Database Project (SWE3033) (Fall 2023)

Homework #5 (50pts, Due date: 11/1)

Student ID: 2020315798

Student Name: Choi Jin Woo

Instruction: In this homework, we provide a dataset(airbnb-listings-newyork.json), and a jupyter notebook file(DBP_Homework5.ipynb). You should follow the instructions in these documents carefully.

Submit two files as follows:
   - DBP_Homework5_StudentID.zip
        - DBP_Homework5_StudentI.ipynb
        - DBP_Homework5_StudentID.pdf

Important: When submitting, you must delete your ***CONNECTION_STRING***.
   - Your *Username* and *Password* information are here.
   - Be sure to remove this before submitting.

Dataset description:

key	Type	description
_id	Int	Airbnb's unique identifier for the listing
name	String	Name of the listing
property_type	String	Property type of the listing
room_type	Int	Room type of the listing
accommodates	Float	The maximum number of people a listing can accommodate
beds	Int	Number of beds
amenities	List	Amenities included in a listing
price	Float	Price per night
text	String	Description about listing

1. [10pts] Capture the code and results.
   a. Create a database and a collection. Specify the name of the database as 'airbnb'.
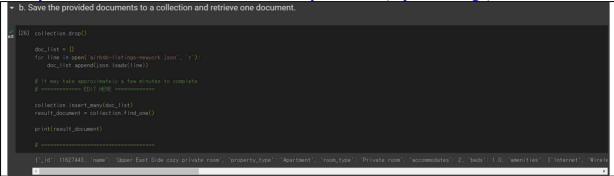**[Answer]**
Enter your code and result here. You must show your result (captured image).

a. Create a database and a collection. Specify the name of the database as 'airbnb'.

```
[25]  # ============= EDIT HERE =============
      my_client = MongoClient(CONNECTION_STRING)
      database = my_client["airbnb"]
      collection = database["listings"]

      # ====================================

      print(my_client)
      print(database)
      print(collection)

MongoClient(host=['ac-k4jho8k-shard-00-02.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-00.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-01.tzcaxbf.mongodb.net:27017'], document_cla
Database(MongoClient(host=['ac-k4jho8k-shard-00-02.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-00.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-01.tzcaxbf.mongodb.net:27017'], doc
Collection(Database(MongoClient(host=['ac-k4jho8k-shard-00-02.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-00.tzcaxbf.mongodb.net:27017', 'ac-k4jho8k-shard-00-01.tzcaxbf.mongodb.net:2
```

b. Save the provided documents to a collection and retrieve one document.

[Answer]

Enter your code and result here. You must show your result (captured image).

2. **[20pts]** Fill in the blank and capture the code and results for the following questions.
   a. Count the number of listings with 2 or more beds. (HINT: count_documents())
   b. Apply a 20% discount to a listing price with a room type of '**Shared room**,' and then retrieve the top 5 listings with a room type of '**Shared room**', sorted in descending order. (HINT: update_many(), find(), sort())

[Answer]

a) The number of listings	b) Top 1 listing price
295	128, 96, 80, 80, 64

Enter your code and result here. You must show your result (captured image).

3. **[20pts]** Fill in the blank and capture the code and results for the following questions.
   a. Update the value of '**amenities**' to **['Internet', 'Shampoo']** for documents in the collection whose '**property_type' is 'Loft'**.
   b. Add the element '**Heating**' to the list of '**amenities**' for the documents in the collection whose '**property_type' is 'Loft.**
   c. Explain the operations used in 'a' and 'b' and describe their differences.

[Answer]

Fill in the table below. In the *init*, write the initial document before the update. For both *a)* and *b)*, write the document after the update.

init	{'_id': 7858169, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Elevator in building', 'Buzzer/wireless intercom', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'Essentials']} {'_id': 13309763, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Breakfast', 'Elevator in building', 'Buzzer/wireless intercom', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'Carbon monoxide detector', 'First aid kit', 'Fire extinguisher', 'Essentials', 'Shampoo', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace']} {'_id': 15393322, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets allowed', 'Elevator in building', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'Essentials', 'Shampoo', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace']} {'_id': 14857830, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Elevator in building', 'Heating', 'Washer', 'Dryer', 'Carbon monoxide detector', 'Essentials', 'Shampoo', 'Lock on bedroom door', 'Hangers', 'Hair dryer', 'Iron', 'translation missing: en.hosting_amenity_49', 'translation missing: en.hosting_amenity_50']} {'_id': 7648634, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'Fire extinguisher', 'Essentials', 'Shampoo', 'Hangers', 'Hair dryer', 'Iron', 'translation missing: en.hosting_amenity_49', 'translation missing: en.hosting_amenity_50']} {'_id': 15872852, 'amenities': ['TV', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'Essentials', 'Lock on bedroom door', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace', 'translation missing: en.hosting_amenity_49', 'translation missing: en.hosting_amenity_50']} {'_id': 3530517, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Breakfast', 'Buzzer/wireless intercom', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'First aid kit', 'Safety card', 'Fire extinguisher', 'Essentials', 'Shampoo', '24-hour check-in', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace', 'translation missing: en.hosting_amenity_49', 'translation missing: en.hosting_amenity_50', 'Self Check-In', 'Lockbox']} {'_id': 16363434, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'Carbon monoxide detector', 'Fire extinguisher', 'Essentials', 'Hangers', 'Iron']} {'_id': 14824160, 'amenities': ['Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets allowed', 'Heating', 'Family/kid friendly', 'Suitable for events', 'Smoke detector', 'Carbon monoxide detector', 'First aid kit', 'Safety card', 'Fire extinguisher', 'Essentials', 'Laptop friendly workspace', 'translation missing: en.hosting_amenity_50']} {'_id': 12088888, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Buzzer/wireless intercom', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'Essentials', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace']} {'_id': 1294438, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Buzzer/wireless intercom', 'Heating', 'Suitable for events', 'Smoke detector', 'translation missing: en.hosting_amenity_49', 'translation missing: en.hosting_amenity_50']} {'_id': 13995614, 'amenities': ['TV', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Smoking allowed', 'Indoor fireplace', 'Family/kid friendly', 'Smoke detector', 'Carbon monoxide detector', 'Essentials', 'Shampoo', 'Hangers', 'Hair dryer', 'Laptop friendly workspace', 'translation missing: en.hosting_amenity_50']} {'_id': 522081, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets live on this property', 'Dog(s)', 'Elevator in building', 'Hot tub', 'Buzzer/wireless intercom', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'Carbon monoxide detector', 'First aid kit', 'Fire extinguisher', 'Essentials', 'Shampoo', 'Hangers', 'Hair dryer', 'Iron', 'Laptop friendly workspace', 'translation missing: en.hosting_amenity_50']}
a)	{'_id': 7858169, 'amenities': ['Internet', 'Shampoo']} {'_id': 13309763, 'amenities': ['Internet', 'Shampoo']} {'_id': 15393322, 'amenities': ['Internet', 'Shampoo']} {'_id': 14857830, 'amenities': ['Internet', 'Shampoo']} {'_id': 7648634, 'amenities': ['Internet', 'Shampoo']} {'_id': 15872852, 'amenities': ['Internet', 'Shampoo']} {'_id': 3530517, 'amenities': ['Internet', 'Shampoo']}

	{'_id': 16363434, 'amenities': ['Internet', 'Shampoo']} {'_id': 14824160, 'amenities': ['Internet', 'Shampoo']} {'_id': 12088888, 'amenities': ['Internet', 'Shampoo']} {'_id': 1294438, 'amenities': ['Internet', 'Shampoo']} {'_id': 13995614, 'amenities': ['Internet', 'Shampoo']} {'_id': 522081, 'amenities': ['Internet', 'Shampoo']}
b)	{'_id': 7858169, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 13309763, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 15393322, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 14857830, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 7648634, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 15872852, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 3530517, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 16363434, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 14824160, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 12088888, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 1294438, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 13995614, 'amenities': ['Internet', 'Shampoo', 'Heating']} {'_id': 522081, 'amenities': ['Internet', 'Shampoo', 'Heating']}
c)	$set replaces the entire value of the field with the specified value $push appends an element to an existing array field

Enter your code and result here. You must show your result (captured image).

init state

```python
[31] for listing in collection.find({'property_type': 'Loft'}, {'_id': 1, 'amenities': 1}):
         print(listing)
```

```
{'_id': 7858169, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Elevator in building', 'Buzzer/wireless intercom', 'Heating', 'Smoke detector', 'Carbon mon
{'_id': 13309763, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Breakfast', 'Elevator in building', 'Buzzer/wireless intercom', 'Heating
{'_id': 15393322, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets allowed', 'Elevator in building', 'Heating', 'Family/kid friendly', 'Washer',
{'_id': 14857830, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Elevator in building', 'Heating', 'Washer', 'Dryer', 'Carbon monoxide detector', 'Es
{'_id': 7648634, 'amenities': ['TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'Fire extinguisher', 'Essenti
{'_id': 15872852, 'amenities': ['TV', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Smoke detector', 'Carbon monoxide detector', 'Essentials', 'Lock on bedroom door', 'H
{'_id': 3530517, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Breakfast', 'Buzzer/wireless intercom', 'Heating', 'Smoke detector', 'Car
{'_id': 16363434, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Heating', 'Family/kid friendly', 'Washer', 'Dryer', 'Smoke detector', 'C
{'_id': 14824160, 'amenities': ['Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets allowed', 'Heating', 'Family/kid friendly', 'Suitable for events', 'Smoke detector', 'Carbon mono
{'_id': 12088888, 'amenities': ['TV', 'Cable TV', 'Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Buzzer/wireless intercom', 'Heating', 'Family/kid friendly', 'Washer',
{'_id': 1294438, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Buzzer/wireless intercom', 'Heating', 'Suitable for events', 'Smoke detector', 'translatio
{'_id': 13995614, 'amenities': ['TV', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Smoking allowed', 'Indoor fireplace', 'Family/kid friendly', 'Smoke detector', 'Carbon monoxide
{'_id': 522081, 'amenities': ['Internet', 'Wireless Internet', 'Air conditioning', 'Kitchen', 'Pets live on this property', 'Dog(s)', 'Elevator in building', 'Hot tub', 'Buzzer/wireless l
```

a. Update the value of 'amenities' to ['Internet', 'Shampoo'] for documents in the collection whose 'property_type' is 'Loft'.

+ 코드   + 텍스트

```python
[32] # ============= EDIT HERE =============

     collection.update_many(
         {"property_type": "Loft"},
         {"$set": {"amenities": ['Internet', 'Shampoo']}}
     )

     # ===================================
     for listing in collection.find({'property_type': 'Loft'}, {'_id': 1, 'amenities': 1}):
         print(listing)
```

```
{'_id': 7858169, 'amenities': ['Internet', 'Shampoo']}
{'_id': 13309763, 'amenities': ['Internet', 'Shampoo']}
{'_id': 15393322, 'amenities': ['Internet', 'Shampoo']}
{'_id': 14857830, 'amenities': ['Internet', 'Shampoo']}
{'_id': 7648634, 'amenities': ['Internet', 'Shampoo']}
{'_id': 15872852, 'amenities': ['Internet', 'Shampoo']}
{'_id': 3530517, 'amenities': ['Internet', 'Shampoo']}
{'_id': 16363434, 'amenities': ['Internet', 'Shampoo']}
{'_id': 14824160, 'amenities': ['Internet', 'Shampoo']}
{'_id': 12088888, 'amenities': ['Internet', 'Shampoo']}
{'_id': 1294438, 'amenities': ['Internet', 'Shampoo']}
{'_id': 13995614, 'amenities': ['Internet', 'Shampoo']}
{'_id': 522081, 'amenities': ['Internet', 'Shampoo']}
```

b. Add the element 'Heating' to the list of 'amenities' for the documents in the collection whose 'property_type' is 'Loft'.

```python
# ============= EDIT HERE =============

collection.update_many(
    {"property_type": "Loft"},
    {"$push": {"amenities": "Heating"}}
)

# ===================================
for listing in collection.find({'property_type': 'Loft'}, {'_id': 1, 'amenities': 1}):
    print(listing)
```

```
{'_id': 7858169, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 13309763, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 15393322, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 14857830, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 7648634, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 15872852, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 3530517, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 16363434, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 14824160, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 12088888, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 1294438, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 13995614, 'amenities': ['Internet', 'Shampoo', 'Heating']}
{'_id': 522081, 'amenities': ['Internet', 'Shampoo', 'Heating']}
```