Coding for Data Science and Data Management Project: Hotels

Exec.: Vladislav Kovalev

Task

Dataset description:

The dataset chosen for the project contains the following information:

- hotels.xlsx: number of vacant rooms and unit cost of each room for 400 hotels;

- guests.xlsx: discount fraction for 4000 potential customers;

- preferences.xlsx: order of hotel preference for each customer.

The program must calculate the allocation of customers at hotels, considering the number of available rooms, the fact that each customer occupies exactly one room, and that each stay lasts only one night. The price paid by the customer is the unit price of the room discounted by the fraction of the discount to which the customer is entitled.

Task

Finally, the program must present and display a

report of the result obtained, showing for each strategy:

- the number of customers accommodated,

- the number of rooms occupied,

- the number of different hotels occupied,

- the total volume of business (total earnings of each hotel)

- the degree of customer satisfaction (calculated according to

the location of the hotel assigned to them with respect to their preferences).

Task

Project Requirements

Each project should present the following characteristics:

1. usage of *GitHub*

2. correct modularization

3. import and output of data

4. usage of *pandas* (or alternative data manipulation library)

5. usage of *numPy* (or alternative scientific computing library)

6. usage of *matplotlib* (or alternative data visualization library)

7. BONUS - usage of *streamlit* (or alternative web app creation framework)

Project structure

| main.py

| utils.py (variables of paths)

| viewer.ipynb (notebook for matplotlib display)

| requirements.txt

| venv/ (python virtual enviroment)

| hotels/ (base xlsx folder)

| results_tools

  - construct_tools

  - report_display (streamlit display)

| strategies

  - first, …, fourth_strategy (calculation modules)

First strategy

The main idea is creation of simple modules for dictionary of available hotels service which can uses a decrement function and random choice function over keys.

When we itialize the main dictionary of available hotels we choose a one hotel randomly (./strategies/first_strategy/tools/random/random_choice_key_dict.py). Then decrement available rooms in the hotel (./strategies/first_strategy/tools/creation/create_available_rooms.py).

Algorithm uses the dictionary until until the guest list goes through

Second strategy

The main idea is creation of simple modules for dictionary of available hotels which can uses a decrement function and sort function over a order and preference.

When we itialize the main dictionary of available hotels we choose a one hotel by preference (./strategies/second_strategy/tools/choice/preference_choice_key_dict.py) and order (./strategies/second_strategy/tools/creation/create_guests_query.py). Then decrement available rooms in the hotel.

Algorithm uses the dictionary until until the guest list goes through

Third and fourth strategies

The main idea is creation of simple modules for dictionary of available hotels which can uses a decrement function and sort function over a order, and preference, and price(3), and availability(4).

When we itialize the main dictionary of available hotels we choose a one hotel by custom sort and order. Then decrement available rooms in the hotel.

Algorithm uses the dictionary until until the guest list goes through
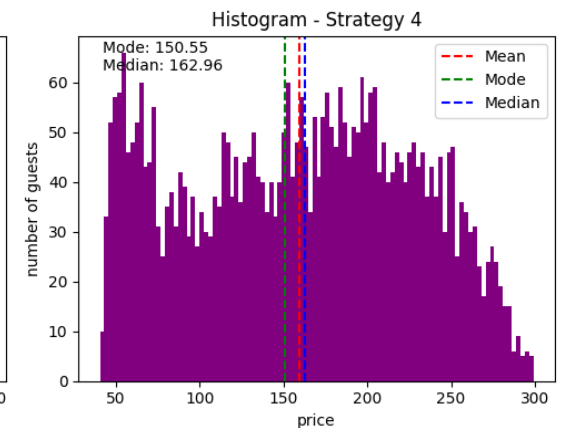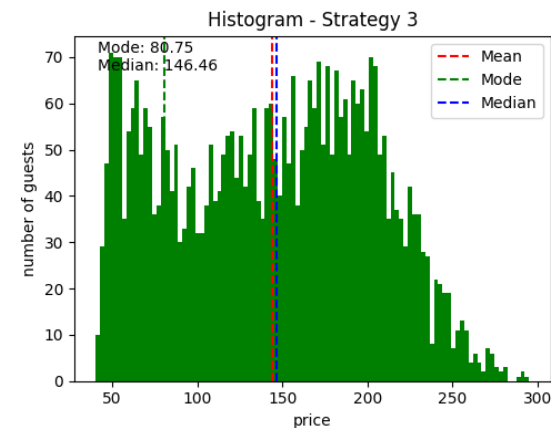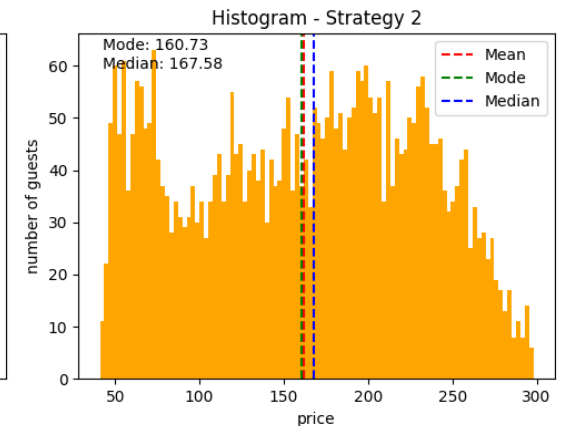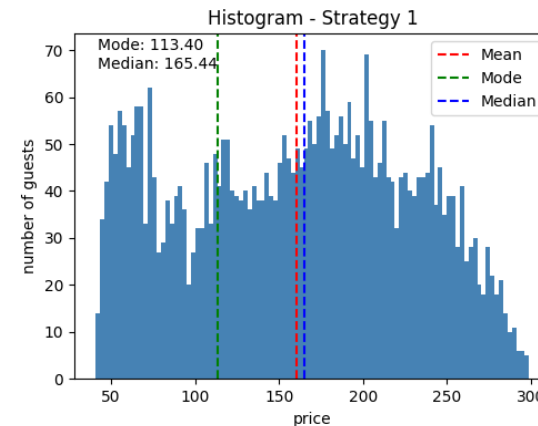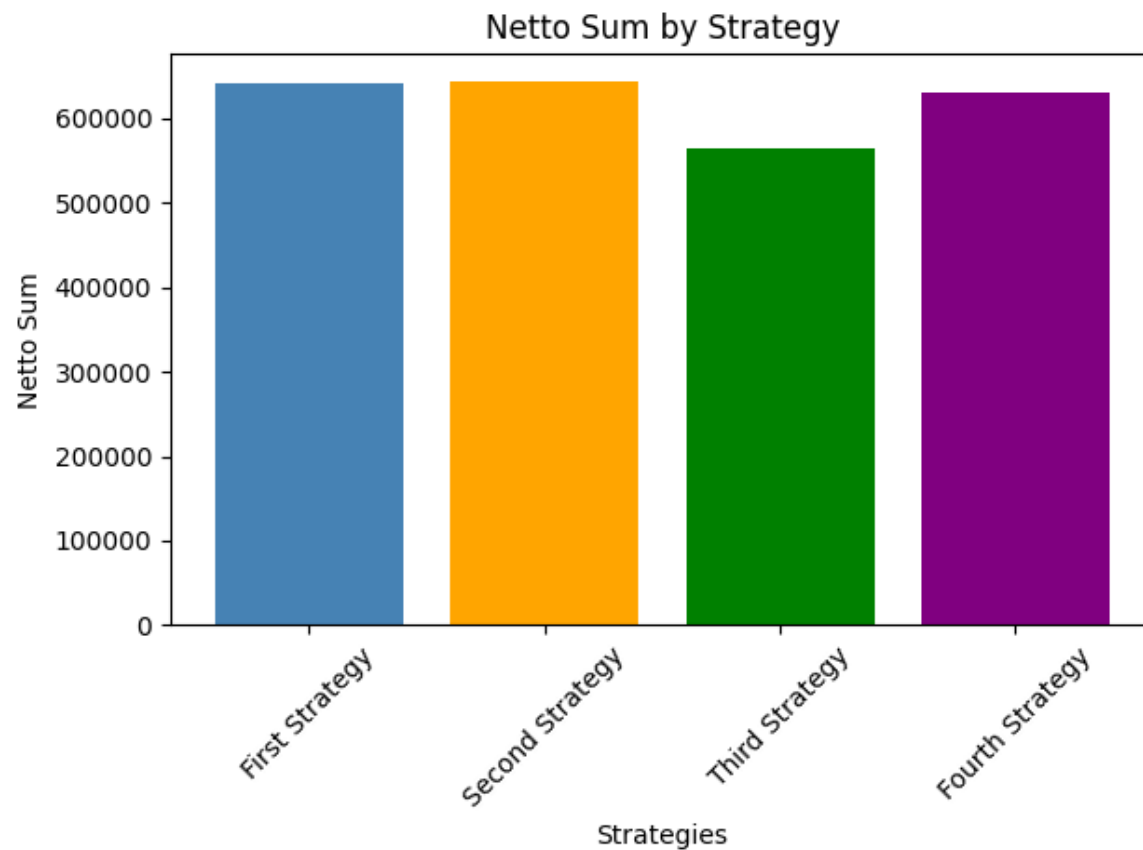
Display (matplotlib)

Random strategy

Type of strategy: Customers are randomly distributed to the rooms until the seats or customers are exhausted;

Number of customers accommodated: 4000

Number of rooms occupied: 4000

Number of different hotels occupied: 400

Total volume of business: 641993.10

Average customer satisfaction: 16.67

Preference strategy

Type of strategy: Customer preference. Customers are served in order of reservation (the customer number indicates the order) and are allocated to the hotel based on their preference, until the seats or customers are exhausted;

Number of customers accommodated: 4000

Number of rooms occupied: 3975

Number of different hotels occupied: 400

Total volume of business: 643597.53

Average customer satisfaction: 1.33

Price strategy

Type of strategy: The places in the hotel are distributed in order of price, starting with the cheapest hotel and following in order of reservation and preference until the places or customers are exhausted;

Number of customers accommodated: 4000

Number of rooms occupied: 3926

Number of different hotels occupied: 388

Total volume of business: 564273.07

Average customer satisfaction: 12.85

Availability strategy

Type of strategy: Places in hotels are distributed in order of room availability, starting with the most roomy hotel and subordinately in order of reservation and preference until places or clients are exhausted.

Number of customers accommodated: 4000

Number of rooms occupied: 3954

Number of different hotels occupied: 365

Total volume of business: 630822.58

Average customer satisfaction: 12.97

Display (streamlit)