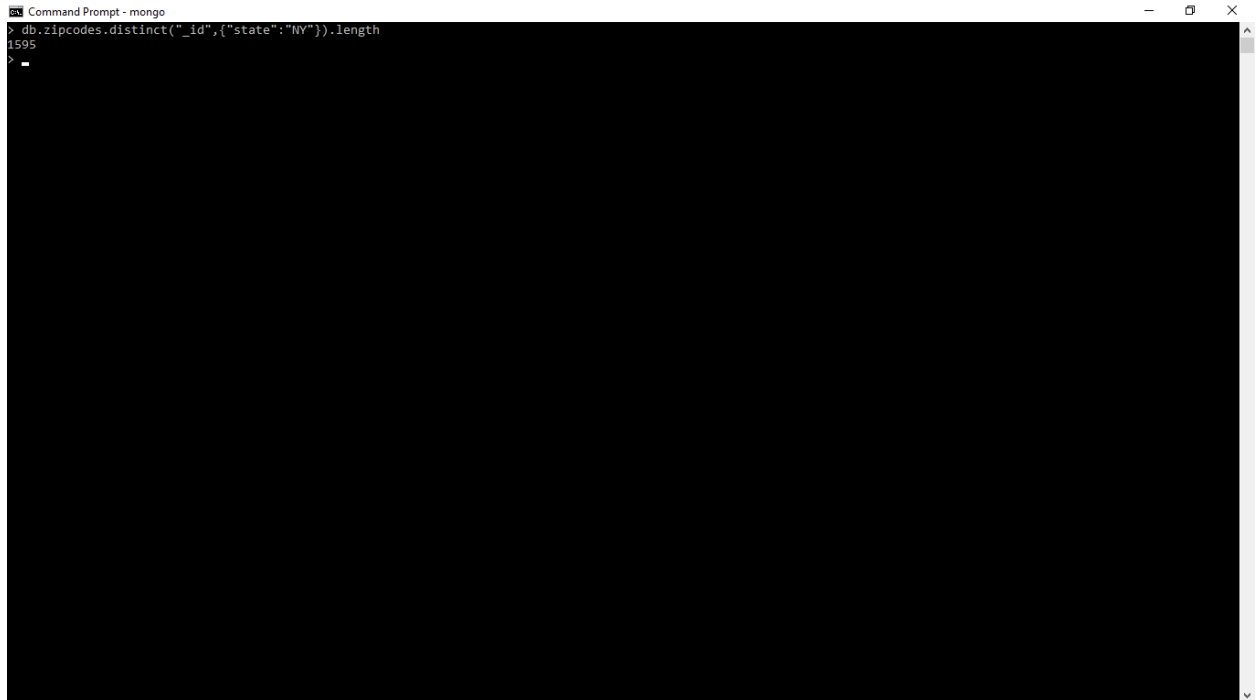
- `db.zipcodes.distinct("city", {"state":"MA"})`

```
Command Prompt - mongo
> db.zipcodes.distinct("city",{"state":"MA"})
[
  "AGAWAM",
  "CUSHMAN",
  "BARRE",
  "BELCHERTOWN",
  "BLANDFORD",
  "CHESTER",
  "CHESTERFIELD",
  "CHICOPEE",
  "WESTOVER AFB",
  "BRIMFIELD",
  "CUMMINGTON",
  "MOUNT TOM",
  "EAST LONGMEADOW",
  "GILBERTVILLE",
  "FEEDING HILLS",
  "GOSHEN",
  "GRAMBY",
  "TOLLAND",
  "HAMPDEN",
  "HADLEY",
  "HATFIELD",
  "HAYDENVILLE",
  "HOLYOKE",
  "HUNTINGTON",
  "LEEDS",
  "LUDLOW",
  "LEVERETT",
  "MONSON",
  "FLORENCE",
  "OAKHAM",
  "PALMER",
  "PLAINFIELD",
  "RUSSELL",
  "SHUTESBURY",
  "SOUTHAMPTON",
  "SOUTH HADLEY",
  "SOUTHWICK",
  "THREE RIVERS",
  "WALES",
  "WARE",
  "MONTGOMERY",
  "WEST SPRINGFIELD",
  "WEST WARREN",
  "WILBRAHAM",
]
```

16. How many different postcodes are there in the NY state?

- `db.zipcodes.distinct("_id",{"state":"NY"}).length`

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A screenshot of a MongoDB Command Prompt window. The title bar reads "Command Prompt - mongo". The prompt shows a command: `> db.zipcodes.distinct("_id", {"state": "NY"}).length`. The output is `1595`. The prompt is followed by a cursor.

```
Command Prompt - mongo
> db.zipcodes.distinct("_id", {"state": "NY"}).length
1595
>
```

For this I figured if we counted all the distinct postcodes(zipcodes being the id) in NY(May have duplicates because people living in the same house), we would get the total amount of different postcodes for NY.

4. List all the cities in the state "MA" with a population less than 100.

- `db.zipcodes.distinct("city", {"state": "MA"}, {"pop": {$lt: 10*10}})`

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```
Command Prompt - mongo
> db.zipcodes.distinct("city", {"state":"MA"}, {"pop":{"$lt:10*10}})
[
  "AGAWAM",
  "CUSHMAN",
  "BARRE",
  "BELCHERTOWN",
  "BLANDFORD",
  "CHESTER",
  "CHESTERFIELD",
  "CHICOPEE",
  "WESTOVER AFB",
  "BRIMFIELD",
  "CUMMINGTON",
  "MOUNT TOM",
  "EAST LONGMEADOW",
  "GILBERTVILLE",
  "FEEDING HILLS",
  "GOSHEN",
  "GRANBY",
  "TOLLAND",
  "HAMPDEN",
  "HADLEY",
  "HATFIELD",
  "HAYDENVILLE",
  "HOLYOKE",
  "HUNTINGTON",
  "LEEDS",
  "LUDLOW",
  "LEVERETT",
  "MONSON",
  "FLORENCE",
  "OAKHAM",
  "PALMER",
  "PLAINFIELD",
  "RUSSELL",
  "SHUTESBURY",
  "SOUTHAMPTON",
  "SOUTH HADLEY",
  "SOUTHWICK",
  "THREE RIVERS",
  "WALES",
  "WARE",
  "MONTGOMERY",
  "WEST SPRINGFIELD",
  "WEST WARREN",
  "WILBRAHAM",
]
```