Our ticket booking service should meet the following requirements:

1. It should be able to list the cities where affiliate Theatres are located.
2. Each Theatre can have multiple halls and each hall can run one movie show at a time.
3. Each Movie will have multiple shows.
4. Customers should be able to search movies by their title, language, genre, release date, and city name.
5. Once the customer selects a movie, the service should display the theatres running that movie and its available shows.
6. The customer should be able to select a show at a particular theatre and book their tickets.
7. The service should show the customer the seating arrangement of the movie hall. The customer should be able to select multiple seats according to their preference.
8. The customer should be able to distinguish between available seats and booked ones.
9. The system should send notifications whenever there is a new movie, as well as when a booking is made or cancelled.
10. Customers of our system should be able to pay with credit cards or cash.
11. The system should ensure that no two customers can reserve the same seat.
12. Customers should be able to add a discount coupon to their payment.

My analysis of the above-mentioned requirements:

1. List those cities of the affiliated theatres on the app
2. A movie theatre "has a" number of movie halls.
3. Movie will have multiple shows, there will be a time attribute for any given movie and also a particular movie hall which has all the seats.
4. It's a combination of all three Movie + movie theatre + show time
5. To implement using various strategies by name, genre etc…, so we can use factory pattern for getting search strategy, or use method overloading or create separate methods for each search type.
6. To get a movie from list of movies -> To select a movie theatre from list of movie theatre of a movie -> to select a show among the list of show with various timings.
7. Seating arrangement of a movie hall. Use of two-dimensional Boolean array to indicate the seating of the movie hall
8. Be able to select multiple seats and to be able to reserve them if they are available.
9. To be able to distinguish between available ones and booked ones -> job of front end, back end has to simply indicate it using a Boolean variable.
10. The system shall have list of customers(subscribers) to whom the system will be sending notification if a new movie is released.
11. Notify the customer of booking if its booking status enum becomes "confirmed" or "cancelled". The system "observes" Ticket.
12. Credit card or cash both shall be implemented by inheriting from a common interface and using command pattern. It also follows the dependency inversion principle
13. No two customers should be able to book the same seat. How to achieve concurrency? What else shall be applied apart from singleton pattern?
14. Passing a coupon as a parameter to payBill method. PaymentInfo class will take care of reducing the price to be paid.

15. The catalog shall have HashMap<City,<HashMap<Movie, Theatre>> . when customer asks for a theatre of a movie. It should search the map first with his City attribute then it will get another HashMap in which it should get list of theatres that movie is being run.

There are three main actors here:

1. Admin: block/ unblock user, cancel show
2. Customer: search movie, select theatre, select show, select seats, and be able to book tickets
3. System: send notifications

Use Case Diagram: