**Dublin
Business
School**

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HETAC

ICT

OCTOBER 2012 EXAMINATIONS

Module Code: **ICT1719**

Module Description: **Object Oriented Programming 2**

Examiner: **Kevin Coady**

Internal Moderator: **Paul Kelly**

External Examiner: **Prof. John Rees**

Date: *Friday 19 October 2012*
Time: *10:00 – 12:00*

INSTRUCTIONS TO CANDIDATES:

Time allowed is 2 hours.

QUESTION 1 IS COMPULSORY

Answer any 2 other questions.

Question 1 – Compulsory – 50 Marks

You have been asked to develop a Customer Management System for a local Dublin business. When the application is ran a list of Customers must be displayed to the user in a grid format. The software must allow users to enter details relating to a new Customer in addition to updating existing customers and removing a customer from the system.

A sample of the data relating to a Customer can be found in the table below:

First Name	Surname	Phone Number	City	Country	Account Manager
Joe	Smith	01 1231231	Dublin	Ireland	Mike Murphy
Mary	Jones	091 554433	Galway	Ireland	Pat Kenny
John	Doe	00 44 88776655	London	United Kingdom	Jeremy Clarkson

The application must be developed using C#, Windows Forms, SQL Server and ADO.Net. It is not a requirement to build a business or data layer for this solution.

You are required to provide the following source code:
- I. SQL for all database objects
  - a) SQL Tables **(3Marks)**
  - b) SQL Stored Procedures **(7 Marks)**
- II. Design and layout of your Windows Form.
  - a) Use of buttons or menu items to add, edit and delete a customer and their related screens **(10 Marks)**
  - b) Use of a DataGridView control to display customer details to the user. The following columns must be shown in the grid **(5 Marks)**:
    - i. Customer First Name
    - ii. Customer Surname
    - iii. Account Manager
  - c) A means to update the DataGridView when a customer is either added, removed or updated. **(5 Marks)**
- III. The connection string used to connect to the database must be stored in an App.config file. **(5 Marks)**
- IV. You are required to make use of ADO.Net objects (**10 Marks**)
- V. Coding standards must be adhered to as well as effective exception handling. **(5 Marks)**

(50 marks)

Question 2 - 25 Marks

A local Music Store has asked you to provide an Album Lookup System. The following is a sample of the data used for an album:

Band Name	Album Name	Number of Songs	Play Length (Minutes)	Release Year
U2	Achtung Baby	12	55	1991
Bruce Springsteen	Born in the U.S.A.	12	47	1984
The Beatles	"White Album"	30	94	1968

You are required to provide the following:

NOTE you are NOT required to use ADO.Net or store any data in a SQL Database. You can simply hard code sample Albums in your C# code

    I.   Provide an object which represents an Album entity. **(3 Marks)**
   II.   A Windows form containing a DataGridView which displays a list of albums. **(5 Marks)**
  III.   Create a LINQ query which allows the user to search the list of albums for an album title or artist. **(7 Marks)**
  IV.   Using the LINQ query you created in part III above, you should provide a textbox on the UI to allow the user to type in the search query. As the user types text into the textbox the data in the DataGridView must be updated if any albums match the query. **(5 Marks)**
   V.   Create a button on the UI which when clicked display a message box displaying the total length of time for all albums in the store. You must use a LINQ query to calculate this. **(5 Marks)**

(25 marks)

Question 3 - 25 Marks

Create a Windows Form application which deserialise the XML below into a C# object and then verifies if the data is valid based on the requirements below:

```xml
<?xml version="1.0" encoding="utf-8"?>
<Person>
  <FirstName>Mary</FirstName>
  <Surname>Smith</Surname>
  <MobileNumber>123</MobileNumber>
</Person>
```

    I.   Create a UI which allows the user to select an XML file from the file system using the OpenFileDialog Control. Your UI should also provide an area to display a First Name, Surname and Mobile Number. **(7 Marks)**

   II.   Using the XML structure above, create C# code to deserialise the document. The data should be displayed in the UI. **(8 marks)**

 III.   Using the following requirements write C# code which determines if the data stored in the XML is valid. All validation rules should be stored in an App.config file. The validation should be performed after deserialising the XML. The user should be informed if the document is valid or not.

Property	Validation Rule	Marks
First Name	Must be at least one character in length	**(2 Marks)**
Surname	Must be at least three characters in length	**(2 Marks)**
Mobile Number	Must conform to the following pattern nnn-nnnnnnn where -1<n<10. You must use the regular expression ^\d{3}-\d{7}$	**(6 Marks)**

(25 marks)

Question 4 – 25 Marks

I.   Write a note on TWO of the following topics in relation to Threads: **(10 Marks)**

    a.   Thread-safe and locking

    b.   Deadlocks

    c.   Semaphores

II.   Create a windows form which iterates through an array of strings and displays each string in a text box for 5 seconds. After the 5 seconds have elapsed the next element in the array should be displayed for another 5 seconds, until all the elements in the array have been displayed to the user.

    a.   You should use a textbox, progress bar and background worker control as part of your design. **(3 Marks)**

    b.   When the application loads it should create a thread to process each string entry in the string array. The thread should pause for 5 seconds after each element of the array has been assigned to the text property of the textbox. **(7 marks)**

    c.   You should update a progress bar to indicate what percentage of the array has been processed at any given time **(5 marks)**

(25 marks)