



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

2nd Year, First Semester Examination – 2014

IT3103 - Object Oriented Analysis and Design

Instructions for Candidates:

No. of questions : 06

Answer FIVE Questions ONLY.

No. of pages : 03

Time : 03 Hours

01)

(i) Briefly explain benefits associated with Object Oriented approach over Traditional approach.

(4 Marks)

(ii) Write the difference between Object Coupling and Object Cohesion.

(4 Marks)

(iii) Define the concept Object Inheritance with an example.

(6 Marks)

(iv) Complete the following sentences using the terms given below.

package	interface	superclass	state	class	behavior	subclass
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(a) Real-world objects contain (A) and (B)

(b) A blueprint for a software object is called a (C)

(c) Common behavior can be defined in a (D)and inherited into a (E)

(d) A collection of methods with no implementation is called an (F)

(6 Marks)

(Total 20 Marks)

02)

(i) (a) Create a C++ class to represent a Student with attributes of name, year of birth, and SGPA (Semester GPA). (3 Marks)

(b) Define methods to get and set the values of these three attributes. (2 Marks)

(c) Add a method which will return a student's approximate age when given a year as a parameter. (2 Marks)

(d) Add another method which will return the average Marks when given Marks of 4 subjects as parameters. (2 Marks)

(e) In the main method, use this class. (3 Marks)

(ii) Using C++ code segments define/explain following concepts

(a) Constructor Overloading (4 Marks)

(b) Base Class and Derived Class (Super Class and Sub Class) (4 Marks)

(Total 20 Marks)

03)

(i) What are the four consecutive phases included in Unifies Process? State key goals which should be achieved in each phase. (06 Marks)

(ii) Briefly describe four (04) critical characteristics of a software product. (06 Marks)

(iii) What is the difference between analysis and design? (04 Marks)

(iv) When performing OO modeling, three possible views can be recognized: conceptual, design, and implementation view. In this context, explain the meaning of the sentence "Views are part of the Unified Process, not of UML itself". (04 Marks)

(Total 20 Marks)

04)

(i) List down four types of relationships available in UML. (4 Marks)

(ii) Why we need models. Give three reasons. (3 Marks)

(iii) List the importance of constructing a use case description? (3 Marks)

(iv) Use the given scenario to answer the questions.

Vidunana Education Center has following activities in regard to student registration.

Teachers indicate which courses they will teach on-line. A course catalog can be printed.

Allow students to select on-line four courses for upcoming semester. No course may have

more than 10 students or less than 3 students. When the registration is completed, the

system sends information to the billing system. Teacher can obtain course rosters on-line.

Students can add or drop classes on-line.

(a) List the actors and use cases in the above scenario. (5 Marks)

(b) Construct the use case diagram. (5 Marks)

(Total 20 Marks)

05)

ASB Car Rental Service is a local company that provides vehicle rental services. The vehicles include saloon car, MPV, SUV, and van. Due to the rapid expansion of its business, the company

requires a computerized system, which is called Car Rental System (CRS), to support its operations. CRS should be able to allow the company staff to register a new customer and vehicle information. Upon receiving a booking from a customer (via phone call or walk-in), the staff should be able to make a booking using CRS. The system will check the vehicle availability based on the details entered by the staff. The system also allows the staff to cancel the booking. Apart from that, CRS should provide the functionality to record the vehicle pick-up and return information. For vehicle return, other than normal return, there are two more different ways of handling this functionality i.e. early return and late return. If a customer return a car more than 24 hours earlier, or more than 3 hours late, the charge will be re-calculated based on the current rules stated by the company.

Based on the above description,

- (i) Identify the classes of the system. (05 Marks)
 - (ii) Develop a class diagram for the System (10 Marks)
 - (iii) Develop a state diagram for a selected class. (05 Marks)
- (Total 20 Marks)

06)

- (i) Draw symbols used in activity diagram to represent followings. (4 Marks)
 - (a) Start Activity
 - (b) Stop Activity
 - (c) Fork/Join
 - (d) Decision Point
 - (ii) Customer uses bank ATM to check balances of his/her bank accounts, deposit funds, withdraw cash and/or transfer funds. ATM Technician provides maintenance and repairs. Bank is related to customer transactions or to the ATM servicing. The customer is authenticated by inserting a plastic ATM card and entering a personal identification number (PIN). Customer Authentication is required for every ATM transaction.
Write down the detail process of the withdraw cash use case regarding the Bank ATM scenario. (5 Marks)
 - (iii) Draw the activity diagram for cash withdrawing process of a Bank ATM which have described in above scenario. (6 Marks)
 - (iv) What is a sequence diagram and explain the use of it? (5 Marks)
- (Total 20 Marks)