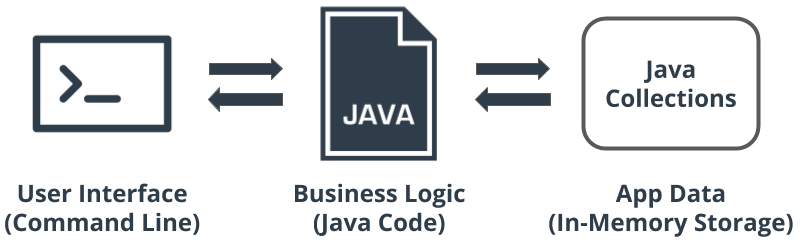
**Overview: Hotel Reservation Application**

In this project, you will be designing and implementing a Java hotel reservation application. The hotel reservation application will allow customers to find and book a hotel room based on room availability. This project will demonstrate your abilities to design classes using OOP, organize and process data with collections, and use common Java types

**Main Components of the App**

The major components of the Hotel Reservation Application will consist of the following:

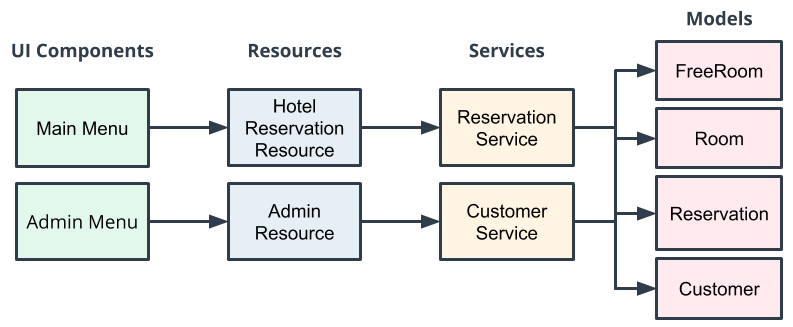
1. **CLI for the User Interface.** We'll use the *Command Line Interface* (or *CLI* for the user interface. For this, we'll need to have Java monitor the CLI for user input, so the user can enter commands to search for available rooms, book rooms, and so on.
2. **Java code.** The second main component is the Java code itself—this is where we add our business logic for the app.
3. **Java collections.** Finally, we'll use *Java collections* for in-memory storage of the data we need for the app, such as the users' names, room availability, and so on.



**Application Architecture**

Let's talk about the structure or architecture of the application. The app will be separated into the following layers:

1. **User interface (UI)**, including a *main menu* for the users who want to book a room, and an *admin menu* for administrative functions.
2. **Resources** will act as our Application Programming Interface (API) to our UI.
3. **Services** will communicate with our resources, and each other, to build the business logic necessary to provide feedback to our UI.
4. **Data models** will be used to represent the domain that we're using within the system (e.g., rooms, reservations, and customers).



**Layers**

An important thing to notice about this architecture is how we use **layers** to support *modularization* and *decoupling*. For example, If we later decided to change our UI components to a webpage instead of a command-line interface, layering would support this.

***Layering****is achieved by ensuring there are no cross-communication calls from one layer to another.*

For example, a UI component should never communicate directly with a service. This would expose the service implementation to the UI and make it difficult for us to change it out later.

NEXT

### [**Project:Hotel Reservation Application**](https://classroom.udacity.com/nanodegrees/nd079-ent-infosys/parts/cd0282)

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# Project Requirements

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# Project Requirements

When building an app, it is common as a developer to be given a specification or set of requirements for how the app should work and what it should do. This page provides the required features for the Hotel Reservation App.

Remembering and applying these requirements will be easiest if you notice the reasons for them—for example, one requirement is that two people should not be able to book the same room on the same date. That requirement is a realistic one for any functional reservation app that isn't going to drive its users crazy!

***Note:****You don't need to memorize the information here—rather, you’ll want to refer to these requirements as you build your application. We suggest that you either print this page or open it in a new tab.*

## User Scenarios

The application provides four user scenarios:

* **Creating a customer account.** The user needs to first create a customer account before they can create a reservation.
* **Searching for rooms.** The app should allow the user to search for available rooms based on provided checkin and checkout dates. If the application has available rooms for the specified date range, a list of the corresponding rooms will be displayed to the user for choosing.
* **Booking a room.** Once the user has chosen a room, the app will allow them to book the room and create a reservation.
* **Viewing reservations.** After booking a room, the app allows customers to view a list of all their reservations.

## Admin Scenarios

The application provides four administrative scenarios:

* **Displaying all customers accounts.**
* **Viewing all of the rooms in the hotel.**
* **Viewing all of the hotel reservations.**
* **Adding a room to the hotel application.**

## Reserving a Room – Requirements

The application allows customers to reserve a room. Here are the specifics:

* **Avoid conflicting reservations.** A single room may only be reserved by a single customer per a checkin and checkout date range.
* **Search for recommended rooms.** If there are no available rooms for the customer's date range, a search will be performed that displays recommended rooms on alternative dates. The recommended room search will add seven days to the original checkin and checkout dates to see if the hotel has any availabilities, and then display the recommended rooms/dates to the customer.

***Example:****If the customers date range search is 1/1/2020 – 1/5/2020 and all rooms are booked, the system will search again for recommended rooms using the date range 1/8/2020 - 1/12/2020. If there are no recommended rooms, the system will not return any rooms.*

# Room Requirements

* **Room cost.** Rooms will contain a price per night. When displaying rooms, paid rooms will display the price per night and free rooms will display "Free" or have a $0 price.
* **Unique room numbers.** Each room will have a unique room number, meaning that no two rooms can have the same room number.
* **Room type.** Rooms can be either single occupant or double occupant (Enumeration: SINGLE, DOUBLE).

# Customer Requirements

The application will have customer accounts. Each account has:

* **A unique email for the customer.** RegEx is used to check that the email is in the correct format (i.e., [name@domain.com](mailto:name@domain.com)).
* **A first name and last name.**

*The email RegEx is simple for the purpose of this exercise and may not cover all real-world valid emails. For example "*[*name@domain.co.uk*](mailto:name@domain.co.uk)*" would not be accepted by the above RegEx because it does end with ".com". If you would like to try to make your RegEx more sophisticated, you may—but it is not required for this project.*

# Error Requirements

The hotel reservation application handles all exceptions gracefully (user inputs included), meaning:

* **No crashing.** The application does not crash based on user input.
* **No unhandled exceptions.** The app has try and catch blocks that are used to capture exceptions and provide useful information to the user. There are no unhandled exceptions.

NEXT

# Setup

Below are the steps you'll need to complete to get set up for the project. If you've been following along with the course and already have IntelliJ installed, along with an up-to-date version of Java, then the only step you'll need to complete is the last one (creating a new Java project).

### **Project Setup**

Before going further, be sure that you've done the following:

Task List

* 

If you're not sure whether your Java version is up to date, check it now. Go to a terminal or command prompt and type java -version. The version needs to be 14 or higher.

* 

If you do not have Java 14 or later installed, you can install it now by following [Oracle's Java Installation Guide here](https://docs.oracle.com/en/java/javase/15/install/overview-jdk-installation.html), which has detailed steps for the major operating systems.

* 

If you don't already have it, download the Community Edition of [IntelliJ IDEA](https://www.jetbrains.com/idea/download/). Run the downloaded installer.

* 

Launch IntelliJ and create a new Java project named hotel reservation.

## Starter Code

Note that there is **intentionally no starter code provided for this project**—you will be showing off your new Java skills by building the entire app from scratch! Although this may be more challenging, it more realistically simulates the situation you'll experience as a developer. Having created everything with your own two hands, you'll have confidence that you truly have learned how to build a Java application!

NEXT

# Create Model Classes

In this section, we will need to create model classes in order to model our data objects for the hotel reservation domain. For example, the hotel reservation application domain will include data models, like Customer, Room and Reservation.

Here are the steps you'll need to complete to create the model classes:

### **Create a new package**

Now it's time to create our model package so we can start to add our data model classes.

Task List

* 

Create a new package under the source folder named model

### **Create the RoomType enumeration**

Next you'll need to create the **RoomType enumeration**. The RoomType should have the following enumerations:

Task List

* 

SINGLE

* 

DOUBLE

### **Create the IRoom Interface**

Next you'll need to create the **IRoom Interface**. It should have the following methods:

Task List

* 

public String getRoomNumber()

* 

public Double getRoomPrice()

* 

public RoomType getRoomType()

* 

public boolean isFree()

### **Create the Room class**

Next you'll need to create the **Room class**. It should have the following:

Task List

* 

Implement the IRoom Interface and it's methods

* 

Add variable, String roomNumber

* 

Add variable, Double price

* 

Add variable, RoomType enumeration

* 

Override the toString() method for a better description

### **Create the FreeRoom class**

Next you'll need to create the **FreeRoom class**. It should have the following:

Task List

* 

Extend the Room class

* 

Change the constructor to set the price to 0

* 

Override the toString() method for a better description

### **Create the Customer class**

Next you'll need to create the **Customer class**. It should have the following:

Task List

* 

Add variable, String firstName

* 

Add variable, String lastName

* 

Add variable, String email

* 

Override the toString() method for a better description

* 

Add a regex to validate the email string in the class constructor. If the email does not match the format: [`name@domain.com](mailto:%60name@domain.com)throw anIllegalArgumentExcpetion`.

### **Create a Reservation class**

Next you'll need to create the **Reservation class**. It should have the following:

Task List

* 

Add variable, Customer customer

* 

Add variable, IRoom room

* 

Add variable, Date checkInDate

* 

Add variable, Date checkOutDate

* 

Override the toString() method for a better description

NEXT

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# Test Your Code

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# Test Your Code

There are many different techniques for testing software, As you continue to learn Java, you should be sure to learn about unit testing frameworks (such as JUnit). However, for the hotel reservation application, you can create a driver program to incrementally test your software as you develop it.

Here are the steps to test the Driver class:

Task List

* 

Create a Java class and name it Driver or Tester.

* 

Include a main method public static void main(String[] args) {}

* 

Add Customer customer = new Customer("first", "second", "j@domain.com");

* 

Next line AddSystem.out.println(customer); Note: If you have overridden the toString() method for the Customer class, this line will display the class contents

Let's use this technique to test your email validation:

Task List

* 

Add Customer customer = new Customer("first", "second", "email");

* 

Run the driver program by right-clicking and selecting Run

* 

An IllegalArgumentException should have been thrown because the String email does not match our regular expression for email, [`name@domain.com](mailto:%60name@domain.com)`

NEXT

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# Create Service Classes

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# Create Model Classes

In this section, we will need to create the service classes in order to combine features that do not belong in our domain or model class. Services can be either stateless or stateful. In our project the services will be stateful and will utilize Collections to store, retrieve and process data. Because our services are stateful they will need to provide static references, making them singleton objects.

Here are the steps you'll need to complete to create the service classes:

### **Create a new package**

Now it's time to create our service package so we can start to add our service classes

Task List

* 

Create a new package under the source folder named service

### **Create the CustomerService class**

Next you'll need to create the **CustomerService class**. It should have the following:

Task List

* 

public void addCustomer(String email, String firstName, String lastName)

* 

public Customer getCustomer(String customerEmail)

* 

public Collection<Customer> getAllCustomers()

* 

Provide a static reference

### **Create the ReservationService class**

Next you'll need to create the **ReservationService class**. It should have the following:

Task List

* 

public void addRoom(IRoom room)

* 

public IRoom getARoom(String roomId)

* 

public Reservation reserveARoom(Customer customer, IRoom room, Date checkInDate, Date checkOutDate)

* 

public Collection<IRoom> findRooms(Date checkInDate, Date checkOutDate)

* 

public Collection<Reservation> getCustomersReservation(Customer customer)

* 

public void printAllReservation()

* 

Create Collections to store and retrieve a Reservation

* 

Provide a static reference

NEXT

### [**Project:Hotel Reservation Application**](https://classroom.udacity.com/nanodegrees/nd079-ent-infosys/parts/cd0282)

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# Create Resource Classes

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# Create Resource Classes

In this section, we will need to create the resource classes so we can provide an intermediary between the UI components and services. Resource classes are used for defining the Application Programming Interface (API).

***Note:****APIs are a best practice and used to separate backend software from frontend software. This provides a clean separation in behavior and responsibilities for the software components.*

The hotel reservation application will have two resources, the HotelResource intended for public usage and the AdminResource intended for the hotel staff only.

Here are the main steps you'll need to complete to create the service classes:

### **Create a new package**

Now it's time to create our api package so we can start to add our api classes.

Task List

* 

Create a new package under the source folder named api

### **Create the HotelResource class**

Next you'll need to create the **HotelResource class**. The HotelResource should have little to no behavior contained inside the class and should make use of the Service classes to implement its methods. The HotelResource will have the following methods:

Task List

* 

Provide a static reference

* 

public Customer getCustomer(String email)

* 

public void createACustomer(String email, String firstName, String lastName)

* 

public IRoom getRoom(String roomNumber)

* 

public Reservation bookARoom(String customerEmail, IRoom room, Date checkInDate, Date CheckOutDate)

* 

public Collection<Reservation> getCustomersReservations(String customerEmail)

* 

public Collection<IRoom> findARoom(Date checkIn, Date checkOut)

### **Create the AdminResource class**

Next you'll need to create the **AdminResource class**. The AdminResource should have little to no behavior contained inside the class and should make use of the Service classes to implement its methods. The AdminResource will have the following methods:

Task List

* 

Provide a static reference

* 

public Customer getCustomer(String email)

* 

public void addRoom(List<IRoom> rooms)

* 

public Collection<IRoom> getAllRooms()

* 

public Collection<Customer> getAllCustomers()

* 

public void displayAllReservations()

NEXT

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# Create Command Line Menus

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# Create Command Line Menus

In this section, we will need to create the different command line menus, so the user can interact with the application from command line. Menus will be displayed to the user from the console with different numbered options. Next, we will be using the Scanner class to read in the user's responses.

Here are the main steps you'll need to complete to create the menu classes:

### **Creating the MainMenu**

First, you'll need to create the **MainMenu class**. The MainMenu should have the following menu items:

Task List

* 

1. Find and reserve a room

* 

2. See my reservations

* 

3. Create an account

* 

4. Admin (open the admin menu described below)

* 

5. Exit (exit the application)

### **Creating the AdminMenu**

Next you'll need to create the **AdminMenu class**. The AdminMenu should have the following menu items:

Task List

* 

1. See all Customers

* 

2. See all Rooms

* 

3. See all Reservations

* 

4. Add a Room

* 

5. Back to Main Menu (returns back to the MainMenu)

NEXT

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# Check Your Work

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# Check Your Work

Once you submit your project, we'll review your work and give you feedback if there's anything that you need to work on. If you'd like to see the exact points that your reviewer will check for when looking at your work, you can have a look over the project [rubric](https://review.udacity.com/#!/rubrics/2926/view).

Before you submit your project, make sure that the following files are included in your .zip file:

Task List

* 

Customer.java

* 

IRoom.java

* 

Room.java

* 

FreeRoom.java

* 

Reservation.java

* 

CustomerService.java

* 

ReservationService.java

* 

HotelResource.java

* 

AdminResource.java

* 

MainMenu.java

* 

AdminMenu.java

* 

HotelApplication.java

* 

Add any other custom class you may have created that is required to run your application

NEXT

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8. [8. Create Command Line Menus](https://classroom.udacity.com/nanodegrees/nd079-ent-infosys/parts/cd0282/modules/b4f693e6-22d3-48a4-9808-6745bab9e6f5/lessons/f20cbe73-16da-4a7d-b47f-f02e65c4d485/concepts/947bd228-f0ed-4a47-9956-26f7c58ec65b)
9. [9. Check Your Work](https://classroom.udacity.com/nanodegrees/nd079-ent-infosys/parts/cd0282/modules/b4f693e6-22d3-48a4-9808-6745bab9e6f5/lessons/f20cbe73-16da-4a7d-b47f-f02e65c4d485/concepts/d1cf6f10-7c9f-4bf3-90c6-4fc9fb2ef882)
10. [**10. Project: Hotel Reservation Application**](https://classroom.udacity.com/nanodegrees/nd079-ent-infosys/parts/cd0282/modules/b4f693e6-22d3-48a4-9808-6745bab9e6f5/lessons/f20cbe73-16da-4a7d-b47f-f02e65c4d485/project)

# Hotel Reservation Application

SUBMIT PROJECT

## Project Submission

When you're ready to submit, go ahead and click the **SUBMIT PROJECT** button. You'll then have the option to upload a .zip file containing your project files.