PES University, Bengaluru

(Established under Karnataka Act 16 of 2013)

END SEMESTER ASSESSMENT (ESA) - JULY - 2023

UE19CS353 - Object Oriented Analysis and Design with Java

Total Marks : 100.0

1.a. State any six differences between abstract class and interface? (6.0 Marks)

1.b. Which are the different types of constructors? Give an example to illustrate creation of objects using different types of constructors. (4.0 Marks)

1.c. i)Give an example for Method overloading and Method overriding.
ii)State the differences between method overloading and method overriding.
(6.0 Marks)

1.d. Briefly describe the need of garbage collector in java (4.0 Marks)

2.a. Elucidate qualified association and aggregation relationship w.r.t class diagram with an example for each. (6.0 Marks)

2.b. Draw a use case diagram for railway reservation system which has all basic features similar to IRCTC portal. (6.0 Marks)

2.c. Describe in a line or two the following elements of component diagram: Port, Dependency, Component, Interface. (4.0 Marks)

2.d. Differentiate between Aggregation and Composition relationships wrt class diagram (4.0 Marks)

3.a. For the given scenarios, choose appropriate diagram to model the scenario. Justify your choice and draw the chosen diagram.
i) Every student is assigned a Faculty Advisor. The Faculty Advisor is assigned a minimum of 25 students with no maximum limit. Deans and Chairpersons are not assigned any students as advisees. Typically, about half the strength of a section is assigned to a Faculty advisor, i.e., a section typically has two Faculty Advisors.
ii) An Order consists of multiple Items. The Order total is computed by adding the product of Item Quantity and Item price for each Item. (6.0 Marks)

3.b. Draw an activity diagram for the given below scenario of purchase ticket: Activity is started by Commuter actor who needs to buy a ticket. Ticket vending machine will request trip information from Commuter. This information will include number and type of tickets, e.g. whether it is a monthly pass, one way or round ticket, route number, destination or zone number, etc. Based on the provided trip info ticket vending machine will calculate payment due and request payment options. Those options include payment by cash, or by credit or debit card. If payment by card was selected by Commuter, another actor, Bank will participate in the activity by authorizing the payment (6.0 Marks)

3.c. Explain the creator and controller GRASP principles with an example along with the corresponding class diagram (8.0 Marks)

4.a. With an example show how a class can be made singleton and what are the benefits of making a class a singleton (4.0 Marks)

4.b. What is a Design pattern? Describe in a line or two the essential elements of a design pattern (6.0 Marks)

4.c. i) Specify when to use a builder pattern
ii) State the difference between Factory and Abstract Factory patter. (4.0 Marks)

4.d. Describe briefly the following:
1. Liskov Substituiton Principle
2. Interface segregation principle
3. Open-Close principle

(6.0 Marks)

5.a. A System has a MediaPlayer interface and a concrete class AudioPlayer implementing the MediaPlayer interface. AudioPlayer can play mp3 format audio files by default. We are having another interface AdvancedMediaPlayer and concrete classes implementing the AdvancedMediaPlayer interface. These classes can play vlc and mp4 format files. We want to make AudioPlayer to play other formats as well.

Identify which design pattern is required to implement the given scenario and Justify. Draw an appropriate class diagram for the scenario with the design pattern. (6.0 Marks)

5.b. Differentiate between pattern and anti-pattern. (4.0 Marks)

5.c. What is a proxy pattern? Which are the three main variations of proxy pattern. (6.0 Marks)

5.d. State the solution for Blob, Lava Flow, Vendor lockin and Analysis-Paralysis antipatterns (4.0 Marks)