Data Science HW5:

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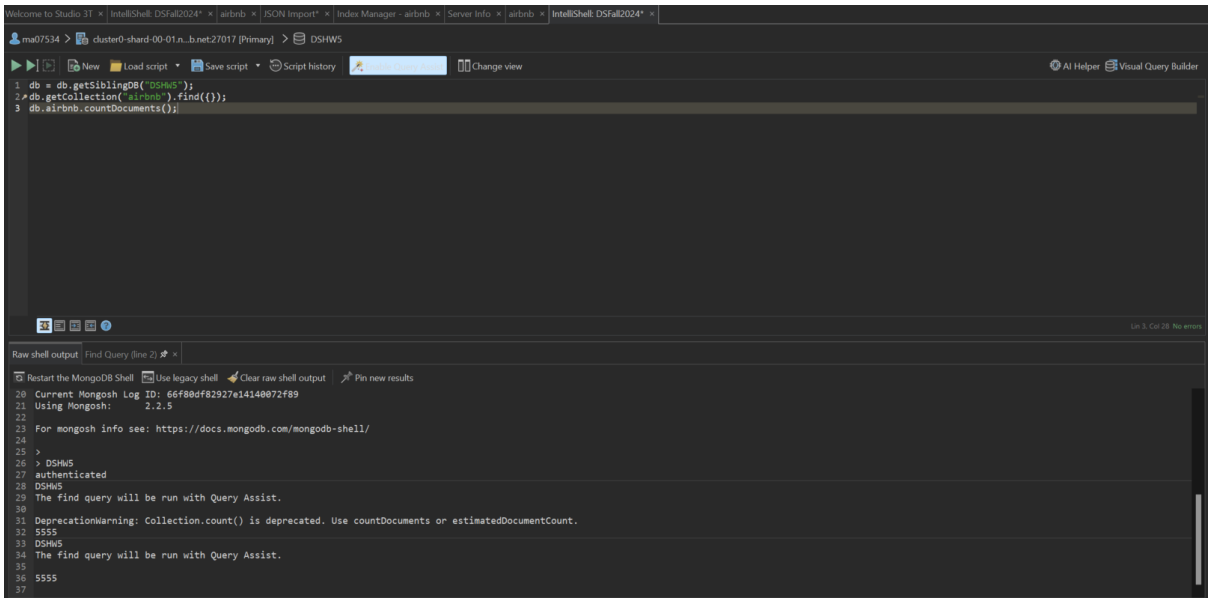
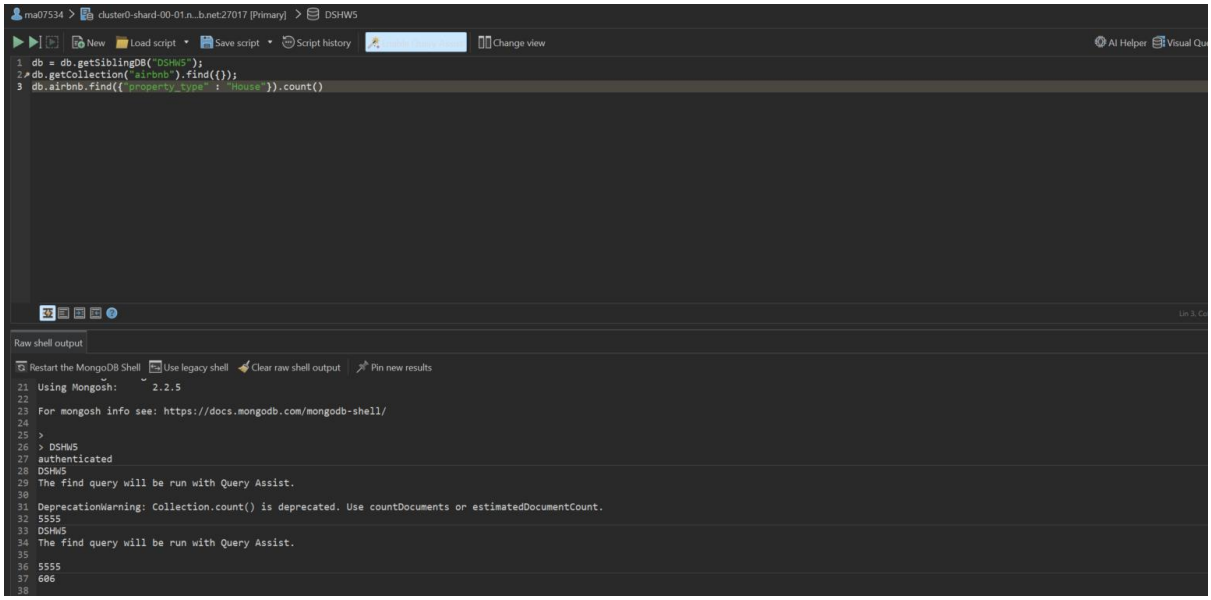
Query the collection and interpret the results, displaying:

Q1. the count of total number of records in the collection



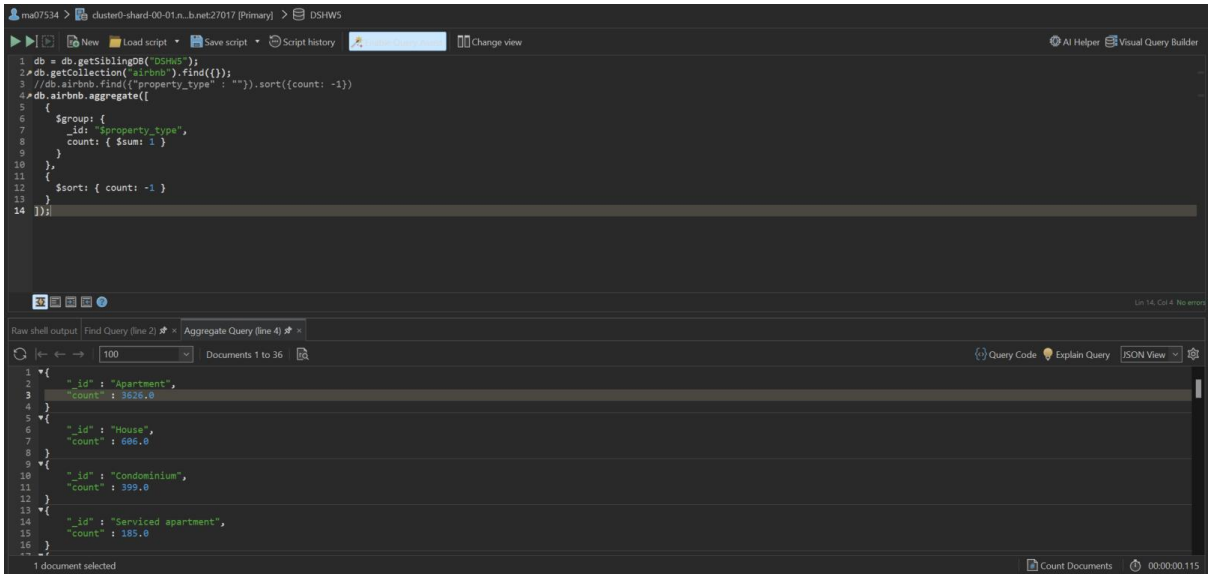
Interpretation: The query output displays that there are a total of 5555 records in the collection.

Q2. the count of records for property_type “House”



Interpretation: The query output displays that there are a total of 606 records of property_type “House”

Q3. **counts for each property_type in descending order of count (use group)**




```
{
   "_id" : "Apartment",
   "count" : 3626.0
}
{
   "_id" : "House",
   "count" : 606.0
}
{
   "_id" : "Condominium",
   "count" : 399.0
}
{
   "_id" : "Serviced apartment",
   "count" : 185.0
}
{
   "_id" : "Loft",
   "count" : 142.0
}
{
   "_id" : "Townhouse",
   "count" : 108.0
```

```
}
{
  "_id" : "Guest suite",
  "count" : 81.0
}
{
  "_id" : "Bed and breakfast",
  "count" : 69.0
}
{
  "_id" : "Boutique hotel",
  "count" : 53.0
}
{
  "_id" : "Guesthouse",
  "count" : 50.0
}
{
  "_id" : "Hostel",
  "count" : 34.0
}
{
  "_id" : "Villa",
  "count" : 32.0
}
{
  "_id" : "Hotel",
  "count" : 26.0
}
{
  "_id" : "Aparthotel",
  "count" : 23.0
}
{
  "_id" : "Cottage",
  "count" : 20.0
}
{
```

```
  "_id" : "Other",
  "count" : 18.0
}
{
  "_id" : "Cabin",
  "count" : 15.0
}
{
  "_id" : "Bungalow",
  "count" : 14.0
}
{
  "_id" : "Resort",
  "count" : 11.0
}
{
  "_id" : "Farm stay",
  "count" : 9.0
}
{
  "_id" : "Casa particular (Cuba)",
  "count" : 9.0
}
{
  "_id" : "Tiny house",
  "count" : 7.0
}
{
  "_id" : "Camper/RV",
  "count" : 2.0
}
{
  "_id" : "Nature lodge",
  "count" : 2.0
}
{
  "_id" : "Chalet",
  "count" : 2.0
```

```
}
{
  "_id" : "Boat",
  "count" : 2.0
}
{
  "_id" : "Earth house",
  "count" : 1.0
}
{
  "_id" : "Castle",
  "count" : 1.0
}
{
  "_id" : "Barn",
  "count" : 1.0
}
{
  "_id" : "Pension (South Korea)",
  "count" : 1.0
}
{
  "_id" : "Campsite",
  "count" : 1.0
}
{
  "_id" : "Train",
  "count" : 1.0
}
{
  "_id" : "Heritage hotel (India)",
  "count" : 1.0
}
{
  "_id" : "Hut",
  "count" : 1.0
}
{
```

"_id" : "Treehouse",

"count" : 1.0

}

{

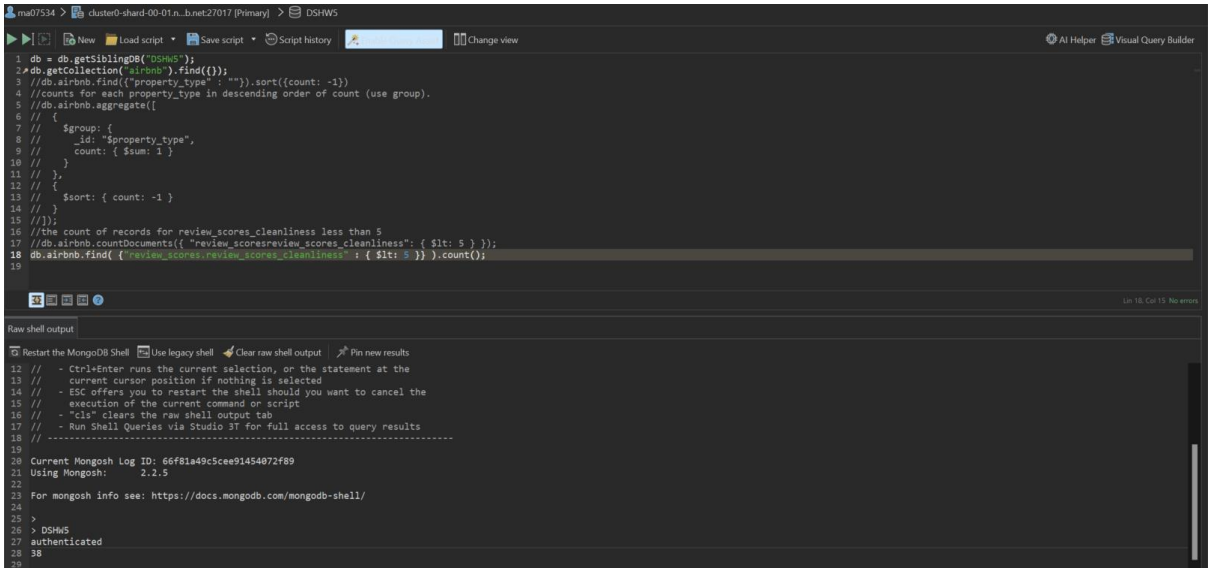
"_id" : "Houseboat",

"count" : 1.0

}

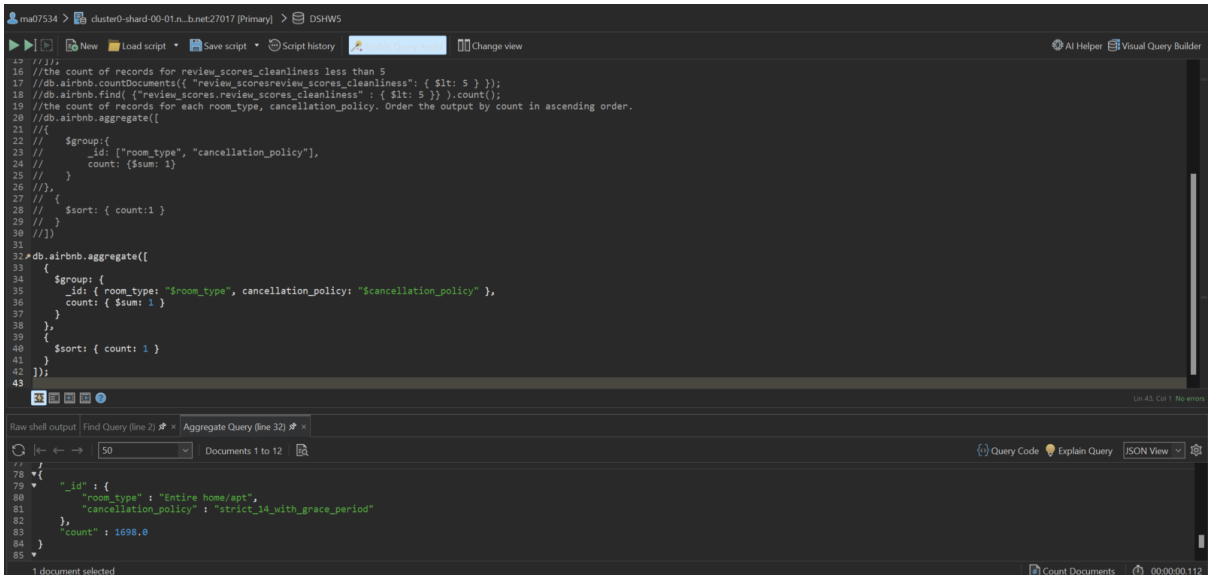
Interpretation: the query indicates that Apartment's count is the highest at 3626, the count of "House" is 606, the count of "Condominium" is 399. These are the top 3, in this long list of property type counts in descending order.

Q4. the count of records for review_scores_cleanliness less than 5.



Interpretation: the query indicates that the count of records for review_score_cleanliness less than 5 is 38.

Q5. **the count of records for each room_type, cancellation_policy. Order the output by count in ascending order**



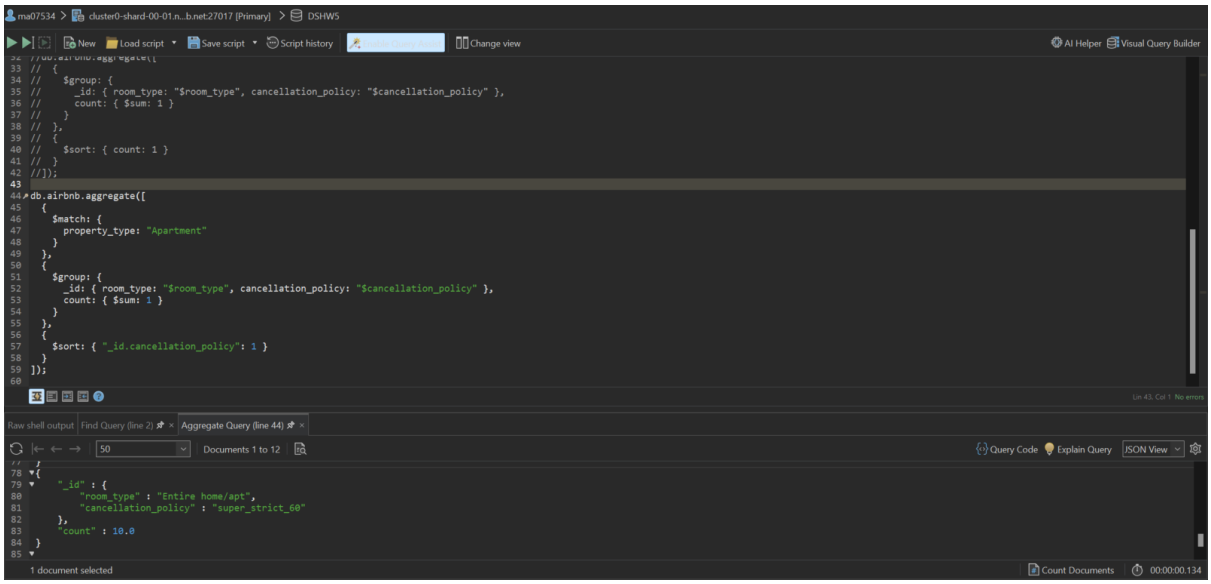

```
{
  "_id" : {
    "room_type" : "Private room",
    "cancellation_policy" : "super_strict_60"
  },
  "count" : 6.0
}
{
  "_id" : {
    "room_type" : "Shared room",
    "cancellation_policy" : "moderate"
  },
  "count" : 8.0
}
{
  "_id" : {
    "room_type" : "Shared room",
    "cancellation_policy" : "strict_14_with_grace_period"
  },
  "count" : 24.0
}
{
  "_id" : {
    "room_type" : "Entire home/apt",
```

```
      "cancellation_policy" : "super_strict_30"
   },
   "count" : 38.0
}
{
   "_id" : {
      "room_type" : "Shared room",
      "cancellation_policy" : "flexible"
   },
   "count" : 51.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "super_strict_60"
   },
   "count" : 73.0
}
{
   "_id" : {
      "room_type" : "Private room",
      "cancellation_policy" : "moderate"
   },
   "count" : 435.0
}
{
   "_id" : {
      "room_type" : "Private room",
      "cancellation_policy" : "strict_14_with_grace_period"
   },
   "count" : 698.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "flexible"
   },
   "count" : 787.0
```

```
}
{
   "_id" : {
      "room_type" : "Private room",
      "cancellation_policy" : "flexible"
   },
   "count" : 844.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "moderate"
   },
   "count" : 893.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "strict_14_with_grace_period"
   },
   "count" : 1698.0
}
```


Interpretation: The count of records for each room_type, cancellation_policy. Ordered the output by count in ascending order indicates that the count is between 6 and 1698.

Q6. Similar to question 5, the count of records for each room_type, cancellation_policy when property_type is “Apartment”. Order the output by cancellation_policy in ascending order.



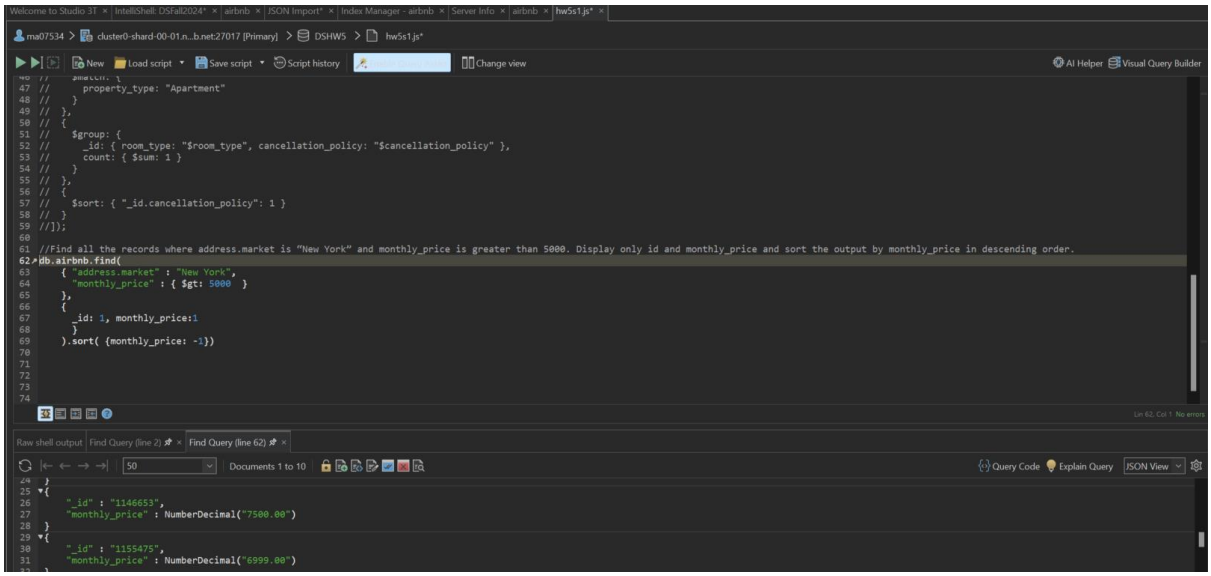

```
{
   "_id" : {
      "room_type" : "Private room",
      "cancellation_policy" : "flexible"
   },
   "count" : 550.0
}
{
   "_id" : {
      "room_type" : "Shared room",
      "cancellation_policy" : "flexible"
   },
   "count" : 24.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "flexible"
   },
   "count" : 567.0
}.
```

```
{
  "_id" : {
    "room_type" : "Entire home/apt",
    "cancellation_policy" : "moderate"
  },
  "count" : 631.0
}
{
  "_id" : {
    "room_type" : "Private room",
    "cancellation_policy" : "moderate"
  },
  "count" : 287.0
}
{
  "_id" : {
    "room_type" : "Shared room",
    "cancellation_policy" : "moderate"
  },
  "count" : 3.0
}
{
  "_id" : {
    "room_type" : "Entire home/apt",
    "cancellation_policy" : "strict_14_with_grace_period"
  },
  "count" : 1112.0
}
{
  "_id" : {
    "room_type" : "Private room",
    "cancellation_policy" : "strict_14_with_grace_period"
  },
  "count" : 416.0
}
{
  "_id" : {
    "room_type" : "Shared room",
```

```
      "cancellation_policy" : "strict_14_with_grace_period"
   },
   "count" : 12.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "super_strict_30"
   },
   "count" : 13.0
}
{
   "_id" : {
      "room_type" : "Private room",
      "cancellation_policy" : "super_strict_60"
   },
   "count" : 1.0
}
{
   "_id" : {
      "room_type" : "Entire home/apt",
      "cancellation_policy" : "super_strict_60"
   },
   "count" : 10.0
}
```


Interpretation: The count of records for each room_type, cancellation_policy when property_type is “apartment”, ordered by cancellation_policy in ascending order shows room types and cancellation policies.

Q7. **Find all the records where address.market is “New York” and monthly_price is greater than 5000. Display only id and monthly_price and sort the output by monthly_price in descending order**




```
{
   "_id" : "846854",
   "monthly_price" : NumberDecimal("17000.00")
}
{
   "_id" : "256328",
   "monthly_price" : NumberDecimal("12000.00")
}
{
   "_id" : "598612",
   "monthly_price" : NumberDecimal("10000.00")
}
{
   "_id" : "1897001",
   "monthly_price" : NumberDecimal("9495.00")
}
{
   "_id" : "6064471",
   "monthly_price" : NumberDecimal("8820.00")
}
{
   "_id" : "640813",
```

"monthly_price" : NumberDecimal("8000.00")

}

{

"_id" : "1146653",

"monthly_price" : NumberDecimal("7500.00")

}

{

"_id" : "1155475",

"monthly_price" : NumberDecimal("6999.00")

}

{

"_id" : "2253500",

"monthly_price" : NumberDecimal("6250.00")

}

{

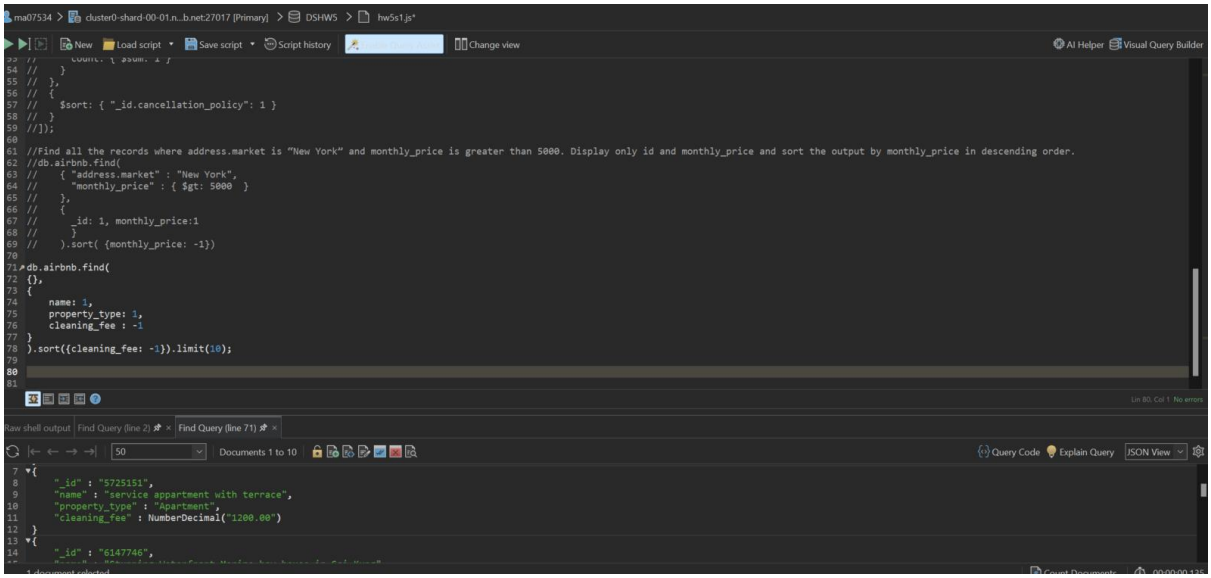
"_id" : "102995",

"monthly_price" : NumberDecimal("6000.00")

}

Interpretation: Displayed are the records where address.market is "New York" and monthly_price is greater than 500, displayed by id and monthly_price and sorted by monthly_price in descending order. These prices range from 17000 to 6000.

Q8. **Display the records with cleaning_fee in descending order. Display name, property_type and cleaning_fee. Limit records to 10 (easy)**

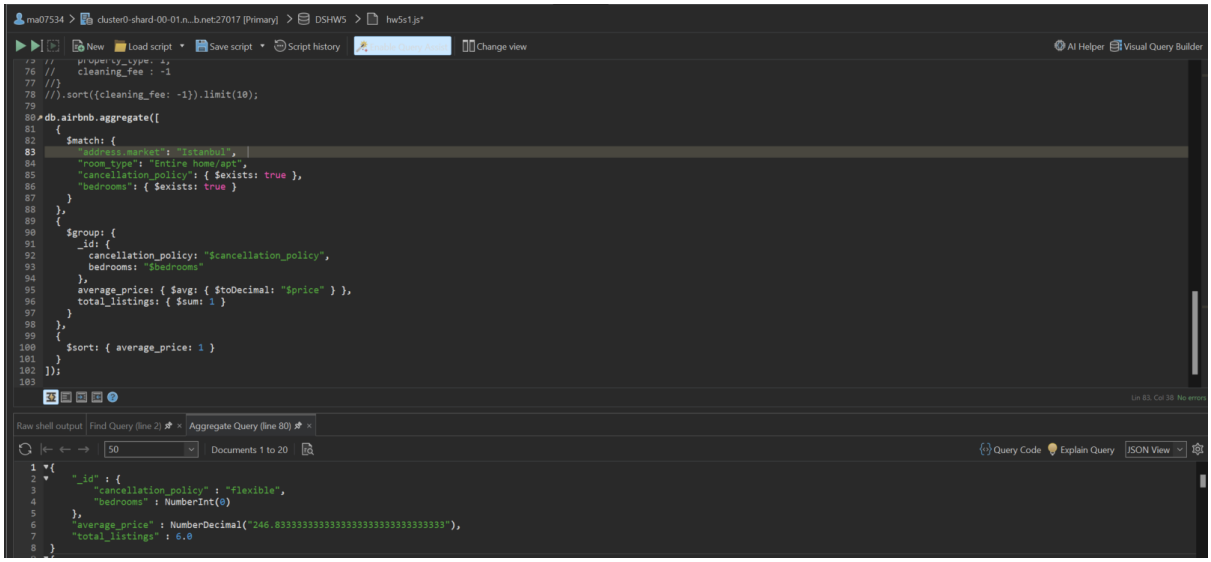


```
{
   "_id" : "13927230",
   "name" : "Casa completa p olimpíadas com serviços incluído",
   "property_type" : "House",
   "cleaning_fee" : NumberDecimal("2000.00")
}
{
   "_id" : "5725151",
   "name" : "service appartment with terrace",
   "property_type" : "Apartment",
   "cleaning_fee" : NumberDecimal("1200.00")
}
{
   "_id" : "6147746",
   "name" : "Stunning Waterfront Marina bay house in Sai Kung",
   "property_type" : "House",
   "cleaning_fee" : NumberDecimal("1000.00")
}
{
   "_id" : "28884716",
   "name" : "两房一厅,出租单人床房间(该房间不足 99 尺,房客不能带超过 2 个行李箱。另外,双人床房已有 1 人长住)",
   "property_type" : "Serviced apartment",
   "cleaning_fee" : NumberDecimal("1000.00")
}
{
   "_id" : "1176693",
   "name" : "BEST REVIEWS*BEST MALLS*SAFE STAY*DIMSUM*CWB*MTR",
   "property_type" : "Apartment",
   "cleaning_fee" : NumberDecimal("942.00")
}
{
   "_id" : "20362690",
   "name" : "WORLD CLASS MALLS*LUXURY 3BED2BATH*CLEAN*MTR*SAFE",
   "property_type" : "Apartment",
   "cleaning_fee" : NumberDecimal("942.00")
}
{
```

```
  "_id" : "15488401",
  "name" : "INSTAGRAM HOME *MTR*ELEMENT MALL*NEW TRAIN KOWLOON",
  "property_type" : "Apartment",
  "cleaning_fee" : NumberDecimal("942.00")
}
{
  "_id" : "16215566",
  "name" : "Kahala Ali'i",
  "property_type" : "House",
  "cleaning_fee" : NumberDecimal("910.00")
}
{
  "_id" : "5640127",
  "name" : "Laulea Kailani Villa (Kauai), Peaceful Luxury",
  "property_type" : "House",
  "cleaning_fee" : NumberDecimal("850.00")
}
{
  "_id" : "25065550",
  "name" : "Lanikai La'i Hale with Oceanview 3BD plus Loft/3BA",
  "property_type" : "House",
  "cleaning_fee" : NumberDecimal("800.00")
}
```


Interpretation: Displayed are the records with cleaning_fee in descending order. We display the name, property_type and cleaning_fee, limiting the records to 10. We can see that the least cleaning fee is 800, with the highest fee at 2000.

Q9. **Come up with your own query to show any interesting insight. Use atleast two fields for match and two fields for group**



```
db.airbnb.aggregate([
  {
    $match: {
      "address.market": "Istanbul",
      "room_type": "Entire home/apt",
      "cancellation_policy": { $exists: true },
      "bedrooms": { $exists: true }
    }
  },
  {
    $group: {
      _id: {
        cancellation_policy: "$cancellation_policy",
        bedrooms: "$bedrooms"
      },
      average_price: { $avg: { $toDecimal: "$price" } },
      total_listings: { $sum: 1 }
    }
  },
  {
    $sort: { average_price: 1 }
  }
]);
```

```
{
    "_id" : {
        "cancellation_policy" : "flexible",
        "bedrooms" : NumberInt(0)
    },
    "average_price" : NumberDecimal("246.83333333333333333333333333333333"),
    "total_listings" : 6.0
}
{
    "_id" : {
        "cancellation_policy" : "flexible",
        "bedrooms" : NumberInt(4)
    },
    "average_price" : NumberDecimal("261.00"),
    "total_listings" : 2.0
}
{
    "_id" : {
        "cancellation_policy" : "moderate",
        "bedrooms" : NumberInt(1)
    },
    "average_price" : NumberDecimal("269.97222222222222222222222222222222"),
    "total_listings" : 36.0
}
```

```
{
  "_id" : {
    "cancellation_policy" : "flexible",
    "bedrooms" : NumberInt(1)
  },
  "average_price" : NumberDecimal("289.16216216216216216216216216216622"),
  "total_listings" : 74.0
}
{
  "_id" : {
    "cancellation_policy" : "strict_14_with_grace_period",
    "bedrooms" : NumberInt(0)
  },
  "average_price" : NumberDecimal("310.50"),
  "total_listings" : 8.0
}
{
  "_id" : {
    "cancellation_policy" : "strict_14_with_grace_period",
    "bedrooms" : NumberInt(1)
  },
  "average_price" : NumberDecimal("310.52"),
  "total_listings" : 25.0
}
{
  "_id" : {
    "cancellation_policy" : "flexible",
    "bedrooms" : NumberInt(2)
  },
  "average_price" : NumberDecimal("358.42553191489361702127659574468809"),
  "total_listings" : 47.0
}
{
  "_id" : {
    "cancellation_policy" : "moderate",
    "bedrooms" : NumberInt(2)
  },
  "average_price" : NumberDecimal("397.53846153846153846153846153846615"),
```

```
  "total_listings" : 13.0
}
{
  "_id" : {
    "cancellation_policy" : "moderate",
    "bedrooms" : NumberInt(0)
  },
  "average_price" : NumberDecimal("403.50"),
  "total_listings" : 4.0
}
{
  "_id" : {
    "cancellation_policy" : "moderate",
    "bedrooms" : NumberInt(4)
  },
  "average_price" : NumberDecimal("430.00"),
  "total_listings" : 2.0
}
{
  "_id" : {
    "cancellation_policy" : "moderate",
    "bedrooms" : NumberInt(3)
  },
  "average_price" : NumberDecimal("446.14285714285714285714285714285714285"),
  "total_listings" : 7.0
}
{
  "_id" : {
    "cancellation_policy" : "strict_14_with_grace_period",
    "bedrooms" : NumberInt(2)
  },
  "average_price" : NumberDecimal("471.90909090909090909090909090909090909"),
  "total_listings" : 22.0
}
{
  "_id" : {
    "cancellation_policy" : "strict_14_with_grace_period",
    "bedrooms" : NumberInt(3)
```

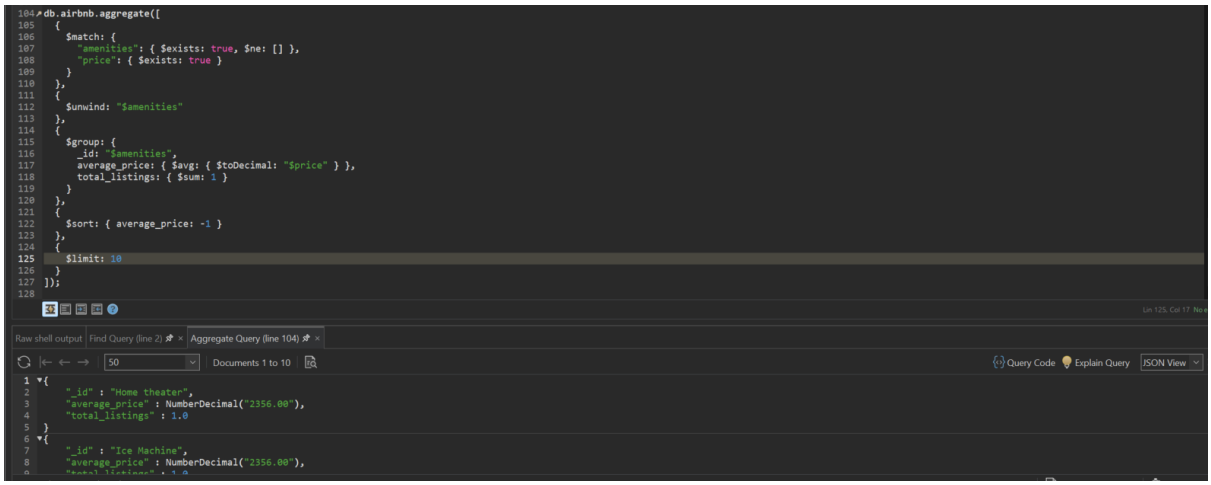
```
  },
  "average_price" : NumberDecimal("556.14285714285714285714285714285714"),
  "total_listings" : 7.0
}
{
  "_id" : {
    "cancellation_policy" : "flexible",
    "bedrooms" : NumberInt(3)
  },
  "average_price" : NumberDecimal("654.30"),
  "total_listings" : 10.0
}
{
  "_id" : {
    "cancellation_policy" : "strict_14_with_grace_period",
    "bedrooms" : NumberInt(4)
  },
  "average_price" : NumberDecimal("914.50"),
  "total_listings" : 2.0
}
{
  "_id" : {
    "cancellation_policy" : "flexible",
    "bedrooms" : NumberInt(5)
  },
  "average_price" : NumberDecimal("1055.00"),
  "total_listings" : 1.0
}
{
  "_id" : {
    "cancellation_policy" : "super_strict_30",
    "bedrooms" : NumberInt(3)
  },
  "average_price" : NumberDecimal("1698.00"),
  "total_listings" : 1.0
}
{
  "_id" : {
```

```
      "cancellation_policy" : "flexible",
      "bedrooms" : NumberInt(10)
   },
   "average_price" : NumberDecimal("2083.00"),
   "total_listings" : 1.0
}
{
   "_id" : {
      "cancellation_policy" : "moderate",
      "bedrooms" : NumberInt(8)
   },
   "average_price" : NumberDecimal("2974.00"),
   "total_listings" : 1.0
}
{
   "_id" : {
      "cancellation_policy" : "moderate",
      "bedrooms" : NumberInt(7)
   },
   "average_price" : NumberDecimal("4745.00"),
   "total_listings" : 1.0
}
```


This query filters Airbnb listings in Istanbul to focus on entire homes or apartments. It ensures that the listings have a cancellation policy and a specified number of bedrooms. Then, it groups the results by both the cancellation policy and the number of bedrooms, calculating the average price for each group and counting the total number of listings. Finally, the results are sorted by average price in ascending order, allowing us to see how prices vary based on different cancellation policies and bedroom counts in Istanbul.

We can see that the listings range from a price of 4745 to 246, and we can see the varying cancellation policies as well.

Q10. **Come up with your own query to show any interesting insight. Use atleast two fields for group.**



```
db.airbnb.aggregate([
  {
    $match: {
      "amenities": { $exists: true, $ne: [] },
      "price": { $exists: true }
    }
  },
  {
    $unwind: "$amenities"
  },
  {
    $group: {
      _id: "$amenities",
      average_price: { $avg: { $toDecimal: "$price" } },
      total_listings: { $sum: 1 }
    }
  },
  {
    $sort: { average_price: -1 }
  },
  {
    $limit: 10
  }
]);
```

Raw shell output | Find Query (line 2) | Aggregate Query (line 104) | Documents 1 to 10 | Query Code | Explain Query | JSON View

```
{
    "_id" : "Home theater",
    "average_price" : NumberDecimal("2356.00"),
    "total_listings" : 1.0
}
{
    "_id" : "Ice Machine",
    "average_price" : NumberDecimal("2356.00"),
```


{

"_id" : "Home theater",

"average_price" : NumberDecimal("2356.00"),

"total_listings" : 1.0

}

{

"_id" : "Ice Machine",

"average_price" : NumberDecimal("2356.00"),

"total_listings" : 1.0

}

{

"_id" : "Parking",

"average_price" : NumberDecimal("2356.00"),

"total_listings" : 1.0

}

{

"_id" : "Dining area",

"average_price" : NumberDecimal("2356.00"),

"total_listings" : 1.0

}

{

"_id" : "Sonos sound system",

```
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
{
  "_id" : "Ironing Board",
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
{
  "_id" : "Chef's kitchen",
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
{
  "_id" : "Breakfast bar",
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
{
  "_id" : "Permit parking",
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
{
  "_id" : "Alfresco shower",
  "average_price" : NumberDecimal("2356.00"),
  "total_listings" : 1.0
}
```


The query begins by filtering listings to include only those that have non-empty amenities and an existing price field. It then unwinds the amenities array, creating separate documents for each amenity to allow for detailed analysis. After that, the results are grouped by individual amenities, calculating the average price and counting how many listings feature each one. The results are sorted in descending order by average price to highlight the most valuable amenities. Finally, the output is limited to the top 10 amenities based on average price. This query provides insight into how specific amenities impact listing prices, helping hosts determine which features might enhance their pricing strategy.

We can see that the top 10 amenities all nearly have the same price at 2356, and all of these can enhance their pricing strategy.