

*Ollscoil na hÉireann, Gaillimh*  
*National University of Ireland, Galway*

GX 1511

Semester II Examinations, 2003/2004

Exam Code(s)	<u>2BA1</u>
Exam(s)	<u>BA1 B.A. Degree</u>
Module Code(s)	<u>CT243</u>
Module(s)	<u>Programming – Data Structures</u>
Paper No.	<u>1</u>
Repeat Paper	<u>Special Paper</u>
External Examiner(s)	<u>Professor D. Bell</u>
Internal Examiner(s)	<u>Professor G. Lyons</u>
	<u>Dr. M. Mc Gettrick</u>

**Instructions**

Answer 4 questions.  
All questions will be marked equally.

Duration	<u>2hrs</u>
No. of Answer Books	<u>1</u>

**Requirements**

Handout	<u></u>
MCQ	<u></u>
Statistical Tables	<u></u>
Graph Paper	<u></u>
Log Graph Paper	<u></u>
Other Material	<u></u>

No. of Pages	<u>3</u>
Department(s)	<u></u>

1. (a) Using a Sub procedure

```
Public Sub BubbleSort(List() As Integer, n as Integer)
```

or otherwise, write Visual Basic code to perform bubble sort on an array List() of n numbers.

- (b) Describe separately the Bubble Sort and Merge Sort of the word "GDANSK" by showing, step by step, the position of each letter in the word as it is sorted.

2. (a) Suppose we use the scale method to set up a picture box 20 units by 20 units, picBOX.scale (0,20) - (20,0), and we have defined the constant PI using const PI = 3.14159 Draw (approximately) the graphical output produced by each of the following (draw each item separately):

- (i) picBOX.circle (10,10), 5, RGB(255,0,0), 4\*PI/3, PI/2
- (ii) picBOX.circle (10,10), 5, RGB(0,255,0), -5\*PI/3, 0
- (iii) picBOX.circle (10,10), 5, RGB(0,0,255), -PI/2, -PI/3
- (iv) picBOX.circle (10,10), 5, RGB(255,255,255), , , 3
- (v) picBOX.line (5,5) - (20,10), RGB(0,0,0), BF
- (vi) picBOX.line (10,5) - (15,20), RGB(100,100,100), BF

State the color of each of the objects.

- (b) Write the generic code for a Sub Procedure

```
Public Sub PieChart(A() As Integer, n as Integer)
```

which draws a Pie Chart for the n percentages A(1), A(2), A(3), ... A(n) in a picture box picBOX. Ensure in your code that neighboring sections in the Pie Chart are either shaded or colored in differently.

3. Assume the text file rain.txt contains monthly rainfall values (in millimeters) for Galway City over the past ten years. Each line contains 12 integers (one for each month), with the first line representing 2003, the second 2002, etc., back to 1994. Write a Visual Basic program to display as a line chart the monthly rainfall for a given year. In your initial form you should have

- A text box (with a suitable label) where the year can be typed in (if a year outside the range is entered a suitable error message should be presented).
- A control button to display a line chart for the year entered.

Write the procedure for displaying the chart, including appropriately labelled x- and y- axes and state the objects used in your form and their property settings. Assume that all of the rainfall values are less than 400 millimeters.

4. Describe each of the following. In each case give a short example (code fragment) showing the use of the control or function in question.

- (a) The Horizontal Scroll Bar Control.
- (b) The Trim family of functions (`trim`, `rtrim`, `ltrim`).
- (c) The Common Dialog Control.
- (d) The Menu Control.
- (e) The `LOF()` function.
- (f) The Image Control.

5. (a) Describe four main properties of the Data Control in Visual Basic.

- (b) Suppose we have created a database `megacity.mdb` which has a single table called `cities` with four fields: City, Country, Population in millions (of the City), and a boolean (true/false) value indicating whether or not the city is a capital city. A sample of entries in the table follows.

City	Country	Population	Capital
Roma	Italia	3.8	True
Sevilla	España	1.2	False
Hamburg	Deutschland	0.8	False
Den Haag	Nederland	0.4	True

Using the Data Control, develop a Visual Basic program that allows the user to read the values in the table. Allow the user to search the table for cities with population greater than a given value (which the user can enter in a text box). If there are any matches to the search, output the corresponding city name to the text box, and change the label on the command button to "Next", so the user can click on this to find all the matches.

6. (a) Explain the distinction between data validation and errors in visual basic.

- (b) In OLE (Object Linking and Embedding), explain the distinction between object linking and object embedding.
- (c) Using run-time OLE, design a program in VB to carry out the following. The main form should have two text boxes and a command button. The first text box `txtFILE` accepts the name of a Word document (file ending in `.doc`) which may or may not exist. The second text box `txtSTRING` accepts text which is to be added at the beginning of the document. When the user clicks on the command button, if the file already exists the text is inserted at the beginning, if not, the file is created, and then the text inserted. Name all objects you use and state their relevant property settings.