Proiect ABD

```
Microsoft Windows [Version 10.0.19045.4046]
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C:\WINDOWS\system32>cd C:\Program Files\MongoDB\tools\bin

C:\Program Files\MongoDB\tools\bin>mongoimport --db=ProiectCristina --collection=ProiectCristina mongodb://mongoadmin:secret@localhost:27888/?authSource=admin ProiectCr
istina.json
2024-03-28T17:24:57.635+0200    connected to: mongodb://[**REDACTED**]@localhost:27888/?authSource=admin
2024-03-28T17:25:00.534+0200    33788 document(s) imported successfully. 0 document(s) failed to import.

C:\Program Files\MongoDB\tools\bin>mongosh mongodb://mongoadmin:secret@localhost:27888/?authSource=admin
Current Mongosh Log ID: 66058be8ecee3b6ba4d87312
Connecting to:          mongodb://<credentials>@localhost:27888/?authSource=admin&directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.1.5
Using MongoDB:          7.0.7
Using Mongosh:          2.1.5
mongosh 2.2.2 is available for download: https://www.mongodb.com/try/download/shell

For mongosh info see: https://docs.mongodb.com/mongodb-shell/

------
   The server generated these startup warnings when booting
   2024-03-28T12:23:49.011+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-file
system
   2024-03-28T12:23:51.577+00:00: /sys/kernel/mm/transparent_hugepage/enabled is 'always'. We suggest setting it to 'never' in this binary version
   2024-03-28T12:23:51.577+00:00: vm.max_map_count is too low
------
```

a) Get the states with a total population of over 10 million.

```
db.ProiectCristina.aggregate( [{ "$group": {"_id": "$state_id",
"state_population": {"$sum": "$population"}} },{ "$match":
{"state_population": {"$gt": 10000000}} }] ) [
```

```
[
  { _id: 'TX', state_population: 28628347 },
  { _id: 'NY', state_population: 19513330 },
  { _id: 'IL', state_population: 12714937 },
  { _id: 'CA', state_population: 39323978 },
  { _id: 'FL', state_population: 21153257 },
  { _id: 'PA', state_population: 12790016 },
  { _id: 'NC', state_population: 10377391 },
  { _id: 'GA', state_population: 10511012 },
  { _id: 'OH', state_population: 11669378 }
]
```

```
ProiectCristina> db.ProiectCristina.aggregate( [{ "$group": {"_id": "$state_id", "state_population": {"$sum": "$population"}} },{ "$match": {"state_population": {"$gt":
10000000}} }] )
[
  { _id: 'TX', state_population: 28628347 },
  { _id: 'NY', state_population: 19513330 },
  { _id: 'IL', state_population: 12714937 },
  { _id: 'CA', state_population: 39323978 },
  { _id: 'FL', state_population: 21153257 },
  { _id: 'PA', state_population: 12790016 },
  { _id: 'NC', state_population: 10377391 },
  { _id: 'GA', state_population: 10511012 },
  { _id: 'OH', state_population: 11669378 }
]
ProiectCristina>
```

b) Get the average city population by state.

```
db.ProiectCristina.aggregate([{ $group: { _id: { state_id: "$state_id", city:
"$city" }, population: { $sum: "$population" } } }, { $group: { _id:
"$_id.state_id", average_city_population: { $avg: "$population" } } }])
```

```
[
  { _id: 'MT', average_city_population: 3000.6977401129943 },
  { _id: 'WV', average_city_population: 2528.7377279102384 },
  { _id: 'VA', average_city_population: 11742.841160220994 },
  { _id: 'SC', average_city_population: 14581.641833810889 },
  { _id: 'IA', average_city_population: 3400.2667386609073 },
  { _id: 'ND', average_city_population: 2038.0564516129032 },
  { _id: 'OK', average_city_population: 6927.956140350877 },
  { _id: 'UT', average_city_population: 12525.733067729083 },
  { _id: 'CA', average_city_population: 32989.9144295302 },
  { _id: 'TX', average_city_population: 20448.819285714286 },
  { _id: 'NE', average_city_population: 3657.4980988593156 },
  { _id: 'AS', average_city_population: 0 },
  { _id: 'MO', average_city_population: 6811.87319243604 },
  { _id: 'LA', average_city_population: 10410.167410714286 },
  { _id: 'NH', average_city_population: 5717.573839662447 },
  { _id: 'KS', average_city_population: 4674.516853932584 },
  { _id: 'NY', average_city_population: 12795.626229508196 },
  { _id: 'IL', average_city_population: 10115.303898170247 },
  { _id: 'NV', average_city_population: 31567.21875 },
  { _id: 'DC', average_city_population: 233935.66666666666 }
]
```

c) Get the largest and the smallest city in each state.

```
db.ProiectCristina.aggregate([{ $group: { _id: { state_id: "$state_id", city: "$city",
state_name: "$state_name" }, population: { $sum: "$population" } } }, { $sort: {
"_id.state_id": 1, "population": -1 } }, { $group: { _id: "$_id.state_id", largest_city:
{ $first: "$_id.city" }, largest_city_population: { $first: "$population" },
smallest_city: { $last: "$_id.city" }, smallest_city_population: { $last: "$population" }
} }, { $project: { _id: 0, state_id: "$_id", state_name: "$_id.state_name", largest_city:
1, largest_city_population: 1, smallest_city: 1, smallest_city_population: 1 } }])
```

```
[
  {
    largest_city: 'Wilmington',
    largest_city_population: 215535,
    smallest_city: 'Dover Afb',
    smallest_city_population: 0,
    state_id: 'DE'
  },
  {
    largest_city: 'Chicago',
    largest_city_population: 2682274,
    smallest_city: 'Royal',
    smallest_city_population: 0,
    state_id: 'IL'
  },
  {
    largest_city: 'Washington',
    largest_city_population: 701620,
    smallest_city: 'Washington Navy Yard',
    smallest_city_population: 0,
    state_id: 'DC'
  },
  {
    largest_city: 'Honolulu',
    largest_city_population: 413517,
    smallest_city: 'Kekaha',
    smallest_city_population: 0,
    state_id: 'HI'
  },
  {
    largest_city: 'Bridgeport',
    largest_city_population: 144978,
    smallest_city: 'Mashantucket',
    smallest_city_population: 0,
    state_id: 'CT'
  },
  {
    largest_city: 'New Orleans',
ProiectCristina>
    smallest_city: 'Saint Benedict',
    smallest_city_population: 0,
```

```
    state_id: 'LA'
  },
  {
    largest_city: 'Portland',
    largest_city_population: 65855,
    smallest_city: 'Squirrel Island',
    smallest_city_population: 0,
    state_id: 'ME'
  },
  {
    largest_city: 'Manchester',
    largest_city_population: 116801,
    smallest_city: 'Wonalancet',
    smallest_city_population: 0,
    state_id: 'NH'
  },
  {
    largest_city: 'Des Moines',
    largest_city_population: 223439,
    smallest_city: 'Frederika',
    smallest_city_population: 0,
    state_id: 'IA'
  },
  {
    largest_city: 'Las Vegas',
    largest_city_population: 1605106,
    smallest_city: 'Manhattan',
    smallest_city_population: 0,
    state_id: 'NV'
  },
  {
    largest_city: 'Portland',
    largest_city_population: 938333,
    smallest_city: 'Arock',
    smallest_city_population: 0,
    state_id: 'OR'
  },
  {
    largest_city: 'Fargo',
    largest_city_population: 125705,
    smallest_city: 'Penn',
    smallest_city_population: 0,
    state_id: 'ND'
  },
  {
    largest_city: 'Newark',
    largest_city_population: 282041,
    smallest_city: 'Grenloch',
    smallest_city_population: 0,
    state_id: 'NJ'
  },
  {
    largest_city: 'Brooklyn',
    largest_city_population: 2576771,
    smallest_city: 'Centerville',
    smallest_city_population: 0,
    state_id: 'NY'
```

```
  },
  {
    largest_city: 'Sioux Falls',
    largest_city_population: 188143,
    smallest_city: 'Glencross',
    smallest_city_population: 0,
    state_id: 'SD'
  },
  {
    largest_city: 'Memphis',
    largest_city_population: 696510,
    smallest_city: 'Pickwick Dam',
    smallest_city_population: 0,
    state_id: 'TN'
  },
  {
    largest_city: 'Billings',
    largest_city_population: 137935,
    smallest_city: 'Vandalia',
    smallest_city_population: 0,
    state_id: 'MT'
  },
  {
    largest_city: 'San Juan',
    largest_city_population: 331682,
    smallest_city: 'La Plata',
    smallest_city_population: 0,
    state_id: 'PR'
  },
  {
    largest_city: 'Houston',
    largest_city_population: 3216453,
    smallest_city: 'Hardin',
    smallest_city_population: 0,
    state_id: 'TX'
  },
  {
    largest_city: 'Salt Lake City',
    largest_city_population: 487463,
    smallest_city: 'Henrieville',
    smallest_city_population: 0,
    state_id: 'UT'
  }
]
```

```
ProiectCristina> db.ProiectCristina.aggregate([{ $group: { _id: { state_id: "$state_id", city: "$city", state_name: "$state_name" }, population: { $sum: "$population" } } }, { $sort: { "_id.state_id": 1, "population": -1 } }, { $group: { _id: "$_id.state_id", largest_city: { $first: "$_id.city" }, largest_city_population: { $first: "$population" }, smallest_city: { $last: "$_id.city" }, smallest_city_population: { $last: "$population" } } }, { $project: { _id: 0, state_id: "$_id", state_name: "$_id.state_name", largest_city: 1, largest_city_population: 1, smallest_city: 1, smallest_city_population: 1 } }])
[
  {
    largest_city: 'Wilmington',
    largest_city_population: 215535,
    smallest_city: 'Dover Afb',
    smallest_city_population: 0,
    state_id: 'DE'
  },
  {
    largest_city: 'Chicago',
    largest_city_population: 2682274,
    smallest_city: 'Royal',
    smallest_city_population: 0,
    state_id: 'IL'
  },
  {
    largest_city: 'Washington',
    largest_city_population: 701620,
    smallest_city: 'Washington Navy Yard',
    smallest_city_population: 0,
    state_id: 'DC'
  },
  {
    largest_city: 'Honolulu',
    largest_city_population: 413517,
    smallest_city: 'Kekaha',
    smallest_city_population: 0,
    state_id: 'HI'
  },
  {
    largest_city: 'Bridgeport',
    largest_city_population: 144978,
    smallest_city: 'Mashantucket',
    smallest_city_population: 0,
    state_id: 'CT'
  },
  {
    largest_city: 'New Orleans',
```

```
{
  largest_city: 'Portland',
  largest_city_population: 65855,
  smallest_city: 'Squirrel Island',
  smallest_city_population: 0,
  state_id: 'ME'
},
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  largest_city: 'Manchester',
  largest_city_population: 116801,
  smallest_city: 'Wonalancet',
  smallest_city_population: 0,
  state_id: 'NH'
},
{
  largest_city: 'Des Moines',
  largest_city_population: 223439,
  smallest_city: 'Frederika',
  smallest_city_population: 0,
  state_id: 'IA'
},
{
  largest_city: 'Las Vegas',
  largest_city_population: 1605106,
  smallest_city: 'Manhattan',
  smallest_city_population: 0,
  state_id: 'NV'
},
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  largest_city: 'Portland',
  largest_city_population: 938333,
  smallest_city: 'Arock',
  smallest_city_population: 0,
  state_id: 'OR'
},
{
  largest_city: 'Fargo',
  largest_city_population: 125705,
  smallest_city: 'Penn',
  smallest_city_population: 0,
  state_id: 'ND'
},
{
  largest_city: 'Newark',
```

```
    largest_city: 'Sioux Falls',
    largest_city_population: 188143,
    smallest_city: 'Glencross',
    smallest_city_population: 0,
    state_id: 'SD'
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{
    largest_city: 'Memphis',
    largest_city_population: 696510,
    smallest_city: 'Pickwick Dam',
    smallest_city_population: 0,
    state_id: 'TN'
},
{
    largest_city: 'Billings',
    largest_city_population: 137935,
    smallest_city: 'Vandalia',
    smallest_city_population: 0,
    state_id: 'MT'
},
{
    largest_city: 'San Juan',
    largest_city_population: 331682,
    smallest_city: 'La Plata',
    smallest_city_population: 0,
    state_id: 'PR'
},
{
    largest_city: 'Houston',
    largest_city_population: 3216453,
    smallest_city: 'Hardin',
    smallest_city_population: 0,
    state_id: 'TX'
},
{
    largest_city: 'Salt Lake City',
    largest_city_population: 487463,
    smallest_city: 'Henrieville',
    smallest_city_population: 0,
    state_id: 'UT'
}
]
```

d) Get the largest and the smallest counties in each state.

```
db.ProiectCristina.aggregate([{ $group: { _id: { state_id: "$state_id", county_name:
"$county_name", state_name: "$state_name" }, population: { $sum: "$population" } } }, {
$sort: { "_id.state_id": 1, "population": -1 } }, { $group: { _id: "$_id.state_id",
largest_county: { $first: "$_id.county_name" }, largest_county_population: { $first:
"$population" }, smallest_county: { $last: "$_id.county_name" },
smallest_county_population: { $last: "$population" } } }, { $project: { _id: 0,
state_id: "$_id", state_name: "$_id.state_name", largest_county: 1,
largest_county_population: 1, smallest_county: 1, smallest_county_population: 1 } }])
```

```
[
  {
    largest_county: 'East Baton Rouge',
    largest_county_population: 442292,
    smallest_county: 'Tensas',
    smallest_county_population: 4435,
    state_id: 'LA'
  },
  {
    largest_county: 'New Castle',
    largest_county_population: 552056,
    smallest_county: 'Kent',
    smallest_county_population: 173662,
    state_id: 'DE'
  },
  {
    largest_county: 'Honolulu',
    largest_county_population: 979631,
    smallest_county: 'Kalawao',
    smallest_county_population: 436,
    state_id: 'HI'
  },
  {
    largest_county: 'District of Columbia',
    largest_county_population: 701807,
    smallest_county: 'District of Columbia',
    smallest_county_population: 701807,
    state_id: 'DC'
  },
  {
    largest_county: 'Cook',
    largest_county_population: 5180058,
    smallest_county: 'Hardin',
    smallest_county_population: 3443,
    state_id: 'IL'
  },
  {
    largest_county: 'Fairfield',
    largest_county_population: 944383,
    smallest_county: 'Windham',
    smallest_county_population: 116383,
    state_id: 'CT'
  },
```

```
{
  largest_county: 'Multnomah',
  largest_county_population: 802561,
  smallest_county: 'Modoc',
  smallest_county_population: 164,
  state_id: 'OR'
},
{
  largest_county: 'Cumberland',
  largest_county_population: 295064,
  smallest_county: 'Piscataquis',
  smallest_county_population: 21170,
  state_id: 'ME'
},
{
  largest_county: 'Hillsborough',
  largest_county_population: 415340,
  smallest_county: 'Oxford',
  smallest_county_population: 341,
  state_id: 'NH'
},
{
  largest_county: 'Polk',
  largest_county_population: 477992,
  smallest_county: 'Adams',
  smallest_county_population: 3313,
  state_id: 'IA'
},
{
  largest_county: 'Cass',
  largest_county_population: 180324,
  smallest_county: 'Sheridan',
  smallest_county_population: 1115,
  state_id: 'ND'
},
{
  largest_county: 'Bergen',
  largest_county_population: 931275,
  smallest_county: 'Salem',
  smallest_county_population: 64150,
  state_id: 'NJ'
},
{
  largest_county: 'Clark',
  largest_county_population: 2228950,
  smallest_county: 'Malheur',
  smallest_county_population: 423,
  state_id: 'NV'
},
{
  largest_county: 'Kings',
  largest_county_population: 2576771,
  smallest_county: 'Hamilton',
  smallest_county_population: 8155,
  state_id: 'NY'
},
{
```

```
    largest_county: 'Minnehaha',
    largest_county_population: 197724,
    smallest_county: 'Jones',
    smallest_county_population: 821,
    state_id: 'SD'
  },
  {
    largest_county: 'Salt Lake',
    largest_county_population: 1144207,
    smallest_county: 'Daggett',
    smallest_county_population: 579,
    state_id: 'UT'
  },
  {
    largest_county: 'Harris',
    largest_county_population: 4695660,
    smallest_county: 'Loving',
    smallest_county_population: 117,
    state_id: 'TX'
  },
  {
    largest_county: 'Yellowstone',
    largest_county_population: 160185,
    smallest_county: 'Petroleum',
    smallest_county_population: 396,
    state_id: 'MT'
  },
  {
    largest_county: 'San Juan',
    largest_county_population: 331682,
    smallest_county: 'Culebra',
    smallest_county_population: 1326,
    state_id: 'PR'
  },
  {
    largest_county: 'Fairfax',
    largest_county_population: 1174946,
    smallest_county: 'Charlottesville',
    smallest_county_population: 0,
    state_id: 'VA'
  }
]
```

```
ProiectCristina> db.ProiectCristina.aggregate([{ $group: { _id: { state_id: "$state_id", county_name: "$county_name", state_name: "$state_name" }, population: { $sum:
$population" } } }, { $sort: { "_id.state_id": 1, "population": -1 } }, { $group: { _id: "$_id.state_id", largest_county: { $first: "$_id.county_name" }, largest_county
_population: { $first: "$population" }, smallest_county: { $last: "$_id.county_name" }, smallest_county_population: { $last: "$population" } } }, { $project: { _id: 0,
state_id: "$_id", state_name: "$_id.state_name", largest_county: 1, largest_county_population: 1, smallest_county: 1, smallest_county_population: 1 } }])
[
  {
    largest_county: 'East Baton Rouge',
    largest_county_population: 442292,
    smallest_county: 'Tensas',
    smallest_county_population: 4435,
    state_id: 'LA'
  },
  {
    largest_county: 'New Castle',
    largest_county_population: 552056,
    smallest_county: 'Kent',
    smallest_county_population: 173662,
    state_id: 'DE'
  },
  {
    largest_county: 'Honolulu',
    largest_county_population: 979631,
    smallest_county: 'Kalawao',
    smallest_county_population: 436,
    state_id: 'HI'
  },
  {
    largest_county: 'District of Columbia',
    largest_county_population: 701807,
    smallest_county: 'District of Columbia',
    smallest_county_population: 701807,
    state_id: 'DC'
  },
  {
    largest_county: 'Cook',
    largest_county_population: 5180058,
    smallest_county: 'Hardin',
    smallest_county_population: 3443,
    state_id: 'IL'
  },
  {
    largest_county: 'Fairfield',
    largest_county_population: 944303,
```

```
{
  largest_county: 'Multnomah',
  largest_county_population: 802561,
  smallest_county: 'Modoc',
  smallest_county_population: 164,
  state_id: 'OR'
},
{
  largest_county: 'Cumberland',
  largest_county_population: 295064,
  smallest_county: 'Piscataquis',
  smallest_county_population: 21170,
  state_id: 'ME'
},
{
  largest_county: 'Hillsborough',
  largest_county_population: 415340,
  smallest_county: 'Oxford',
  smallest_county_population: 341,
  state_id: 'NH'
},
{
  largest_county: 'Polk',
  largest_county_population: 477992,
  smallest_county: 'Adams',
  smallest_county_population: 3313,
  state_id: 'IA'
},
{
  largest_county: 'Cass',
  largest_county_population: 180324,
  smallest_county: 'Sheridan',
  smallest_county_population: 1115,
  state_id: 'ND'
},
{
  largest_county: 'Bergen',
  largest_county_population: 931275,
  smallest_county: 'Salem',
  smallest_county_population: 64150,
  state_id: 'NJ'
},
{
  largest_county: 'Clark',
```

```
{
  largest_county: 'Kings',
  largest_county_population: 2576771,
  smallest_county: 'Hamilton',
  smallest_county_population: 8155,
  state_id: 'NY'
},
{
  largest_county: 'Minnehaha',
  largest_county_population: 197724,
  smallest_county: 'Jones',
  smallest_county_population: 821,
  state_id: 'SD'
},
{
  largest_county: 'Salt Lake',
  largest_county_population: 1144207,
  smallest_county: 'Daggett',
  smallest_county_population: 579,
  state_id: 'UT'
},
{
  largest_county: 'Harris',
  largest_county_population: 4695660,
  smallest_county: 'Loving',
  smallest_county_population: 117,
  state_id: 'TX'
},
{
  largest_county: 'Yellowstone',
  largest_county_population: 160185,
  smallest_county: 'Petroleum',
  smallest_county_population: 396,
  state_id: 'MT'
},
{
  largest_county: 'San Juan',
  largest_county_population: 331682,
  smallest_county: 'Culebra',
  smallest_county_population: 1326,
  state_id: 'PR'
},
{
```

e) Get the nearest 10 zips from one of Chicago's landmarks, the Willis Tower situated at coordinates 41.878876, -87.635918.

```
db.ProiectCristina.updateMany({}, [{ "$set": { "location2dsphere.type":
"Point", "location2dsphere.coordinates": ["$lng", "$lat"] } }])
```

```
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 33788,
  modifiedCount: 33788,
  upsertedCount: 0
}
```

```
db.ProiectCristina.createIndex({ location2dsphere: "2dsphere" })
```

location2dsphere_2dsphere

```
db. ProiectCristina.find({ location2dsphere: { $near: { $geometry: {
type: "Point", coordinates: [-87.635918, 41.878876] } } } }).limit(10)
```

```
[
  {
    _id: ObjectId('66058bcb68df36688c3a4464'),
    zip: 60606,
    lat: 41.88178,
    lng: -87.63724,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 3204,
    density: 5330.7,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.63724, 41.88178 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4462'),
    zip: 60604,
    lat: 41.87799,
    lng: -87.62928,
```

```
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 729,
    density: 3644.3,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.62928, 41.87799 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4461'),
    zip: 60603,
    lat: 41.88018,
    lng: -87.6274,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 1186,
    density: 3859.9,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.6274, 41.88018 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4467'),
    zip: 60602,
    lat: 41.88304,
    lng: -87.62906,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 1596,
    density: 7477.9,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.62906, 41.88304 ] }
```

```
    },
    {
      _id: ObjectId('66058bcb68df36688c3a4497'),
      zip: 60661,
      lat: 41.88291,
      lng: -87.64409,
      city: 'Chicago',
      state_id: 'IL',
      state_name: 'Illinois',
      zcta: 'TRUE',
      population: 10734,
      density: 13562.3,
      county_fips: 17031,
      county_name: 'Cook',
      county_weights: { '17031': 100 },
      county_names_all: 'Cook',
      county_fips_all: 17031,
      imprecise: 'FALSE',
      military: 'FALSE',
      timezone: 'America/Chicago',
      location2dsphere: { type: 'Point', coordinates: [ -87.64409, 41.88291 ] }
    },
    {
      _id: ObjectId('66058bcb68df36688c3a4468'),
      zip: 60601,
      lat: 41.88527,
      lng: -87.62197,
      city: 'Chicago',
      state_id: 'IL',
      state_name: 'Illinois',
      zcta: 'TRUE',
      population: 14513,
      density: 14417.8,
      county_fips: 17031,
      county_name: 'Cook',
      county_weights: { '17031': 100 },
      county_names_all: 'Cook',
      county_fips_all: 17031,
      imprecise: 'FALSE',
      military: 'FALSE',
      timezone: 'America/Chicago',
      location2dsphere: { type: 'Point', coordinates: [ -87.62197, 41.88527 ] }
    },
    {
      _id: ObjectId('66058bcb68df36688c3a4465'),
      zip: 60607,
      lat: 41.87467,
      lng: -87.65175,
      city: 'Chicago',
      state_id: 'IL',
      state_name: 'Illinois',
      zcta: 'TRUE',
      population: 30306,
      density: 5058.2,
      county_fips: 17031,
      county_name: 'Cook',
      county_weights: { '17031': 100 },
```

```
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.65175, 41.87467 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4492'),
    zip: 60654,
    lat: 41.89209,
    lng: -87.63673,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 20812,
    density: 14831.3,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.63673, 41.89209 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4463'),
    zip: 60605,
    lat: 41.86644,
    lng: -87.61956,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 30950,
    density: 8354.1,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.61956, 41.86644 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a446f'),
    zip: 60611,
    lat: 41.89483,
    lng: -87.61944,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
```

```
        zcta: 'TRUE',
        population: 33937,
        density: 16525.1,
        county_fips: 17031,
        county_name: 'Cook',
        county_weights: { '17031': 100 },
        county_names_all: 'Cook',
        county_fips_all: 17031,
        imprecise: 'FALSE',
        military: 'FALSE',
        timezone: 'America/Chicago',
        location2dsphere: { type: 'Point', coordinates: [ -87.61944, 41.89483 ] }
    }
]
```

```
ProiectCristina> db.ProiectCristina.updateMany({}, [{ "$set": { "location2dsphere.type": "Point", "location2dsphere.coordinates": ["$lng", "$lat"] } }])
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 33788,
  modifiedCount: 33788,
  upsertedCount: 0
}
ProiectCristina> db. ProiectCristina.createIndex({ location2dsphere: "2dsphere" })
location2dsphere_2dsphere
ProiectCristina> db. ProiectCristina.find({ location2dsphere: { $near: { $geometry: { type: "Point", coordinates: [-87.635918, 41.878876] } } } }).limit(10)
[
  {
    _id: ObjectId('66058bcb68df36688c3a4464'),
    zip: 60606,
    lat: 41.88178,
    lng: -87.63724,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 3204,
    density: 5330.7,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.63724, 41.88178 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4462'),
    zip: 60604,
    lat: 41.87799,
    lng: -87.62928,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 729,
```

    location2dsphere: { type: 'Point', coordinates: [-87.62906, 41.88304] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4497'),
    zip: 60661,
    lat: 41.88291,
    lng: -87.64409,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 10734,
    density: 13562.3,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [-87.64409, 41.88291] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4468'),
    zip: 60601,
    lat: 41.88527,
    lng: -87.62197,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 14513,
    density: 14417.8,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [-87.62197, 41.88527] }
```

```
    _id: ObjectId('66058bcb68df36688c3a4492'),
    zip: 60654,
    lat: 41.89209,
    lng: -87.63673,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 20812,
    density: 14831.3,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.63673, 41.89209 ] }
  },
  {
    _id: ObjectId('66058bcb68df36688c3a4463'),
    zip: 60605,
    lat: 41.86644,
    lng: -87.61956,
    city: 'Chicago',
    state_id: 'IL',
    state_name: 'Illinois',
    zcta: 'TRUE',
    population: 30950,
    density: 8354.1,
    county_fips: 17031,
    county_name: 'Cook',
    county_weights: { '17031': 100 },
    county_names_all: 'Cook',
    county_fips_all: 17031,
    imprecise: 'FALSE',
    military: 'FALSE',
    timezone: 'America/Chicago',
    location2dsphere: { type: 'Point', coordinates: [ -87.61956, 41.86644 ] }
  },
```

f) Get the total population situated between 50 and 200 kms around New York's landmark, the Statue of Liberty at coordinates 40.689247, -74.044502.

```
db.ProiectCristina.aggregate([{ $geoNear: { near: { type: "Point", coordinates:
[-74.044502, 40.689247] }, key: "location2dsphere_2dsphere", distanceField:
"distance", maxDistance: 200000, minDistance: 50000, spherical: true } }, {
$group: { _id: null, total_population: { $sum: "$population" } } }])
```

```
[ { _id: null, total_population: 17679688 } ]
```

```
ProiectCristina> db.ProiectCristina.aggregate([{ $geoNear: { near: { type: "Point", coordinates: [-74.044502, 40.689247] }, distanceField: "distance", maxDistance: 2000
00, minDistance: 50000, spherical: true } }, { $group: { _id: null, total_population: { $sum: "$population" } } }])
[ { _id: null, total_population: 17679688 } ]
ProiectCristina>
```