How to create a Hotel Recommendation System using Sorting Algorithms?

Problem-based learning (PBL) for students of the Advanced Algorithms 1 course

Background :

The aim of travel recommendation systems is to suggest travel destinations of interest to Internet users, based on the opinions left by other users concerning the same trips, thus suggesting the best-rated destinations.


Among the elements of travel recommendation, we find hotels. The system generates relevant hotel recommendations for travelers based on several criteria such as destination, budget, length of stay, activities on offer, quality of service, cleanliness and reviews left by other users.
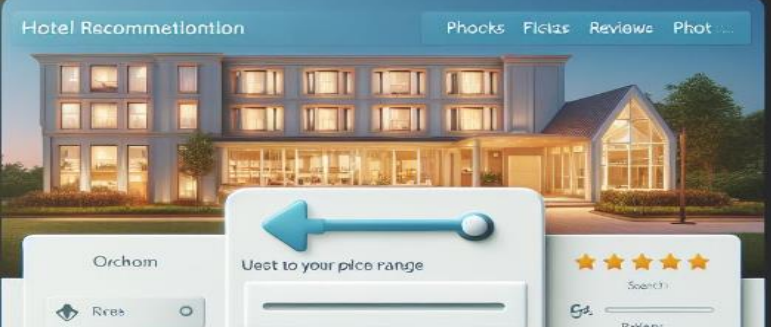
Required work:

You're a team of engineers and you want to create a recommendation application enabling users to discover the best hotels in the city.
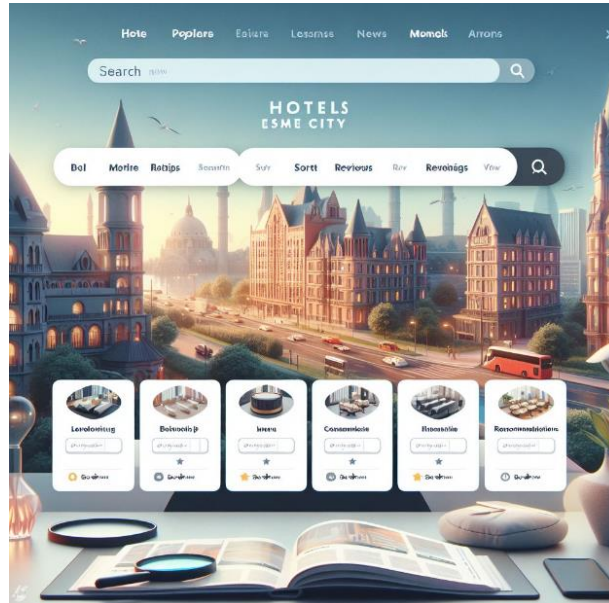
You will be guided by the following criteria:

| Reviews left by other travelers about the hotel.	
The price of the hotel.	

| Hotel features, for example:
- Swimming pool
- Free parking
- Free High Speed Internet (WiFi)
- Fitness Centre with Gym / Workout Room
- Restaurant
- Breakfast available
- Meeting rooms
- Pets allowed
- Refrigerator in room
- Kitchenette....etc | |

The application uses efficient sorting algorithms to rank hotels according to user preferences, and displays recommendations for each category.
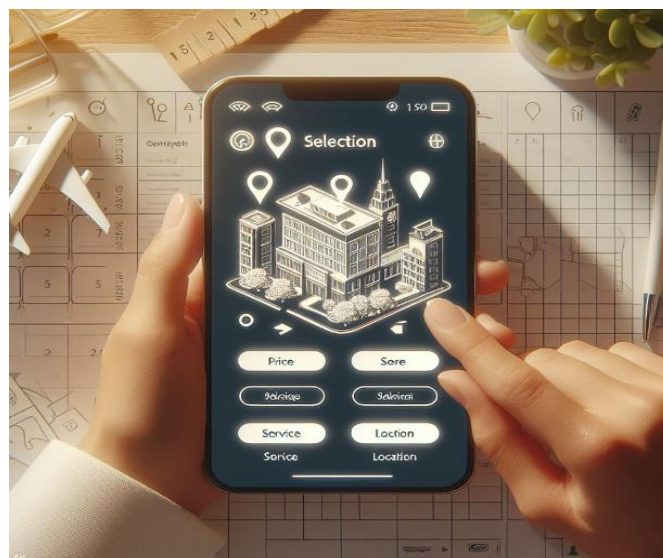
The application also displays the execution time of each sorting algorithm, and indicates the best algorithm in terms of execution time.
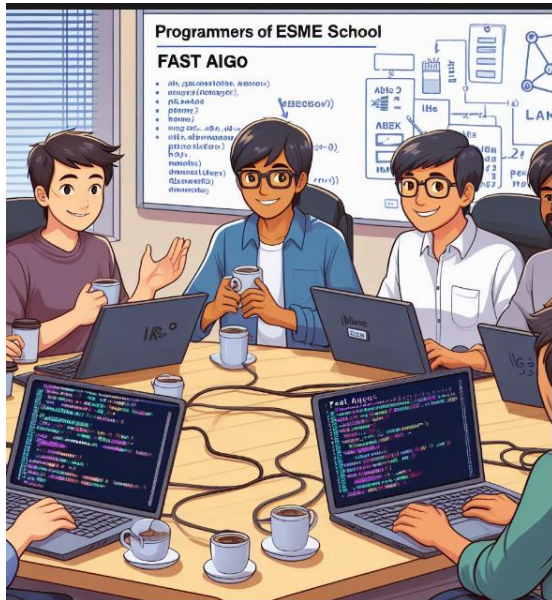
Resources for dealing with the problem situation

- Course 2 and TD 2 "Sorting algorithms: insertion sort, selection sort, bubble sort"
- The "Files" course (1st semester course: "Python")
- Optional : the "Tkinter graphical interfaces" course (1st semester course: "Python")
- The dataset :

https://github.com/sachinnpraburaj/Intelligent-Travel-Recommendation-System/blob/master/tripadvisor_hotel_output/hotel_info_dedup.csv

This dataset was used in a project that provides a Tailor-made travel itinerary for users using their travel details like destination, budget, start and end dates of travel and their preferences of attraction categories, hotel amenities and cuisine type.

id	hotel_name	hotel_rating	hotel_experience	amenities
9001	Peterborough House B&B			[]
9002	Ramada Inn			['Bar/Lounge', 'Non-smoking hotel', 'Wheelchair Access', 'Non-smoking rooms']
9003	Hotel Le Floral	4.5	Excellent	['Free High Speed Internet (WiFi)', 'Pool', 'Free parking', 'Bar/Lounge', 'Breakfast included', 'Dry Cleaning', 'Heat
9004	OTL Gouverneur Sherbrooke	5.0	Excellent	['Pool', 'Room service', 'Free parking', 'Restaurant', 'Bar/Lounge', 'Spa', 'Free High Speed Internet (WiFi)', 'Breakf
9005	Delta Hotels by Marriott Sherbrooke Conference Center	3.5	Very good	['Restaurant', 'Free High Speed Internet (WiFi)', 'Fitness Centre with Gym / Workout Room', 'Room service', 'Fre
9006	Auberge Marquis de Montcalm	5.0	Excellent	['Free parking', 'Free High Speed Internet (WiFi)', 'Breakfast included', 'Room service', 'Spa', 'Breakfast Available
9007	Hotel Le President	4.0	Very good	['Pool', 'Free parking', 'Free High Speed Internet (WiFi)', 'Banquet Room', 'Conference Facilities', 'Heated pool',
9008	Grand Times Hotel Sherbrooke	3.5	Very good	['Pool', 'Free High Speed Internet (WiFi)', 'Fitness Centre with Gym / Workout Room', 'Breakfast included', 'Bar/l

This dataset contains may information such as:

Hotel identifier	**id**
Hotel name	**hotel_name**
Hotel rating (vote) (average of ratings given by travelers who have visited this hotel) This rating is between 0 and 5	**hotel_rating**
Hotel review (Excellent, very good, good, average, poor, terrible, bad)	**Hotel_experience**
Hotel services (the list of services of this hotel, if the services have not been mentioned: the list is empty) : - Swimming pool - Free parking - Free high-speed Internet (WiFi) - Gym/training room - Restaurant - Breakfast available - Conference rooms - Pets allowed - In-room refrigerator - Kitchenette…	**amenities**
Hotel location (latitude and longitude)	**location**
Hotel rates	**price**

➢ **Notes :**

- Replace the missing rating and hotel-experience values according to the following table:

Rating	Hotel_experience
5	Excellent
4.5	Excellent
4	Very good
3.5	Very good
3	Average
2.5	Average
2	Poor
1.5	Poor
1	Terrible
0.5	Terrible
0	Bad

Pay attention to lower/upper case.

- If you can't find either the *rating* or the *hotel_experience* on the same line, enter 0 for rating and Bad for *hotel_experience*.
- If the price does not exist, replace it with the value 300.
- To calculate the execution time of each sorting algorithm, use the package time :

```python
import time

# Start the timer
start_time = time.time()

# Call your function
my_function()

# End the timer
end_time = time.time()

# Calculate the elapsed time
execution_time = end_time - start_time

print("Execution time:", execution_time, "seconds")
```

➢ Results to display :

• Use different sorting algorithms to display N-TOP hotels:

- The hundred best hotels according to travelers' evaluation (rating).

- The hundred best hotels according to travelers' opinions (hotel_experience).

- The hundred best hotels according to price (cheapest).

- The hundred best hotels that offer the greatest number of services (amenities).

• You can add other sorting criteria based on characteristics present in the dataset if you wish.

• View the execution time of each used sorting algorithm.

PBL Learning Objectives :

• Understand and master sorting algorithms

• Test and compare sorting algorithms and be able to identify the fastest algorithm

• Distribute roles and tasks within the APP

• Comment on your code relevantly

• Summarize the group's work

• Use the Python language to manipulate text files

• Import, use and test a dataset from a CSV file