King Saud University
College of Computer and Information Sciences
CSC111
Lab Final Exam

Write a Java program that manages apartments in a building. Here are the UML diagrams:

Apartment	3 marks
- id: int	1
- rooms: int	
- rent: double	
- status: String	
+ Apartment ()	0.5
+ Apartment (id: int,rooms: int, rent: double, status: Srting)	0.5
+ setters	0.5
+ getters	0.5

Building	12 marks
- apts[ ]: Apartment	1
- numApts: int	
+ MAX_SIZE: public static final int	
+ Building ()	1
+ main()	4
+ getNumApts(): int	0.5
+ addApt(a: Apartment) : void	1.5
+ removeApt(i: int): void	1
+ displayApt(i: int): void	1
+ getFirstAvailable(rent: double, rooms: int): int	2
+ rentApt(i :int): void	1

The Class: Apartment

As shown in the UML diagram, write the class Apartment that has the attributes:

- **id**: the id of the apartment
- **rooms**: the number of rooms in the apartment. Integer from 1 to 4
- **rent**: the monthly rent of the apartment.
- **status**: represents availability of the apartment, either “**Available**” or “**Occupied**”.

The methods of this class are:

- **Apartment**(): A default constructor that sets id,rooms, and rent to -1 and ststus to “NA”.
- **Apartment**(id,rooms,rent,status): A constructor that initializes new apartment with the initial values from the user.
- **Setter methods** (one for each): That sets the values for: id, rooms, rent and status

- **Getter Methods** (one for each): That returns the values for: id, rooms, rent and status

The Main Class: Building

The main class is class **Building** which is the class that you are going to use to test your program. This class contains an array of objects **apts[ ]** that contains all the apartments in a building. It also contains the variable **numApts** that represents the current number of apartments stored in the array of objects **apts[ ]**.

This class contains main method as well as other methods. Note that the maximum number of apartments in the list is 100 (hint: **MAX_SIZE** constant).

The methods of this class are:

- **Building**(): a constructor that initializes the attributes and creates an array of apartments of size 100
- **getNumApts**: returns the current number of apartments stored in the array.
- **addApt**: this method will add an apartment. If it is not possible to add the apartment, you should print an error message "**ERROR Adding**".
- **removeApt**: remove the apartment with index 'i' and put the last apartment in its place. Otherwise print "**ERROR removing**"
- **displayApt**: displays the apartments details for Apartment with index 'i' in the array, Otherwise print "**ERROR Printing**"
- **getFirstAvailable**: returns the index of the first available apartment with a given number of rooms and rent. If no such apartment then return -1. For example, get the index of first apt in array with 2 rooms and rent 1000 SR or less.(Note: status should be "**Available**")
- **rentApt**: if the apartment status at index 'i' is "**Available**" then change it to "**Occupied**". Otherwise, print error message "**Apartment Already Rented**".

- **main**: the main method does the following:
  1. Create a **Building** object.
  2. Ask the user to enter apartment information. Keep reading and storing apartments information in array apts until user enters (-1) as id of apartment.
  3. Ask the user to enter how many rooms he want in the apartment and the maximum rent?
  4. Display the first apartment with that rent or less and has the same number of rooms.
  5. Rent that apartment.
  6. Ask the user to enter index of an apartment to remove from list, then delete it.
  7. Display all apartments

Sample run:

```
Please enter id (-1 to exit), number of rooms, rent and status:
301 2 1100 Available
Please enter id (-1 to exit), number of rooms, rent and status:
```

```
305 1 900 Available
Please enter id (-1 to exit), number of rooms, rent and status:
304 3 2000 Available
Please enter id (-1 to exit), number of rooms, rent and status:
309 4 1500 Available
Please enter id (-1 to exit), number of rooms, rent and status:
310 2 800 Available
Please enter id (-1 to exit), number of rooms, rent and status:
-1
What is the maximum rent are you willing to pay?: 1000
What is the minimum number of rooms you like in your apt?: 2
first available apartment with rent 1000 or less and 2 rooms or more is:
the Apt id 310 with 2.0 rooms and rent 800.0 SR is available
Enter index of apartment to delete :2
Display all apartments:
the Apt id 301 with 2.0 rooms and rent 1100.0 SR is available
the Apt id 305 with 1.0 rooms and rent 900.0 SR is available
the Apt id 310 with 2.0 rooms and rent 800.0 SR is Occupied
the Apt id 309 with 4.0 rooms and rent 1500.0 SR is available
```