

HOMEWORK 4

QUESTION 1

INPUT

```
db.BikeStations.aggregate([
  { $group: { _id: "$extra.status", count: { $sum: 1 } } },
  {
    $match: {
      _id: { $in: ["online", "offline"] },
    },
  },
]);
```

OUTPUT

```
[
  {
    "_id": "online",
    "count": 33
  },
  {
    "_id": "offline",
    "count": 28
  }
]
```

QUESTION 2

INPUT

```
db.BikeStations.countDocuments({
  "extra.status": { $nin: ["online", "offline"] },
});
```

OUTPUT

```
32
```

QUESTION 3

INPUT

```
db.BikeStations.find(
  { "extra.status": { $nin: ["online", "offline"] } },
  { "extra.status": 1, _id: 0 }
);
```

OUTPUT

```
[
  {
    "extra": {
      "status": "maintenance"
    }
  },
  {
    "extra": {
      "status": "maintenance"
    }
  },
  {
    "extra": {
      "status": "maintenance"
    }
  },
  {
    "extra": {
      "status": "maintenance"
    }
  }
]
```

QUESTION 4

INPUT

```
db.BikeStations.find(
  { "extra.status": "online", "extra.score": { $gte: 4 } },
  { name: 1 }
).sort({ name: 1 });
```

OUTPUT

```
[
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c983"
    },
    "name": "02. Pettiti"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c9a6"
    },
    "name": "04. Reggia"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c9a7"
    },
    "name": "06. Municipio"
  },
  {
    "_id": {
```

```
    "$oid": "6586ed046f7432c6fa55c987"
  },
  "name": "08. San Marchese"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c988"
  },
  "name": "10. Gallo Praile"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c994"
  },
  "name": "Belfiore"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c99a"
  },
  "name": "Borromini"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c9a5"
  },
  "name": "Castello 1"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c96b"
  },
  "name": "Corte d`Appello"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c96e"
  },
  "name": "Giolitti 1"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c9a1"
  },
  "name": "Politecnico 1"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c99e"
  },
  "name": "Politecnico 3"
},
{
  "_id": {
    "$oid": "6586ed046f7432c6fa55c96c"
  },
  "name": "Porta Palatina"
}
```

```

    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c9a2"
      },
      "name": "Principi d`Acaja 1"
    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c9a3"
      },
      "name": "Principi d`Acaja 2"
    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c96f"
      },
      "name": "San Francesco da Paola"
    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c98e"
      },
      "name": "Sant`Anselmo"
    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c9a0"
      },
      "name": "Tribunale"
    }
  ]

```

QUESTION 5

INPUT - INACTIVE STATIONS WITH FREE SLOTS OR BIKES

```

db.BikeStations.find(
  {
    "extra.status": "offline",
    $or: [{ empty_slots: { $gt: 0 } }, { free_bikes: { $gt: 0 } }],
  },
  { name: 1 }
);

```

OUTPUT

```

[
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c976"
    },
    "empty_slots": 1,
    "free_bikes": 0,
    "name": "06. Le Serre"
  }
]

```

```

    },
    {
      "_id": {
        "$oid": "6586ed046f7432c6fa55c985"
      },
      "empty_slots": 0,
      "free_bikes": 5,
      "name": "05. Corso Garibaldi"
    }
  ]

```

INPUT - COUNT FREE SLOTS OR BIKES

```

db.BikeStations.aggregate([
  {
    $match: {
      $and: [
        { "extra.status": "offline" },
        { $or: [{ empty_slots: { $gt: 0 } }, { free_bikes: { $gt: 0 } }] },
      ],
    },
  },
  {
    $group: {
      _id: null,
      total_empty_slots: { $sum: "$empty_slots" },
      total_free_bikes: { $sum: "$free_bikes" },
    },
  },
]);

```

OUTPUT

```

[
  {
    "_id": null,
    "total_empty_slots": 1,
    "total_free_bikes": 5
  }
]

```

QUESTION 6

INPUT

```

db.BikeStations.aggregate([
  { $group: { _id: null, tot_reviews: { $sum: "$extra.reviews" } } },
]);

```

OUTPUT

```

[
  {

```

```
    "_id": null,  
    "tot_reviews": 15311  
  }  
]
```

QUESTION 7

INPUT

```
db.BikeStations.aggregate([  
  { $group: { _id: "$extra.score", num: { $sum: 1 } } },  
  { $sort: { _id: -1 } },  
]);
```

OUTPUT

```
[  
  {  
    "_id": 4.7,  
    "num": 1  
  },  
  {  
    "_id": 4.5,  
    "num": 2  
  },  
  {  
    "_id": 4.4,  
    "num": 2  
  },  
  {  
    "_id": 4.3,  
    "num": 2  
  },  
  {  
    "_id": 4.2,  
    "num": 7  
  },  
  {  
    "_id": 4.1,  
    "num": 5  
  },  
  {  
    "_id": 4,  
    "num": 9  
  },  
  {  
    "_id": 3.9,  
    "num": 9  
  },  
  {  
    "_id": 3.8,  
    "num": 1  
  },  
  {  
    "_id": 3.7,
```

```
    "num": 2
  },
  {
    "_id": 3.6,
    "num": 1
  },
  {
    "_id": 3.5,
    "num": 4
  },
  {
    "_id": 3.4,
    "num": 3
  },
  {
    "_id": 3.2,
    "num": 1
  },
  {
    "_id": 3,
    "num": 4
  },
  {
    "_id": 2.8,
    "num": 2
  },
  {
    "_id": 2.7,
    "num": 1
  },
  {
    "_id": 2.5,
    "num": 1
  },
  {
    "_id": 2.4,
    "num": 1
  },
  {
    "_id": 2.1,
    "num": 1
  },
  {
    "_id": 1.5,
    "num": 1
  },
  {
    "_id": 1.4,
    "num": 1
  },
  {
    "_id": 1.2,
    "num": 1
  },
  {
    "_id": 1,
    "num": 3
  }
```

```
}  
]
```

QUESTION 8

INPUT

```
db.BikeStations.aggregate([  
  {  
    $match: {  
      $or: [{ "extra.status": "online" }, { "extra.status": "offline" }],  
    },  
  },  
  { $group: { _id: "$extra.status", rating: { $avg: "$extra.score" } } },  
]);
```

OUTPUT

```
[  
  {  
    "_id": "online",  
    "rating": 3.8454545454545452  
  },  
  {  
    "_id": "offline",  
    "rating": 3.0285714285714285  
  }  
]
```

QUESTION 9

INPUT

```
db.BikeStations.aggregate([  
  {  
    $group: {  
      _id: {  
        $cond: [{ $gt: ["$free_bikes", 0] }, "with bikes", "without bikes"],  
      },  
      avg_rating: { $avg: "$extra.score" },  
    },  
  },  
]);
```

INPUT - USING MAPREDUCE PARADIGM (DEPRECATED)

```
var mapper = function () {  
  emit(this.free_bikes > 0 ? "with bikes" : "without bikes", this.extra.score);  
};  
  
var reducer = function (key, values) {  
  return Array.avg(values);  
};
```



```
db.BikeStations.mapReduce(mapper, reducer, { out: "avg_rating" });
```

OUTPUT

```
[
  {
    "_id": "with bikes",
    "avg_rating": 3.8758620689655174
  },
  {
    "_id": "without bikes",
    "avg_rating": 3.2305555555555556
  }
]
```

QUESTION 10

INPUT

```
db.BikeStations.aggregate([
  { $match: { "extra.status": "online" } },
  {
    $group: {
      _id: {
        $cond: [{ $gt: ["$free_bikes", 0] }, "with bikes", "without bikes"],
      },
      avg_rating: { $avg: "$extra.score" },
    },
  },
]);
```

INPUT - USING MAPREDUCE PARADIGM (DEPRECATED)

```
var mapper = function () {
  if (this.extra.status !== "online") return;
  emit(this.free_bikes > 0 ? "with bikes" : "without bikes", this.extra.score);
};

var reducer = function (key, values) {
  return Array.avg(values);
};

db.BikeStations.mapReduce(mapper, reducer, { out: "avg_rating" });
```

OUTPUT

```
[
  {
    "_id": "with bikes",
    "avg_rating": 3.8642857142857143
  },
  {
    "_id": "without bikes",
    "avg_rating": 3.2305555555555556
  }
]
```

```

    "_id": "without bikes",
    "avg_rating": 3.7399999999999998
  }
]

```

QUESTION 11

INPUT

```

db.BikeStations.createIndex( {location: "2dsphere"} );

db.BikeStations.find(
  {
    free_bikes: { $gt: 0 },
    location: {
      $near: {
        $geometry: {
          type: "Point",
          coordinates: [45.07456, 7.69463],
        },
      },
    },
  },
  { name: 1 }
)
.sort({ name: 1 })
.limit(3);

```

OUTPUT

```

[
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c982"
    },
    "name": "01. Concordia"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c98c"
    },
    "name": "02. BIKE POINT Mandria"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c983"
    },
    "name": "02. Pettiti"
  }
]

```

QUESTION 12

INPUT

```

db.BikeStations.find(
{
  free_bikes: { $gt: 0 },
  location: {
    $near: {
      $geometry: {
        type: "Point",
        coordinates: db.BikeStations.findOne({ name: "Politecnico 4" })
          .location.coordinates,
      },
    },
  },
},
{ name: 1, free_bikes: 1 }
)
.sort({ name: 1 })
.limit(3);

```

OUTPUT

```

[
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c982"
    },
    "free_bikes": 2,
    "name": "01. Concordia"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c98c"
    },
    "free_bikes": 2,
    "name": "02. BIKE POINT Mandria"
  },
  {
    "_id": {
      "$oid": "6586ed046f7432c6fa55c983"
    },
    "free_bikes": 2,
    "name": "02. Pettiti"
  }
]

```