German University in Cairo
Media Engineering and Technology
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Data Structures and Algorithms, Winter term 2020
Practice Assignment 6

Exercise 6-1 Supermarket Offers

A supermarket manager has decided to make offers on the yoghurt products. The offer will depend on the expiry date of the product. The price of the product with the earlier expiry date will be reduced by 50% of the original price.Then the offer decreases by 5% for every product with later expiry date; i.e. the price of the product with the second earlier expiry date will be reduced by 45% ...etc.

a) Implement a class `YoghurtProduct` with three attributes; the ID of the product, its original price and its expiry date.
Hint: You may find it useful to use the predifined Java class `Date`.

b) Implement a class `SuperMarket` that keeps track of the instances of `YoghurtProduct` being sold.

c) Implement a method `double newPrice(int productID)` in the class `SuperMarket`. The input to the method is the ID of the product to be purchased. It returns the product's new price after calculating the discount offered on it. The method can only remove the product that has been purchased from the supermarket. It returns -1 if the product is not found.

Exercise 6-2 University

Implement a class `University`, which describes a university in terms of its name and its rank. The class will be used to help a high school student to decide about which university he will be enrolled in. The student should be able to prioritize universities according to their rank by using a `PriorityQueue` data structure. If multiple universities have the same rank, they should be ordered alphabetically.

Exercise 6-3 Hospital Emergency Room

Scheduling patients for entering a hospital emergency room is done according to how critical their case is, not according to their arrival time.

a) Implement a class `Patient` which keeps track of the patient's name and the degree of severity of his case. The degree of severity is represented by a number; the smaller the number, the more severe the case is.

b) Implement a class `EmergencyRoom` which keeps track of the patients scheduled to enter the emergency room. Add the following methods to your class:

- The method `void newPatient(String n, int p)` that adds a new Patient to be scheduled to enter the emergency room.
- The method `Patient nextPatient()` that returns the next Patient to enter the room, according to the priorities of the scheduled patients.