Title: DB Assignment 5
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Date: 11/22/24

1. **Over how many years was the unemployment data collected?**

```
> db.unemployment.distinct("Year").length;
< 27
test>
```

2. **How many states were reported on in this dataset?**

```
> db.unemployment.distinct("State").length;
< 47
test>
```

3. **What does this query compute?**
   db.unemployment.find({Rate : {$lt: 1.0}}).count()

```
> db.unemployment.find({Rate: {$lt: 1.0}}).count();
< 657
test>
```

   It counts the number of counties where the unemployment rate is less than 1.0%.

4. **Find all counties with unemployment rate higher than 10%**

```
> db.unemployment.aggregate([
    { $match: { Rate: { $gt: 10.0 } } },
    { $group: { _id: { County: "$County", State: "$State" } } },
    { $count: "count" }
  ]);
< {
    count: 1887
  }
test>
```

There are way too many to document so i shared the count.

5. **Calculate the average unemployment rate across all states.**

```
> db.unemployment.aggregate([
    { $group: { _id: null, averageRate: { $avg: "$Rate" } } }
  ]);
< {
    _id: null,
    averageRate: 6.1750097115006755
  }
test>
```

6. **Find all counties with an unemployment rate between 5% and 8%.**

```
> db.unemployment.aggregate([
    { $match: { Rate: { $gte: 5.0, $lte: 8.0 } } },
    { $group: { _id: { County: "$County", State: "$State" } } },
    { $count: "count" }
  ]);
< {
    count: 2838
```

7. **Find the state with the highest unemployment rate. Hint. Use { $limit: 1 }**

```
> db.unemployment.aggregate([
    { $group: { _id: "$State", avgRate: { $avg: "$Rate" } } },
    { $sort: { avgRate: -1 } },
    { $limit: 1 }
  ]);
< {
    _id: 'Arizona',
    avgRate: 9.274588477366255
  }
test>
```

8. **Count how many counties have an unemployment rate above 5%.**

```
> db.unemployment.aggregate([
    { $match: { Rate: { $gt: 5.0 } } },
    { $group: { _id: { County: "$County", State: "$State" } } },
    { $count: "uniqueCounties" }
  ]);
< {
    uniqueCounties: 2835
  }
test>
```

9. **Calculate the average unemployment rate per state by year.**

```
> db.unemployment.aggregate([
    {
      $group: {
        _id: { State: "$State", Year: "$Year" },    // Group by State and Year
        averageRate: { $avg: "$Rate" }              // Calculate the average Rate for each group
      }
    },
    {
      $sort: { "_id.Year": 1, "_id.State": 1 }      // Sort the result by Year and State
    }
  ]);
< {
    _id: {
      State: 'Alabama',
      Year: 1990
    },
    averageRate: 8.226990049751244
  }
  {
    _id: {
      State: 'Arizona',
      Year: 1990
    },
    averageRate: 8.285555555555556
  }
  {
    _id: {
      State: 'Arkansas',
```

10. **(Extra Credit) For each state, calculate the total unemployment rate across all counties (sum of all county rates).**

This makes some weird numbers.

```
Type "it" for more
> db.unemployment.aggregate([
    {
      $group: {
        _id: { State: "$State" },
        totalRate: { $sum: "$Rate" }
      }
    },
    {
      $sort: { "_id.State": 1 }
    }
  ]);
< {
    _id: {
      State: 'Alabama'
    },
    totalRate: 167669.2
  }
  {
    _id: {
      State: 'Arizona'
    },
    totalRate: 45074.5
  }
  {
    _id: {
      State: 'Arkansas'
    },
    totalRate: 164807.7
  }
```

11. **(Extra Credit) The same as Query 10 but for states with data from 2015 onward**

```
db.unemployment.aggregate([
  {
    $match: { Year: { $gte: 2015 } }
  },
  {
    $group: {
      _id: { State: "$State" },
      totalRate: { $sum: "$Rate" }
    }
  },
  {
    $sort: { "_id.State": 1 }
  }
]);
{
  _id: {
    State: 'Alabama'
  },
  totalRate: 11100.7
}
{
  _id: {
    State: 'Arizona'
  },
  totalRate: 2974.4
}
{
  _id: {
```