1) Suppose you had a Java class `SpaceShip` that represents a space ship. Should the following variables and methods be static or non-static:

- a variable representing the number of instances of class `SpaceShip` ______________
- a variable representing the year a space ship was built ______________
- a variable that represents the speed of light ______________
- a method that returns the number of instances of class `SpaceShip` ______________
- a method that refuels a `SpaceShip` object ______________
- an `equals` method that compares two `SpaceShip` instances ______________

2) In Problem Set 5b, you wrote the class `Characteristic`, which represents a characteristic on an online dating profile. Part of this class is below:

```java
public class Characteristic {
    private String description;
    private int rating;

    public Characteristic(String d) {
        description = d;
        rating = 0;
    }

    ...
}
```

Consider the class `DatingProfile`, which represents a profile on an online dating website. This class has two instance variables:

- `username`, which is a `String` representing the username of that profile
- `firstChar`, which is an instance of `Characteristic` representing the first characteristic that shows up on the dating profile.

(continued on the back)
public class DatingProfile {
    private String username;
    private Characteristic firstChar;

    // your code goes here
}

a) Write a constructor for the class DatingProfile that takes in two Strings, where the first String is the username and the second String is the description for the Characteristic firstChar. The rating of firstChar should be 0.

b) Write a piece of code that creates an instance of DatingProfile using your constructor from part (a). This instance should have the username “lookin4love” and the first characteristic should have the description “Likes sunsets”.

c) Write a toString method for DatingProfile that returns the String “This is the dating profile of <username>”, where <username> is replaced by the actual username of that instance. For example, if the username is “lookin4love” the toString method would return the String “This is the dating profile of lookin4love”.