Dublin Business School
excellence through learning

ICT Skills Programme

Repeat 2015 EXAMINATIONS

Module Code: **B8IT052**

Module Description: **Object-Oriented Programming I**

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Date: Thursday, 16th April 2015
Time: 15:00 – 17:00

INSTRUCTIONS TO CANDIDATES:

Time allowed is 2 hours.

QUESTION 1 IS COMPULSORY (30 marks);
Answer any 2 other questions (35 marks each).

Question 1 – Compulsory – 30 Marks

a) Explain the following by providing appropriate examples for each of them.

  i. Constructor

  ii. Interface

  iii. Inheritance

  iv. Enum

(4 *5 = 20 marks)

b) What is Encapsulation? Explain the concept of Access Modifiers in C#.

(10 marks)

(Total: 30 marks)

Question 2 - 35 Marks

A local organization "ABC Inc." has requested a software company to develop an information system for them to keep records of their employees. As a part of the software team, you are required to write the following classes, interfaces etc. in C#.

a) Write an interface IPayable with one method header:

- decimal GetPaymentAmount()

(4 marks)

b) Write an abstract class "Employee" which implements the interface IPayable

- This class should have a three parameter constructor with firstName, lastName and PPS No.
- Write properties for these firstName, lastName and PPS No.
- Write an abstract method "GetPaymentAmount"

(5 marks)

c) Write a derived class "HourlyEmployee" with two properties Wage and Hours

- Also write constructor to initialise base class fields and the current class fields
- Write the method GetPaymentAmount

(7 marks)

d) Write another derived class CommisionEmployee with

- A parameterised constructor
- Two properties CommisionRate and GrossSales,
- A method GetPaymentAmount

(7 marks)

e) Write a test class to test by creating an object of each class and test these classes.

(6 marks)

f) Develop a UML class diagram to show the inheritance hierarchy.

(6 marks)

(Total: 35 marks)

Question 3 - 35 Marks

DBS Sports Society wishes to create a piece of software for all the field sports played in the college. You have been asked to provide a prototype of this software.

There are several types of field games played in DBS such as football, rugby and hurling, etc. All games share certain common attributes (Properties) as follows:

- Name of game (e.g. “football”)
- Number of players per team (e.g. 11)
- Description (e.g. “Kicking a ball with your foot to score a goal”)
- Pitch Dimension (e.g. 115 x 74)

Additionally all games have the following behaviours (Methods)

- HowToScore – describes how a score occurs in the game (e.g. “A goal is scored when the ball passes over the white line between the posts”)

a) Provide C# code for Pitch Dimensions which can store the length and width of a pitch and can calculate the area of the pitch.

(3 marks)

b) Provide C# code which defines an interface ISport based on the above description.

(7 marks)

c) Provide C# code for a class named Football which implements the ISport interface. Your implementation must contain at least two constructors.

(7 marks)

d) The class Football should implement the IComparable interface.

(6 marks)

e) The class Football should also overload the equality operators (== and !=). Two instances should be considered the equal if the name property and number of players property in one instance of Football contain the same values as another instance of Football.

(7 marks)

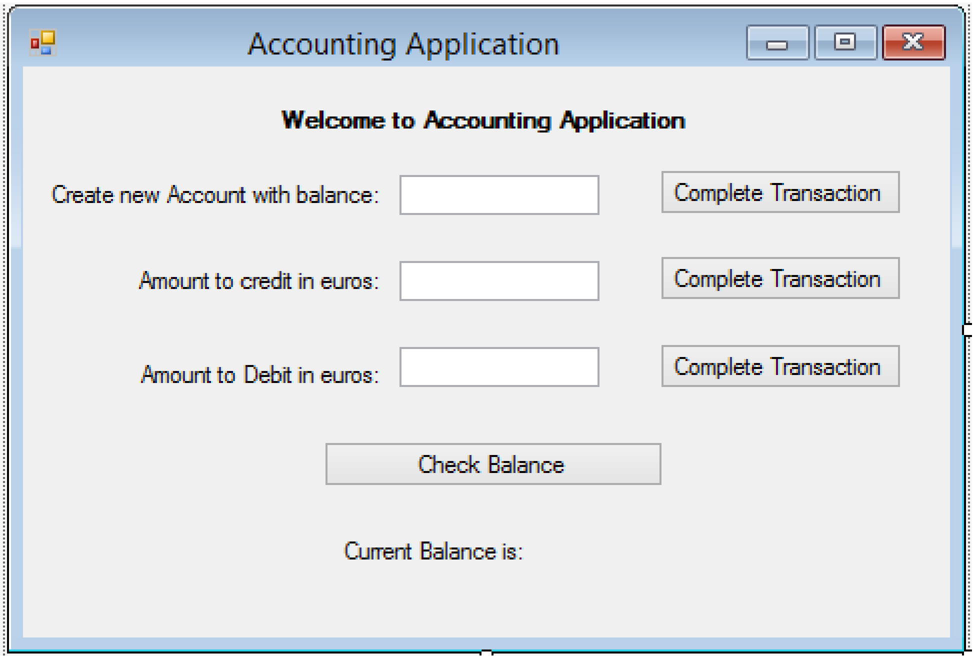
f) Provide test code which ensures your implementation is correct.

(5 marks)

(Total: 35 marks)

Question 4 - 35 Marks

You are required to develop a C# Windows Application for an Accounting firm. To complete the transactions, a form is required as given below:


Accounting Application
Welcome to Accounting Application
Create new Account with balance:
Complete Transaction
Amount to credit in euros:
Complete Transaction
Amount to Debit in euros:
Complete Transaction
Check Balance
Current Balance is:

(8 marks)

To develop this accounting application, you have to perform the following task:

a) Write an Account class in C# with the following specification:

- Balance (property)
- A parameter less and a parameterised constructor
- A method to credit the Account by the given amount.
- A method to debit the Account by the given amount
- An exception should be thrown and handled if a negative amount is entered.

(15 marks)

b) When the user clicks on the any “Show Transaction” button, an appropriate message should be displayed.

(9 marks)

c) When the user clicks on the “Check Balance” button, the balance should be displayed.

(3 marks)

(Total: 35 marks)