**44-542 Object-Oriented Programming**

**Assignment09: Abstract Classes and Interfaces**

**Objective:** Executing a Motel Management Booking System using Abstract classes and Interfaces.

**Instructions:**

1. Read every instruction carefully and follow them.
2. Do not hard code any values unless specified and you must follow the given naming conventions.
3. Check the given sample output to understand how the results need to be printed.
4. Use **@author**, **@param,** and **@return** annotations wherever possible.
5. **@author** notation should contain your full name.
6. Generate proper Javadoc comments for all the classes with clear and thorough descriptions of their contents.
7. Ensure your code is indented properly. Use **shift+alt+f** to indent your code.
8. Each class that you create for this assignment should include the information given below.



Here, NN is your section number.

**How to create and view Javadoc in NetBeans:**

1. Select the project that you want to generate Javadoc for from the Projects pane. At the top, click on the **Run** tab and then click on **Generate Javadoc**.
2. If the project build tool is Maven: Go to the project location in Files folder -> target -> site -> apidocs -> click on index.html file to access the Javadoc.

**Steps for project creation:**

1. Create a Java project in **NetBeans** (Click on File -> New Project -> Select Categories as Java with Maven and Projects as Java Application -> Click on Next) and name the project as **S######Assignment09,** where **S######** is your student ID, for instance, **S123456Assignment09**.
2. **edu.nwmissouri.spring24.cs44542.secNN.abstralctclassesinterfaces** is the name of the package. Here **NN** should be replaced by your section number. All classes in this assignment should be placed in this package.
3. Create a new Java Driver Class in the above package and name it as **BookingDriver**.
4. Use the main method in the **BookingDriver** class run your application.

**Class Creator:** This class has no attributes.

1. **createRoom(String name, double cost, int roomNumber, int numOfBeds):** This method is a factory method responsible for instantiating and returning instances of the **Room** class or its subclasses (**King**, **Queen**, and **Suite**). The method takes four parameters: **name**, **cost**, **roomNumber**, and **numOfBeds**. It creates a new room based on the specified **name** and initializes it with the provided values for cost, room number, and number of beds.

**A computer screen shot of a computer

Description automatically generated**

Figure 1 UML Diagram 1

**Class Property:** This class has no attributes.

1. **isOccupied():** This method returns a Boolean value, which is the value of the instance variable isOccupied.

**Class Room:** This class contains the below attributes. All attributes are private except **MOTEL\_TAX**.

Table 1 Class Room attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **roomNumber** | **int** | Room number of the room |
| **isOccupied** | **boolean** | Flag to check whether a room is occupied or not |
| **guest** | **Guest** | Stores ref to the guest object |
| **numOfNights** | **int** | Number of nights for which the room is booked |
| **MOTEL\_TAX** | **double** | A static constant value which stores the tax of the motel as 15% |

1. Write a parameterized constructor with roomNumber of type int as an argument in the constructor.
2. Write getter and setter methods for the above-mentioned attributes.
3. **isOccupied():** This method return’s the isOccupied attribute value of type boolean.
4. **calculateCost():** This method returns a double value. Based on the type of the room, override this method in the related subclasses to calculate cost per night stay along with the tax applied for the total duration of stay.

**Class King:** This class contains the below attributes. All attributes are private.

Table 2 Class King attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **costPerNight** | **double** | Room Cost Per Night |
| **numOfBeds** | **int** | The Number of beds in a room |

1. Write a parameterized constructor with costPerNight of type double, roomNumber of type int and numOfBeds of type int as arguments in the constructor.
2. Write getter and setter methods for the above-mentioned attributes.
3. **calculateCost():** This method returns the total cost for the room reserved. Use the below equation.

**Class Queen:** This class contains the below attributes. All attributes are private.

Table 3 Class Queen attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **costPerNight** | **double** | Room Cost Per Night |
| **numOfBeds** | **int** | The Number of beds in a room |

1. Write a parameterized constructor with **costPerNight** of type double, **roomNumber** of type int and **numOfBeds** of type int as arguments in the constructor.
2. Write getter and setter methods for the above-mentioned attributes.
3. **calculateCost():** This method returns the total cost for the room reserved. Use the below equation.

**Class Suite:** This class contains the below attributes. All attributes are private.

Table 4 Class Suite attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **costPerNight** | **double** | Room Cost Per Night |
| **numOfBeds** | **int** | The Number of beds in a room |

1. Write a parameterized constructor with **costPerNight** of type double, **roomNumber** of type int and **numOfBeds** of type int as arguments in the constructor.
2. Write getter and setter methods for the above-mentioned attributes.
3. **calculateCost():** This method returns the total cost for the room reserved.  
   Use the below equation.

**A screenshot of a phone

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Figure 2 UML Diagram 2

**interface Customer:** This is an interface.

1. **displayOccupancy():** An abstract method that prints information of a guest.

**Class Guest:** This class contains the below attributes. All attributes are private.

Table 5 Class Guest attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **firstName** | **String** | Guest First name |
| **lastName** | **String** | Guest Last name |
| **age** | **int** | Guest age |
| **folio** | **double** | Guest folio balance |

1. Write a parameterized constructor with **firstName** of type String, **lastName** of type String, **age** of type int and **folio** of type double as arguments in the constructor.
2. Write getter and setter methods for the above-mentioned attributes.
3. **displayOccupancy():** This method prints the guest information.
4. Sample output



**A screenshot of a computer

Description automatically generated**

Figure 3 UML Diagram 3

**interface FrontDesk:** This is an interface.

1. **checkOut():** An abstract method which starts the check out for the guest.
2. **checkIn(Guest guest):** An abstract method which starts the check in for the guest.

**interface Reservation:** This is an interface.

1. **makeReservation():** An abstract method which initiates the reservation process.
2. **confirmReservation():** An abstract method which confirms the reservation process.
3. **isRoomAvailable(int number):** An abstract method which returns a Boolean value depending on whether a room is available or not.
4. **isRoomBooked(int number):** An abstract method, which returns a Boolean value depending on whether a room is already booked or not.
5. **isRoomDirty(int number):** An abstract method, which returns a Boolean value depending on whether a room is dirty or not.

**interface RoomService:** This is an interface.

1. **orderFood():** An abstract method which initiates the food order request.
2. **requestCleaning():** An abstract method which initiates the cleaning of dirty rooms.

**abstract class BookingSystem:** This is an abstract class with no instance variables.

1. **printFoodReceipt(Property room):** An abstract method, which prints the food order receipt.
2. **printReceipt(Property room):** An abstract method, which prints the receipt for the guest folio.

**Class Motel:** This class contains the below attributes. All attributes are private except **MAX\_ROOMS and BUFFET\_PRICE**.

Table 6 Class Motel attributes

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Type** | **Attribute Description** |
| **rooms** | **List<Room>** | Room number of the room |
| **roomsBooked** | **List<Room>** | Flag to check whether a room is occupied or not |
| **dirty** | **List<Room>** | Stores ref to the guest object |
| **MAX\_ROOMS** | **int** | A static constant value which stores value of 20 |
| **BUFFET\_PRICE** | **double** | A static constant value which stores the value of 30.00 |

1. Write a no argument constructor, which calls **initializeRooms()** method**.**
2. Write getter and setter methods for the above-mentioned attributes.
3. **initializeRooms():** Initializes the lists of rooms, booked rooms, and dirty rooms for the motel using **new ArrayList()<>.**
4. **checkOut():** Manages the check-out process for a guest, including printing the receipt and updating room status.
5. **checkIn()**: Manages the check-in process for a guest, including selecting a room and making a reservation.
6. **printReceipt(Property property):** Prints the receipt for a guest checking out, including details such as name, room number, and total amount.
7. **Sample output**



1. **printFoodReceipt(Property property):** Prints the receipt for a food order, including details such as customer name, food item, and total cost.
2. **Sample output**



1. **makeReservation(int number, Guest guest, int nights):** Makes a reservation for a guest in a specified room for a certain number of nights.
2. **confirmReservation(Property property):** Confirms the reservation for a specific type of room (King, Queen, or Suite).
3. **isRoomDirty(int number):** Checks if a specific room is marked as dirty and needs cleaning.
4. **isRoomBooked(int number):** Checks if a specific room is currently booked by a guest.
5. **isRoomAvailable(int number):** Checks if a specific room is available for booking.
6. **orderFood():** Takes a food order from a guest in a booked room and updates the guest's folio.
7. **requestCleaning():**Initiates the cleaning process for a dirty room, making it available for booking again.
8. **printInHouseRooms():** Prints details of currently occupied (in-house) rooms, including room number, type, nights, cost, beds, and guest information.
9. **Sample output**



1. **printDirtyRooms():** Prints details of rooms marked as dirty, including room number, type, cost, and beds.
2. **Sample output**



1. **printRooms():** Prints details of available rooms for booking, including room number, type, cost, and beds.
2. **Sample output**



1. **toString():** Provides a summary of the motel, including the counts of available, booked, and dirty rooms.
2. **Sample output**



**Use the supplied BookingDriver class and complete the driver class.**

**Sample Output**

|  |
| --- |
| **\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***  **\*\*\*\*\*\*\*\*\*\*\* Motel Management System \*\*\*\*\*\*\*\*\*\*\*\***  **\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***  **Available Rooms: 20**  **In-House Rooms: 0**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 1**  **Enter First Name: John**  **Enter Last Name: Doe**  **Enter Age: 24**  **Available Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 1 | King | $59.99 | 1 |**  **| 2 | King | $59.99 | 1 |**  **| 3 | King | $59.99 | 1 |**  **| 4 | King | $59.99 | 1 |**  **| 5 | King | $59.99 | 1 |**  **| 6 | King | $59.99 | 1 |**  **| 7 | King | $59.99 | 1 |**  **| 8 | King | $59.99 | 1 |**  **| 9 | King | $59.99 | 1 |**  **| 10 | King | $59.99 | 1 |**  **| 11 | Queen | $69.99 | 2 |**  **| 12 | Queen | $69.99 | 2 |**  **| 13 | Queen | $69.99 | 2 |**  **| 14 | Queen | $69.99 | 2 |**  **| 15 | Queen | $69.99 | 2 |**  **| 16 | Queen | $69.99 | 2 |**  **| 17 | Queen | $69.99 | 2 |**  **| 18 | Queen | $69.99 | 2 |**  **| 19 | Suite | $99.99 | 3 |**  **| 20 | Suite | $99.99 | 3 |**  **+--------+---------+-------+----------+**  **Enter total nights for check-in: 2**  **Enter room number to check in: 10**  **Room 10 is booked.**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 3**  **Available Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 1 | King | $59.99 | 1 |**  **| 2 | King | $59.99 | 1 |**  **| 3 | King | $59.99 | 1 |**  **| 4 | King | $59.99 | 1 |**  **| 5 | King | $59.99 | 1 |**  **| 6 | King | $59.99 | 1 |**  **| 7 | King | $59.99 | 1 |**  **| 8 | King | $59.99 | 1 |**  **| 9 | King | $59.99 | 1 |**  **| 11 | Queen | $69.99 | 2 |**  **| 12 | Queen | $69.99 | 2 |**  **| 13 | Queen | $69.99 | 2 |**  **| 14 | Queen | $69.99 | 2 |**  **| 15 | Queen | $69.99 | 2 |**  **| 16 | Queen | $69.99 | 2 |**  **| 17 | Queen | $69.99 | 2 |**  **| 18 | Queen | $69.99 | 2 |**  **| 19 | Suite | $99.99 | 3 |**  **| 20 | Suite | $99.99 | 3 |**  **+--------+---------+-------+----------+**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 4**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **| 10 | King | 2 | $137.98 | 1 | John Doe |**  **+--------+---------+---------+----------+--------+--------------------------+**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 5**  **Dirty Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **+--------+---------+-------+--------+**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 6**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 1**  **There are no dirty rooms.**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 2**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **| 10 | King | 2 | $137.98 | 1 | John Doe |**  **+--------+---------+---------+----------+--------+--------------------------+**  **Enter room number to for which you want to order food: 10**  **Food Order Receipt**  **-------------------**  **Customer Name: John Doe**  **Food Item: Buffet**  **Total Cost: $34.50**  **-------------------**  **Thank you for your order!**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 3**  **Exiting the Room Service System.**  **Invalid option. Please choose a valid option.**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 2**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **| 10 | King | 2 | $137.98 | 1 | John Doe |**  **+--------+---------+---------+----------+--------+--------------------------+**  **Enter room number to check out:**  **10**  **Guest Receipt**  **-----------------------------------------------------**  **Name: John Doe**  **Age: 24**  **Room Number: 10**  **Number of Nights: 2**  **Total Amount: $172.48**  **-----------------------------------------------------**  **Thank you for your stay!**  **Available Rooms: 19**  **In-House Rooms: 0**  **Dirty Rooms: 1**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 3**  **Available Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 1 | King | $59.99 | 1 |**  **| 2 | King | $59.99 | 1 |**  **| 3 | King | $59.99 | 1 |**  **| 4 | King | $59.99 | 1 |**  **| 5 | King | $59.99 | 1 |**  **| 6 | King | $59.99 | 1 |**  **| 7 | King | $59.99 | 1 |**  **| 8 | King | $59.99 | 1 |**  **| 9 | King | $59.99 | 1 |**  **| 11 | Queen | $69.99 | 2 |**  **| 12 | Queen | $69.99 | 2 |**  **| 13 | Queen | $69.99 | 2 |**  **| 14 | Queen | $69.99 | 2 |**  **| 15 | Queen | $69.99 | 2 |**  **| 16 | Queen | $69.99 | 2 |**  **| 17 | Queen | $69.99 | 2 |**  **| 18 | Queen | $69.99 | 2 |**  **| 19 | Suite | $99.99 | 3 |**  **| 20 | Suite | $99.99 | 3 |**  **+--------+---------+-------+----------+**  **Available Rooms: 19**  **In-House Rooms: 0**  **Dirty Rooms: 1**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 4**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **+--------+---------+---------+----------+--------+--------------------------+**  **Available Rooms: 19**  **In-House Rooms: 0**  **Dirty Rooms: 1**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 5**  **Dirty Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 10 | King | $0.00 | 1 |**  **+--------+---------+-------+--------+**  **Available Rooms: 19**  **In-House Rooms: 0**  **Dirty Rooms: 1**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 6**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 1**  **Dirty Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 10 | King | $0.00 | 1 |**  **+--------+---------+-------+--------+**  **Enter room number to clean:**  **10**  **Room 10 is Cleaned, Thank you.**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 3**  **Exiting the Room Service System.**  **Invalid option. Please choose a valid option.**  **Available Rooms: 20**  **In-House Rooms: 0**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 1**  **Enter First Name: Jane**  **Enter Last Name: Doe**  **Enter Age: 26**  **Available Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 1 | King | $59.99 | 1 |**  **| 2 | King | $59.99 | 1 |**  **| 3 | King | $59.99 | 1 |**  **| 4 | King | $59.99 | 1 |**  **| 5 | King | $59.99 | 1 |**  **| 6 | King | $59.99 | 1 |**  **| 7 | King | $59.99 | 1 |**  **| 8 | King | $59.99 | 1 |**  **| 9 | King | $59.99 | 1 |**  **| 11 | Queen | $69.99 | 2 |**  **| 12 | Queen | $69.99 | 2 |**  **| 13 | Queen | $69.99 | 2 |**  **| 14 | Queen | $69.99 | 2 |**  **| 15 | Queen | $69.99 | 2 |**  **| 16 | Queen | $69.99 | 2 |**  **| 17 | Queen | $69.99 | 2 |**  **| 18 | Queen | $69.99 | 2 |**  **| 19 | Suite | $99.99 | 3 |**  **| 20 | Suite | $99.99 | 3 |**  **| 10 | King | $59.99 | 1 |**  **+--------+---------+-------+----------+**  **Enter total nights for check-in: 1**  **Enter room number to check in: 3**  **Room 3 is booked.**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 4**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **| 3 | King | 1 | $68.99 | 1 | Jane Doe |**  **+--------+---------+---------+----------+--------+--------------------------+**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 6**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 3**  **Exiting the Room Service System.**  **Invalid option. Please choose a valid option.**  **Available Rooms: 19**  **In-House Rooms: 1**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 2**  **In-House:**  **+--------+---------+---------+----------+--------+--------------------------+**  **| Room | Type | Nights | Cost | Beds | Guest |**  **+--------+---------+---------+----------+--------+--------------------------+**  **| 3 | King | 1 | $68.99 | 1 | Jane Doe |**  **+--------+---------+---------+----------+--------+--------------------------+**  **Enter room number to check out:**  **3**  **Guest Receipt**  **-----------------------------------------------------**  **Name: Jane Doe**  **Age: 26**  **Room Number: 3**  **Number of Nights: 1**  **Total Amount: $68.99**  **-----------------------------------------------------**  **Thank you for your stay!**  **Available Rooms: 19**  **In-House Rooms: 0**  **Dirty Rooms: 1**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 6**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 1**  **Dirty Rooms:**  **+--------+---------+-------+--------+**  **| Room | Type | Cost | Beds |**  **+--------+---------+-------+--------+**  **| 3 | King | $0.00 | 1 |**  **+--------+---------+-------+--------+**  **Enter room number to clean:**  **3**  **Room 3 is Cleaned, Thank you.**  **Choose the Following Room Service Options:**  **1. Clean Room.**  **2. Order Food.**  **3. Go back.**  **Enter your choice: 3**  **Exiting the Room Service System.**  **Invalid option. Please choose a valid option.**  **Available Rooms: 20**  **In-House Rooms: 0**  **Dirty Rooms: 0**  **Choose the Following Options:**  **1. Check-In Room.**  **2. Check-out Room.**  **3. Get Available Rooms.**  **4. Get In-House Rooms.**  **5. Get Dirty Rooms.**  **6. Room Service.**  **7. Exit.**  **Enter your choice: 7**  **Exiting the Motel Management System. Goodbye!** |

**Bonus (2 points): Write your answer using print statements.**

1. How do you solve diamond inheritance problem by implementing multiple interfaces that have same default method implementations with same signature and return types?
2. In a scenario of polymorphic substitution, where a subclass object is referenced to a super class reference variable. How do you access the subclass methods using the said reference? Explain in detail.

**Submission:** Push your entire Java project to GitHub and submit your private repository link on Canvas as Website URL before the due date.