HBnB Project: Technical Design Document

HBnB Evolution

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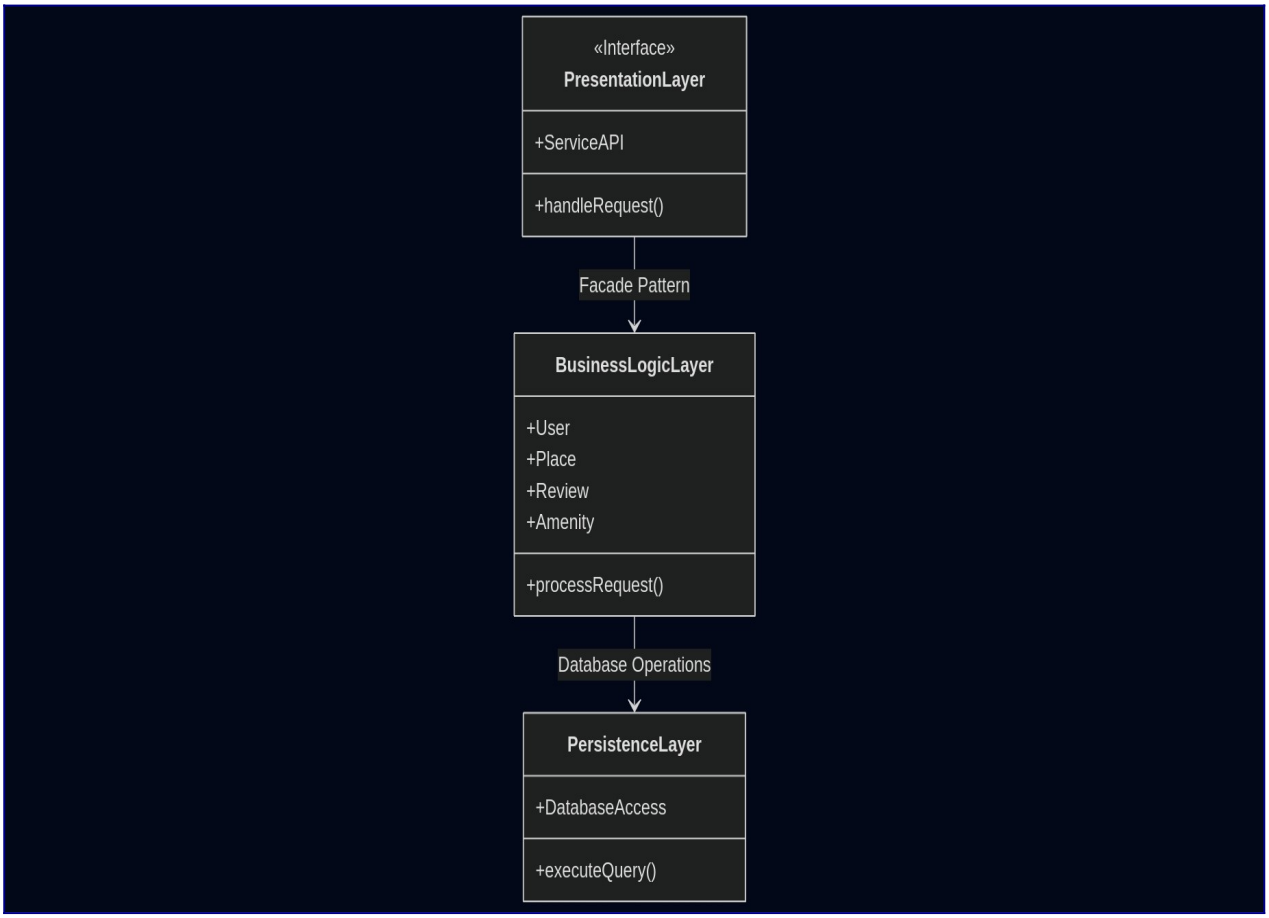
1. Introduction

This document serves as a comprehensive technical blueprint for the HBnB project, a system designed for managing rental properties, user interactions, and reviews. Its primary purpose is to outline the system's architecture, detail the core business logic, and illustrate the interaction flows for key API operations. By consolidating high-level architectural views with granular design details, this document aims to guide the implementation phases, foster a shared understanding among developers, and provide a clear, accessible reference for all stakeholders involved in the HBnB project. Accuracy and completeness are paramount to ensure smooth development and maintenance.

2. High-Level Architecture

The HBnB project adopts a layered architectural approach, promoting separation of concerns, modularity, and maintainability. This structure facilitates independent development and testing of different components while ensuring a clear flow of responsibility within the system.

High-Level Package Diagram (Task 0)

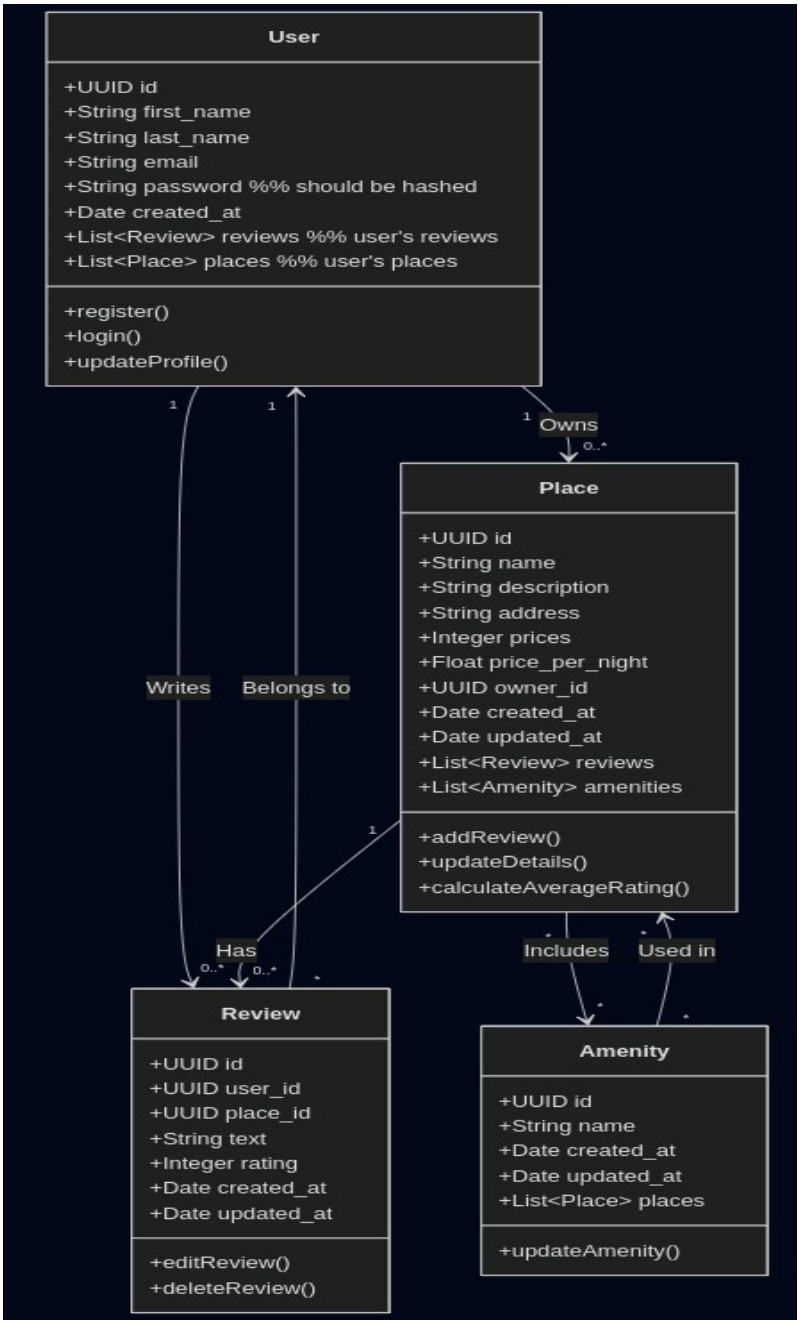


This diagram illustrates the layered architecture, highlighting the Presentation Layer acting as a facade to simplify interactions with the Business Logic Layer. The Business Logic Layer then coordinates with the Persistence Layer for data operations.

3. Business Logic Layer

The Business Logic Layer forms the core of the HBnB application, encapsulating the business rules and data models. It manages user authentication, place listings, reviews, and amenity management.

Detailed Class Diagram for the Business Logic Layer (Task 1)



This diagram details the entities within the Business Logic Layer:

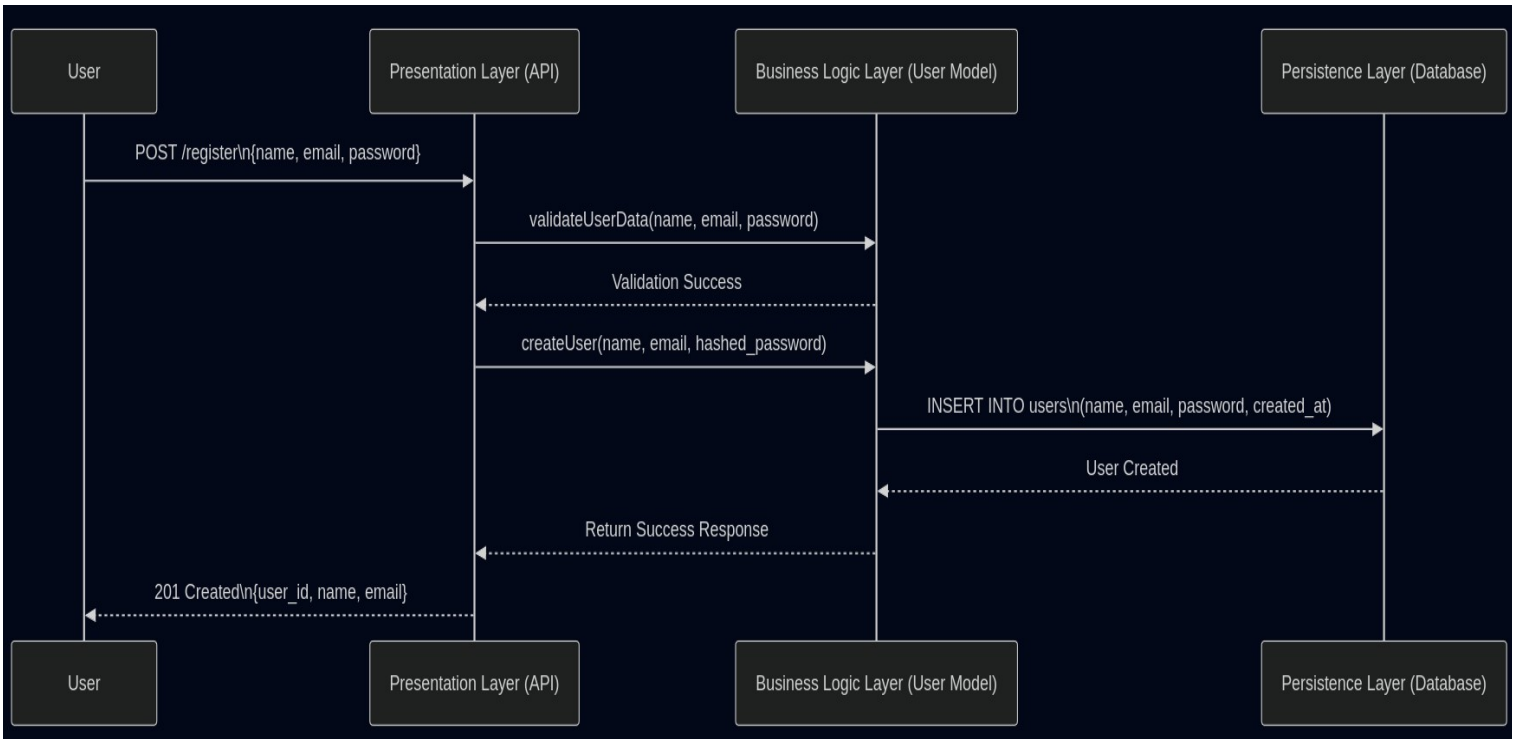
- **User:** Represents system users, including their attributes and methods for registration, login, and profile updates.
- **Place:** Represents rental properties, with attributes for location, pricing, and amenities. It includes methods for adding reviews and updating details.
- **Review:** Represents user feedback on places, including text and ratings.
- **Amenity:** Represents features associated with places, such as Wi-Fi or pools.

The relationships between these entities are clearly defined, showing how users own places, write reviews, and how places include amenities.

4. API Interaction Flow

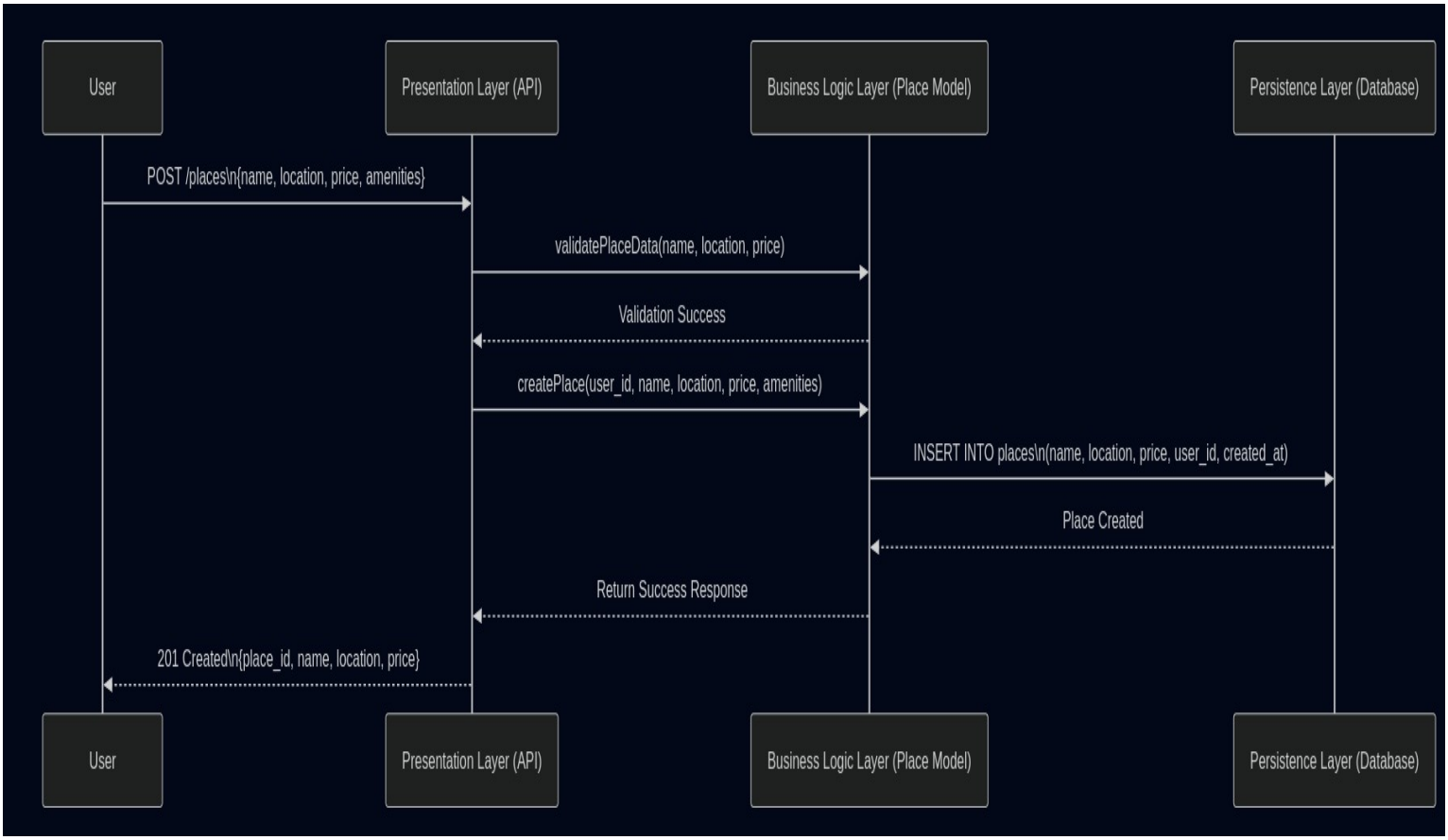
This section outlines the sequence of interactions for key API calls, illustrating the flow of data between the User, Presentation Layer (API), Business Logic Layer, and Persistence Layer (Database).

Sequence Diagram – User Registration Flow (Task 2)



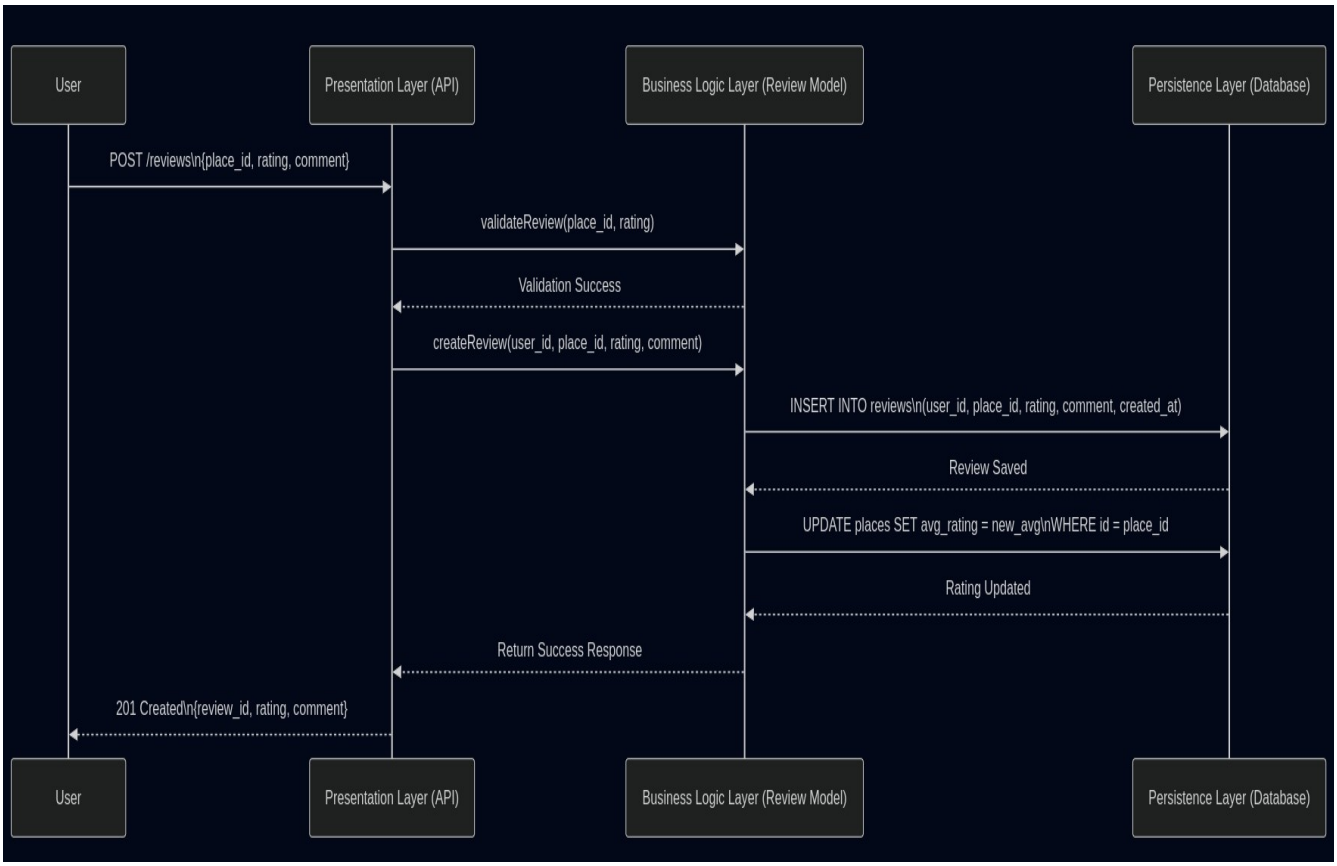
This diagram shows the user registration process, from the initial request to the creation of a new user in the database. It includes validation steps and the return of a success response with user details.

Sequence Diagram – Place Creation Flow (Task 2_2)



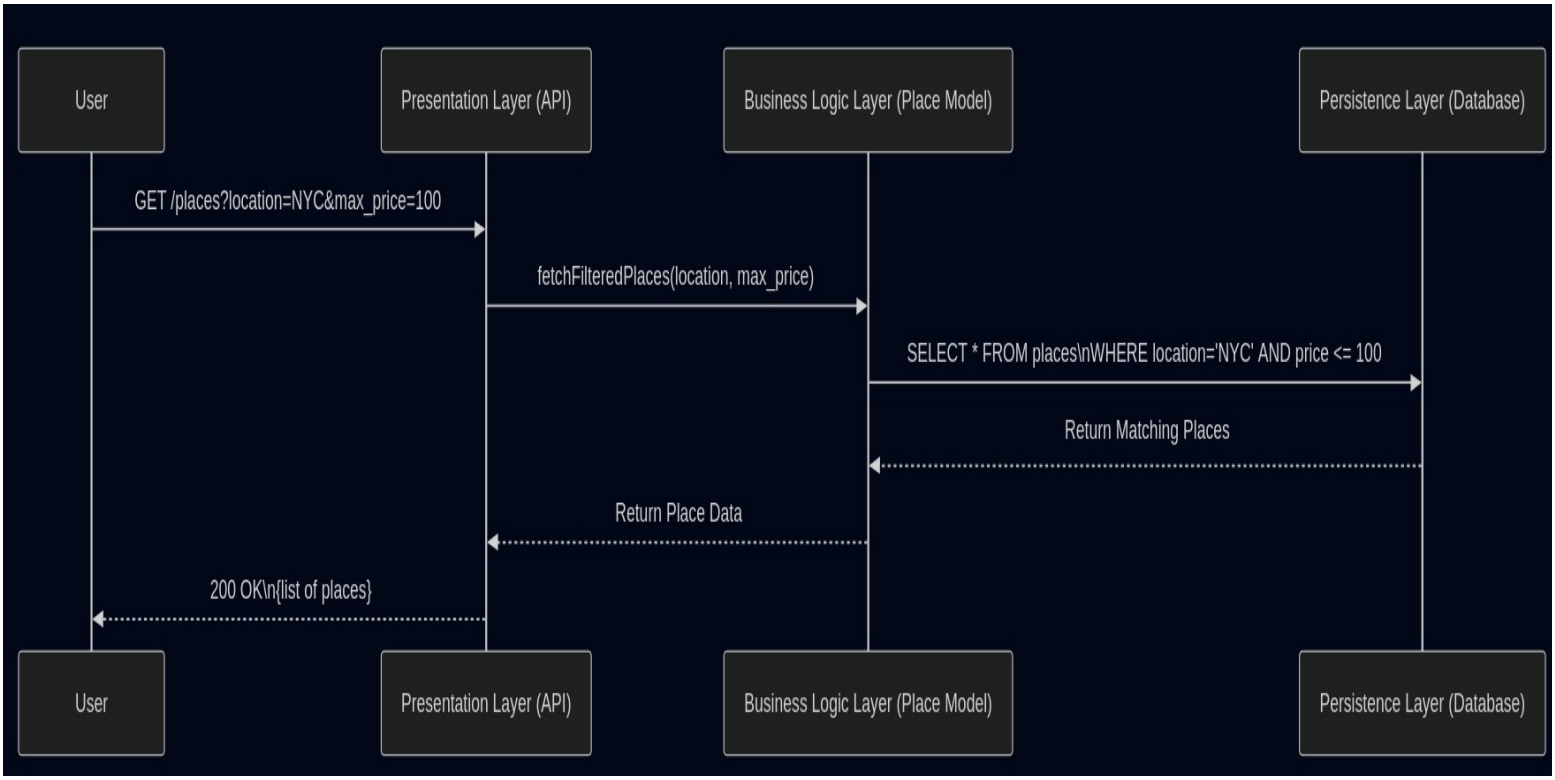
This diagram details the flow for creating a new place listing, including data validation, database insertion, and the return of the newly created place's ID

Sequence Diagram – Review Creation Flow (Task 2_3)



This diagram illustrates the process of adding a review to a place, including validation, saving the review to the database, updating the place's average rating, and returning a success response.

Sequence Diagram – Place Search Flow (Task 2_4)



This diagram shows how users can search for places based on criteria like location and price, with the API querying the database and returning a filtered list of places.

5. Conclusion

This technical document has served as a comprehensive blueprint for the HBnB project, detailing its architectural design, core business logic, and critical API interaction flows. We began by outlining a clear, layered architecture that emphasizes modularity and separation of concerns, featuring a Presentation Layer acting as a facade to the Business Logic Layer, which in turn interacts with the Persistence Layer.

The detailed class diagram for the Business Logic Layer provided a granular view of the system's key entities—User, Place, Review, and Amenity—and their intricate relationships, forming the backbone of the application's functionality. Furthermore, the sequence diagrams for user registration, place creation, review submission, and place searching illuminated the dynamic interactions between the system's layers, demonstrating the flow of data and control for fundamental operations.

This document, with its combination of high-level overviews and detailed process flows, will serve as an invaluable guide throughout the HBnB project's implementation, testing, and future maintenance phases. It aims to ensure clarity, consistency, and a shared understanding among all team members, contributing to the successful development of a robust and scalable HBnB application. The adherence to structured design principles, as laid out in these diagrams and explanations, is crucial for building a maintainable and efficient system.