

OLLSCOIL NA hÉIREANN
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER II EXAMINATIONS 2001/2002

THIRD YEAR COMMERCE EXAMINATION
FOURTH YEAR COMMERCE (WITH LANGUAGE) EXAMINATION
(MS311) PROGRAM DESIGN AND DEVELOPMENT

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Time Allowed: **TWO** hours

Answer **QUESTION 1** from Section A
AND
TWO other questions from Section B.

Question 1 carries 40 marks, all other questions carry 30 marks.
You should spend no longer than 50 minutes on Q1.

All Visual Basic code referred to in the questions below is based on the Hungarian naming convention.

SECTION A

Q1.

A new bank wishes to install an Automated Teller Machine (ATM) outside its premises in an Irish city. The (English language only) ATM will be directly connected to the bank's customers' account data. The ATM will allow customers to enter their 4-digit Personal Identification Number (PIN), and then to view their own account balance and/or withdraw cash. The ATM cannot dispense €5 notes, so withdrawals such as €35 or €15 are not possible. The ATM deals only in the Euro currency. The ATM customer will have the facility to print the customer's own account balance on a paper slip dispensed by the ATM, whether the customer has made a withdrawal or not. The bank has asked you to design and develop the software for the customer interactions with the ATM.

Sketch the user interface for this software, indicating and naming all the controls.

Write all the code necessary for this software.

(40 marks)

SECTION B

Q2.

(a) Write **PSEUDOCODE** for the **following** scenario, in order to calculate the overall total sale price for a basket of items (**DO NOT** write actual code):

During a sale, a customer may purchase items in a shop that sells only three types of item: type A, type B, and type C. Type A carries a discount of 10%, type B carries a discount of 15%, and type C carries a discount of 25%. When a customer brings their basket of items to the till, each item's barcode is scanned into the till and discounts are calculated. The total price payable by the customer is displayed on the till's screen, and the customer is issued with a printed receipt showing the pre-sale total price, the total discounted amount, and the total price payable.

(10 marks)

(b) The form below shows a program at run-time that converts a currency amount from Euro to Irish Pounds (Punt) and vice versa. The form contains two text boxes named txtEuro and txtPunt, two labels, a single graphic, and some buttons. When the user clicks the cmdConvert button, any currency amount already entered by the user into either of the text boxes will be converted into the other currency and displayed in the corresponding text box.

Write a private sub procedure in Visual Basic to properly manage the currency conversion when the user clicks the 'Convert' button. (€1 = £0.787564). Ensure that all logical and error checks are performed within this sub procedure for such a conversion.

(20 marks)

Q3.

Describe in detail **THREE** of the following issues with respect to Visual Basic, and where appropriate give **examples in code** of how they are used:

- (a) Scope and Lifetime of variables
- (b) Event-Driven Programming in Visual Basic
- (c) Object Encapsulation in Visual Basic
- (d) Reusability vs. Inheritance in Visual Basic

(30 marks)

Q4.

(a) Give a *full* explanation of what each of the following separate pieces of code is doing, by describing the purpose of individual components within all line(s) of that piece of code.

- (i) Private Function curInterestEarned(ByVal curPrincipal As Currency, _
sngRate As Single, intYears as Integer) As Currency
- (ii) lblPrice.Caption = FormatCurrency(Val(txtPrice.text), 2)
- (iii) strTitle = "December Intake: " & intTotalIntake & vbCrLf & _
"Average Monthly Intake: " & strAverageSale
- (iv) lblMessage.ForeColor = dlgColor.Color

(20 marks)

(b) The code below contains 4 separate errors, and is only partially commented. Rewrite a **fully commented error-free** version of this code in your answer book. (*Your code comments should fully inform a reader of what is happening in the code*).

```
Private Sub mnuFileSummary_Click()  
    'Calculate the total pay, total commission, total sales  
  
    Dim strMessage                As String  
    Dim strTotalSales             As String  
    Dim strTotalCommission        As String  
    Dim strTotalPay               As String  
  
    If mcurTotalPay > 0  
        strTotalSales == FormatCurrency(mcurTotalSales)  
        strTotalCommission = FormatCurrency(mcurTotalCommission)  
        strTotalPay = FormatCurrency(mcurTotalPay)  
        strMessage = "Total Sales: " & strTotalSales & vbCrLf & _  
            "Total Commissions: " & strTotalCommission & vbCrLf & _  
            "Total Pay: " & strTotalPay  
        MsgBox "strMessage", vbOKOnly, "Summary"  
    Else  
        MsgBox "No data to summarise"  
    End Sub
```

(10 marks)

Q5.

(a) **StrReverse(*StringExpression*)** is a function in Visual Basic that takes a string argument and returns that string with the characters reversed.

Use the StrReverse function to write your own function or procedure in Visual Basic that determines if a string entered by a user is a palindrome (A palindrome is a word or phrase the letters of which, when taken in reverse order, give the same word or phrase, for example, "NAVAN", or "deed").

(10 marks)

(b) Write an Open statement in Visual Basic that opens the sequential file CUSTOMER_DETAILS.TXT on the C drive as file number 2 for input.

Describe the actions that occur when CUSTOMER_DETAILS.TXT is closed later in the code.

(10 marks)

(c) A program in Visual Basic asks a user to input a whole number (**n**) between 0 and 10. Write a **FOR** loop that sums the cumulative added total of the positive whole numbers up to and excluding n. (For example, if the user enters '4', the FOR loop will calculate the value of 1+2+3 only).

(10 marks)