



QQI

Higher Diploma in Science and Computing

SEPTEMBER 2014 EXAMINATIONS

Module Code: **B8IT057**

Module Description: **Object Oriented Programming 2**

Examiner: **Damien Kettle**

Internal Moderator: **Shazia Afzal**

External Examiner: **Pat Donnelly**

Date: **Wednesday 1 October 2014**

Time: **09.30 – 11.30**

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 Student Management System for DBS. When the application is ran a list of Students must be displayed to the user in a grid format. The software must allow users to enter details relating to a new Student in addition to updating existing students and removing a student from the system.

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

<u>First Name</u>	<u>Surname</u>	<u>Student Number</u>	<u>County</u>	<u>Country</u>	<u>Course</u>
Joe	Smith	1712345	Dublin	Ireland	Software Development
Mary	Jones	1712346	Galway	Ireland	Arts
John	Doe	1712347	Donegal	Ireland	Business

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 student and their related screens **(10 Marks)**
 - b) Use of a DataGridView control to display student details to the user. The following columns must be shown in the grid **(5 Marks)**:
 - i. Student First Name
 - ii. Student Surname
 - iii. Student Id
 - iv. Course
 - c) A means to update the DataGridView when a student 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 Book Store has asked you to provide a Book Lookup System. The following is a sample of the data used for a book:

<u>Book</u>	<u>Author</u>	<u>ISBN</u>	<u>Price</u>	<u>Release Year</u>
Understanding C#	Bill Gates	12345	19.99	2001
Your guide to exams	John Murphy	43232	22.50	2011
To win just once	Willie Joe Padden	43234	15.60	2007

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 Books in your C# code

- I. Provide an object which represents a Book entity. **(3 Marks)**
- II. A Windows form containing a DataGridView which displays a list of books. **(5 Marks)**
- III. Create a LINQ query which allows the user to search the list of books for a book title or author. **(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 books match the query. **(5 Marks)**
- V. Create a button on the UI which when clicked display a message box displaying the total cost for all books 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 serialises an Employee C# object. The form must allow the user to enter the following employee details:

- i. First Name
- ii. Surname
- iii. Employee Id
- iv. PPS Number

- I. Create a UI which allows the user to display the details listed above. **(5 Marks)**
- II. Using the following requirements write C# code which determines if the data entered by the user is valid. All validation rules should be stored in an App.config file. The validation should be performed before serialising the C# object to XML. The user should be informed if the data is invalid.

<u>Property</u>	<u>Validation Rule</u>	<u>Marks</u>
First Name	Must be at least one character in length	(2 Marks)
Surname	Must be at least three characters in length	(2 Marks)
Employee Number	Must conform to the following pattern EMPnnnnn where $-1 < n < 10$. You must use the regular expression <code>^EMP\d{5}</code>	(4 Marks)
PPS Number	Must conform to the following pattern nnnnnnnA where $-1 < n < 10$ and A is any uppercase letter between A and Z. You must use the regular expression <code>^\d{7}[A-Z]\$</code>	(4 Marks)

- III. If the data entered by the user is valid, display a SaveFileDialog to allow the user to select a location to store and name the serialised object. **(8 Marks)**

(25 marks)

Question 4 – 25 Marks

Create a windows form which iterates through a string array of music bands playing at a festival and displays each string in a text box for 15 seconds. After the 15 seconds have elapsed the next band in the array should be displayed for another 15 seconds, until all the bands 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 15 seconds after each element of the array has been assigned to the text property of the textbox. **(7 marks)**
- c. You should update the progress bar to indicate what percentage of the array has been processed at any given time **(5 marks)**

(25 marks)