

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

GX 1472

Semester 1 Examinations, 2003/2004
Front Page Template

Exam Code(s)	2BA1 Information Technology
Exam(s)	Second University Examination in Arts
Module Code(s)	CT240
Module(s)	Programming : Algorithms
Paper No.	
Repeat Paper	<input type="checkbox"/> No <input type="checkbox"/> Special Paper
External Examiner(s)	Professor D. Bell
Internal Examiner(s)	Professor G. Lyons Dr. S. Flynn

Instructions:

Candidates should attempt question one and any two other questions.

All questions carry equal marks.

Duration	Two hours
No. of Answer books	1

Requirements:

Handout	
MCQ	
Statistical Tables	
Graph Paper	
Log Graph Paper	
Other Material	

No. of Pages	4	Excluding Cover Page
Department(s)	Information Technology	

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NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER 1 EXAMINATIONS 2003/2004

Second University Examination in Arts

PROGRAMMING : ALGORITHMS (CT240)

Professor D. Bell;
Professor G. Lyons;
Dr S. Flynn.

Time allowed: **Two hours.**

Candidates should attempt question one and any two other questions.
All questions carry equal marks.

1. (a) Suggest a suitable setting for the Name property of the following controls on a Visual Basic form: (8)
- (i) A command button used to quit an application.
 - (ii) A text box used to input the name of a customer.
 - (iii) A picture box used to display the logo of a company.
 - (iv) A label used to prompt for input of a person's age.
- (b) In the following Visual Basic code, identify the errors and rewrite the code to perform the intended task. (10)

```
Dim age As Integer, message As String
age = InputBox("Please enter your age") Select Case age
    Case age >= 18
        message = "collect your polling card"
    Case Is 17
        message = "you can vote next year"
    Case Is < 17
        message = "sorry you are too young to vote"
picOut.Cls
picOut.Print "You are "; age; message
```

- (c) Employees in a certain workplace are paid "time-and-a-half" for work in excess of 40 hours in a week. For example, if a person's hourly wage is 8 euro, and she works

60 hours in a given week, her gross pay for that week should be:

$$(40 \times 8) + (1.5 \times 8 \times (60 - 40)) = 560 \text{ euro}$$

Write some VB code to read the number of hours worked in a week and the hourly wage from textboxes `txthours` and `txtwage`, and displays the gross pay in a picture box `picGrossPay`. (12)

2. (a) Distinguish between sub procedures and function procedures in Visual Basic. Give one example of each and show how it could be used. (8)
- (b) In the following, determine the output displayed in the picture box when the command button is clicked. (10)

```
Private Sub cmdDisplay_Click()  
    Dim amt1 As Integer, amt2 As Integer  
    amt1 = 1  
    amt2 = 2  
    picOutput.Print amt1; amt2  
    Call Swap(amt1, amt2)  
    picOutput.Print amt1; amt2  
End Sub
```

```
Private Sub Swap(num1 As Integer, ByVal num2 As Integer)  
    Dim temp As Integer  
    temp = num1  
    num1 = num2  
    num2 = temp  
    picOutput.Print num1; num2  
End Sub
```

- (c) The body mass index (BMI) is used to determine ideal weights. BMI is calculated as 703 times the weight in pounds, divided by the square of the height in inches, and then rounded to the nearest whole number. For example, a person with a height of 62 inches weighing 114 pounds will have BMI:

$$\text{Round}((114 \times 703)/62^2) = 21$$

Develop some Visual Basic code that takes a person's weight and height as inputs in text boxes `txtweight` and `txtheight`, and displays the person's body mass index in the picture box `picbmi`. Your code should make good use of general procedures. (12)

3. (a) Write a note on the EOF function in Visual Basic. Show how it can be used in an EOF-controlled loop. (8)
- (b) Consider the following Visual Basic code. What is wrong with this loop? How would you correct it? (10)

```
Private Sub cmdCompute_Click()
    Dim sum As Single, score As Single
    'Find the sum of a collection of scores
    sum = 0
    Open "SCORES.TXT" For Input As #1
    Input #1, score
    Do While Not EOF(1)
        sum = sum + score
        Input #1, score
    Loop
    Close #1
    picTotal.Print sum
End Sub
```

- (c) The text file COFFEE.TXT contains a list of coffee menu options and their prices (e.g. "cappuccino", 1.95). Write some Visual Basic code to open the file and search for a coffee option specified by the user in the text box txtCoffee. The corresponding price should be displayed in the picture box picPrice. (12)

4. (a) Give Visual Basic variable declarations for the following arrays: (8)
- (i) an array of twenty elements to store the prices of sports items
 - (ii) an array of one hundred elements to store the names of a group of students
 - (iii) an array to store the names of the winners of the best film Oscar for the years 1980 to 2002
- (b) Assume element 0 of the lblID control array was created during design time. Identify the error in the following code, explaining clearly the reasons for your answer: (8)

```
Private Sub Form_Load()
    Dim i As Integer
    For i = 0 To 5
        Load lblID(i)
        lblID(i).Caption = Str(1995 + i)
        lblID(i).Top = lblID(i - 1).Top + lblID(i - 1).Height
        lblID(i).Visible = True
    Next i
End Sub
```

- (c) A restaurant takes bookings for the timeslots 6pm, 7pm, 8pm, 9pm and 10pm. Only 50 guests can be served in each timeslot. Using an array `timeslots()` to hold details for each time, develop a piece of code in Visual Basic that reads a time and number of guests from text boxes `txttime` and `txtguests`, and checks if the required number of guests can be accommodated at that time. If they can, update the array appropriately, otherwise suggest another suitable time as close as possible to that requested. Give declarations for any variables that you use, and state any assumptions you make. (14)
5. (a) Place parentheses (brackets) in the following condition to show how it would be evaluated in Visual Basic:
- $$a = b \text{ Or Not } b < a \text{ And } a < b \text{ Or } b = a + 1$$
- Given that $a = 2$ and $b = 3$, determine whether the condition is true or false. (8)
- (b) In the following Visual Basic code, identify and correct the errors.
- ```
Private Sub cmdAverage_Click()
 Dim x As Integer, y As Integer, z As Integer

 x = Val(txtx.Text)
 y = Val(tyty.Text)
 z = Val(txtz.Text)
 picResult.Print "Average is "; x + y + z / 3
End Sub
```
- For each error you found, was it a syntax, run-time or logic error? Explain. (10)
- (c) Thirty scores, each lying between 0 and 49, are given in a data file `DATA.TXT`. Write some Visual Basic code that opens the file, and uses the data to create an array `frequency()` such that: (12)
- ```
frequency(1) = number of scores < 10
frequency(2) = number of scores such that 10 <= score < 20
frequency(3) = number of scores such that 20 <= score < 30
frequency(4) = number of scores such that 30 <= score < 40
frequency(5) = number of scores such that 40 <= score < 50
```