

**OLLSCOIL NA hÉIREANN
NATIONAL UNIVERSITY OF IRELAND, GALWAY**

AUTUMN 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. *Three political candidates intend to run in a certain constituency in an Irish election. On election day electronic voting will be used. To vote, each constituent enters a solitary voting booth where the electronic system's screen interface is displayed on a 17" touchscreen monitor. This screen display includes a picture of each candidate together with their political party affiliation. User input is by touchscreen only. Each constituent can vote for some or all of the three candidates by allocating their 1 (first preference), 2 (second preference), or 3 (last preference) choices only. When a constituent allocates a voting preference to a candidate, the constituent must be able to change their mind if they so wish. Once a constituent has allocated preferences to some or all of the candidates, the constituent presses a button on screen to cast their vote. The constituent then leaves the voting booth, so that the booth may be used by the next constituent.*

You are required to design a potential user interface for this voting system, indicating and naming all the controls.

You are also required to write the code necessary to handle the **user interaction components** of your design. You may mimic touchscreen input with mouse-click activation(s).

(40 marks)

SECTION B

Q2.

(a) Write **PSEUDOCODE** for the **following** scenario, so as to allow the shop's information system to "*accurately calculate the overall price of a number of book(s) brought to the bookshop's till by a customer intending to purchase them*" (**DO NOT** write actual code).

Background information:

A bookshop (open 9am to 5pm Monday to Saturday) uses an information system that allows the shop to offer the following services to its customers when books are brought to the till for purchase:

- 1) On any given weekday, the 100th customer receives a 40% discount, and all other discounts do not apply
- 2) On Monday, Tuesday, and Wednesday mornings between 9am and 11am all books are discounted by 10%
- 3) In addition to any other discounts that may apply, where a customer buys more than 5 books in a given transaction, a further 10% discount is applied to the total payable amount

(10 marks)

(b) When loaded, a program written in Visual Basic generates a random whole number between 1 and 100 inclusive, and then displays a message on screen prompting a user to guess that number. The program tracks the number of guesses until the user guesses the number correctly (unless the user quits the program), and then displays the total number of guesses taken. After each guess the program informs the user if the guess is too low, too high, or correct.

Presuming that the system has already generated the random number, write a **sub-procedure** in Visual Basic that handles the logic and feedback to the user, until the number is guessed correctly.

(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) Code reuse in Visual Basic
- (b) Datafile management in Visual Basic
- (c) Scope and Lifetime of variables
- (d) Procedural vs Event-Driven aspects to 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 intAge(ByVal dtmCurrentDate As Date, _
dtmBirthDate As Date) As Integer

(ii) lblDiscount.Caption = (FormatCurrency(Val(txtPrice.text), 2)) * .15

(iii) Printer.Print Tab(10); strFirstName; " "; strLastName; _
Tab(30 - Len(strFormattedPhoneNumber)); strFormattedPhoneNumber

(iv) cboCustomers.RemoveItem cboCustomers.ListIndex

(16 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 cmdFind_Click()

Dim blnItemFound As Boolean
Dim intItemIndex As Integer

blnItemFound = False
intItemIndex = 0

'lstItems is a list box containing a list of items

Do Until blnItemFound Or intItemIndex == lstItems.ListCount
 If txtNewItem = lstItems.List(intItemIndex)
 blnItemFound = True
 End If
 intItemIndex + 1 = intItemIndex
Loop

If blnItemFound Then
 MsgBox "Item is in the list", vbInformation, "Match found"
Else
 MsgBox "Item is not is the list", vbInformation "No match found"
End If

'Reset the txtNewItem textbox
txtNewItem.Text = ""

End Sub

(14 marks)

Q5.

(a) A travelling sales representative receives 40c per mile for the first 300 miles she travels, and 50c for any remaining miles travelled. Write a public function in Visual Basic to calculate the monetary amount due to the sales representative, using the number of miles travelled as argument. *(The function should return a properly formatted monetary amount in Euro and cent correct to two decimal places, for example, € 27.79).*

(10 marks)

(b) Write a private function in Visual Basic that takes a distance in kilometres as argument, and returns the equivalent distance in miles.
(8 kilometers = 5 miles)

(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)