RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree
Second Year - Semester I Examination - April/May 2016

COM 2306 - VISUAL PROGRAMMING

Time Allowed: Two (02) hours.

INSTRUCTIONS TO CANDIDATES

- This paper contains five (05) questions on five (05) pages.
- **PART - A is Compulsory.**
- Answer **any three (03)** Questions from **PART - B**
- Mobile phones or any other communication devices are not permitted.

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PART – A

1.

a) Write a console application that reads two integer numbers from keyboard and prints how many integer numbers which can be divided by 5, exist between them. Example: in the range (14, 25) there are 3 such numbers: 15, 20 and 25.

(04 marks)

b) Write a console application to input a digit from 0 to 9 and print the input digit as a text. Use a switch statement. Example: if input is 1 then it should print **one** as the output.

(04 marks)

c) Write a console application that facilitate user to input a data type out of three choices namely int, double and string. If the variable is int or double, the program increases it by 1. If the input variable is string, the program appends "*" at the end. Finally print the results to the console. Use switch statement.

(05 marks)

d) Write a console application to read two arrays from the key board and check whether they are equal (two arrays are said to be equal if those arrays have equal length and keeping identical values in each index position).

(04 marks)

e) Write a console application to read a series of integers from the key board and print the smallest and largest of them.

(04 marks)

f) Write a method that prints the digits of a given decimal number in reversed order. For example 256, must be printed as 652.

(04 marks)

PART – B

1.

a) What is Microsoft Intermediate Language (MSIL)?

(03 marks)

b) List down four(04) properties of the .NET Framework?

(04 marks)

c) Explain how does an Integrated Development Environment(IDE) help programmers to develop their applications?

(04 marks)

d) What are the main four (04) functions that occur in Visual Studio IDE when compiling a program ?

(04 marks)

e) List four types of Applications that can be developed using Visual Studio IDE.

(04 marks)

f) What is event driven programming? Write four (04) different types of events that can be occurred in an application?

(03 marks)

g) Compare and Contrast Java and C sharp programming languages.

(03 marks)

2.

a) Write a class called student with 03 (three) data fields and declare several constructors, which have different lists of parameters. Data fields that are unknown have to be initialized to 0 or null.

(03 marks)

b) Write a class with two encapsulated fields. Initialize and access those declared fields using public **properties** in C sharp.

(05 marks)

c) What are static variables and methods? Add a static field for a class called Student to hold the number of created objects of this class.

(03 marks)

d) What are the main rules to be considered when implementing method overriding in C sharp?

(03 marks)

e) Explain the advantage of using Interfaces than using Abstract classes. Use a suitable example.

(04 marks)

f) Write an enumeration to represent the Days of Week.

(03 marks)

g) Write a class called "Rectangle" which draws the Rectangular shape using the instruction given below. Hint – Use method overloading and method implementation is not necessary.

I. using four coordinates of four points of the rectangle
II. using two coordinates of a diagonal of the rectangle

(04 marks)

3.

a) Explain the singleton design pattern using a suitable example.

(04 marks)

b) Assume there is a class called Duck and need to sort a set of Duck objects. If the Template design pattern is used, need to implement the following method to compare two Duck class objects. Assume two Duck objects can be compared by Weight of ducks.

(05 marks)

c) Explain how do you cope with thread safe when you work with Singleton design pattern.

(05 marks)

d) The iterator design pattern helps to encapsulate the traversing of different types of lists. In this algorithm, hasNext() and next() methods are playing a major role. Briefly explain the functionality of these two methods and implement them using a proper example.

(05 marks)

e) Explain the terms Polymorphism and Dynamic Binding using suitable examples.

(06 marks)

5.

- A bank holds different types of accounts for its customers: savings accounts, loan accounts and mortgage accounts. Customers can be individuals or companies. All accounts have a customer, account balance and interest rate (monthly based). Savings accounts allow depositing and withdrawing of money. Loan and mortgage accounts allow only depositing. All accounts can It is possible to calculate the interest of all these account types for a given period (in months). In general case, it is calculated as follows:

- interest = number_of_months * interest_rate.

- Individual loan accounts have no interest for the first 3 months and company loan accounts have no interest for the first 2 months. The Savings accounts of balance less than 1000 have no interest . Company mortgage accounts have50% interest rate for first 12 months and individual mortgage accounts have no interest for first 6 months.

1. Draw a simple class diagram identifying appropriate data fields and methods for above mentioned bank system. Clearly state the identified classes, interfaces, base classes and abstract actions. Clearly state the assumptions you make.

(08 marks)

2. Write C sharp program to represent above class diagram. Your program should have proper implementation of calculating interest. Hint – Properly follow the method overriding rules.

(08 marks)

3. Design a proper Graphical User Interface for above system.

(09 marks)