Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Specialized in Information Technology

Final Examination
Year 1, Semester 2 (2019)

IT1050 – Object Oriented Concepts

Duration: 2 Hours

October 2019

Instructions to Candidates:

- This paper 4 questions.
- Answer all questions in the booklet given.
- The total marks for the paper 100.
- This paper contains 5 pages, including the cover page.
- Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.
- This paper is proceeded by 10 minutes reading period. The supervisor will indicate when answering may commence.

Question 01 **(40 Marks)**

a) Briefly explain the following terms using an example. (3 marks)

i) Abstraction
ii) Encapsulation

b) Briefly describe the three types of Analysis classes. (3 marks)

c) Consider the following description and answer the questions below;

A software is developed to maintain information about XYZ Hospitals (pvt) Limited. The Doctors can be of two categories, namely General Practitioners and Consultants. A Doctor has a name, address, phone number and registered number. A General Practitioner has a name, address, phone number, registered number and hourly rate and a Consultant has name, address, phone number, registered number and doctor's charge per patient.

At the end of each month, the system must calculate the total payments for each doctor. General Practitioners are paid based on the number of visiting hours during a month and the Consultants are paid based on the number of patients consulted during a month.

A patient can register the system by entering the NIC Number, name, address and age. Patients can book doctors online or visit the Hospital to take appointments.
Dr. Kennedy is a registered General Practitioner in the XYZ Hospital while Prof. John is a consultant. Mr. Harry has taken an appointment to visit Prof. John through the system. Mrs. William was treated by Dr. Kennedy when she was admitted to hospital for a severe heart pain.

i) Identify the classes, objects, attributes and write them separately in the table shown below. (6 marks)

Classes	Attributes	Objects

ii) What is the Relationship among Doctor, General Practitioner and Consultant? 2 marks)

iii) Draw the relationship among the Doctor, General Practitioner and Consultant using UML notations. Write the attributes of each class according to the description given above. (5 marks)

d) Draw separate UML class diagrams to link the following classes. Use correct UML notations to show the relationship among classes. (You need not include attributes or methods in classes) (6 marks)

i) Laptop, Desktop_Computer, Display_Unit, Keyboard, DVD_Drive
ii) Invoice, Customer, Item, Supermarket, Grocery_Shop, Supplier
iii) Employee, Manager, Worker, Company, Department, Project

e) Consider the following class and answer the questions below.

Event
eventID : integer # Date : string - description : string - duration : integer - noOfParticipants : integer
+ Event(id : int, date : string, desc : string) + setDuration (due : int) : void +setParticipants (no : int) : void + print() : void

i) Write the coding for the class shown above. (4 marks)
ii) Implement the constructor of the Event class. (3 marks)
iii) Create a static object called **eve1** from the above class which stores the following details.

(2 marks)

eve1 : Event
EventID = 101 Date = 10Oct2019 Description = wedding

iv) Call the method "setDuration()" to set the duration for the above event as 5 hours.

(2 marks)

v) Create a dynamic object called **eve2** to store the following details. (2 marks)

eve2 : Event
EventID = 102 Date = 15Dec2019 Description = conference

vi) Cal the "SetParticipants()" methods for object **eve2** to set the number of participants to 300. (2 marks)

Question 02 **(20 marks)**

a) What is meant by CRC Cards ? (2 marks)

b) Read the description below and identify the nouns and the noun phrases in the description. Apply the rules that is used to eliminate the nouns and write the final set of nouns that can be used as classes. (8 marks)

A new cable TV company called SenseTV is providing over 100 entertainment TV channels to customers. Any person can become a customer by registering with SenseTV. The customer has to provide customer details and the package (channels he wishes to see) during the registration. The customer is provided with a unique customer number. The customer details are stored in the system. The package details selected by the customers are also recorded in the system. The system should be able to produce bills for each customer at the end of each month. The customer can login to SenseTV's website and perform several online tasks. The customer can add new channels to the subscription he has. He can remove channels from his subscription. In addition the customer can provide a list of channels that he wants to get a detailed weekly TV schedule by email. The customer can pay the monthly bill online using a credit card. He has to provide the credit card details and the amount to the system. The payment has to be validated through the payment gateway. The system should also produce a list of customers who have paid on time and the list of customers whose payments are due.

c) Write the CRC cards for the classes identified in part b. (10 marks)

Question 03 **(20 marks)**

Read the following description of a student enrollment system of NWS University and draw the UML class diagram. Clearly show the classes, relationships among the classes, and multiplicity using UML Notations.

The NWS University offers degrees for students. It consists of five faculties each of which consists of one or more departments. Each degree program is administrated by a single department. Each student is studying towards a single degree. Each degree program requires one to twenty courses. A student enrolls in one to five courses per term. A course can be either graduate or undergraduate course, but not both. Likewise, students are graduates or undergraduates, but not both.

Question 04 **(20 marks)**

Consider the following class diagram and write the coding for the classes shown in the diagram. (For aggregations and compositions implement the method/s that are needed to show the relationship in each class. For other relationships, you need not implement any method)