

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

SUMMER EXAMINATIONS 2004/2005

**FIRST YEAR BSc. IN BUSINESS INFORMATION SYSTEMS
EXAMINATION**

(ms106) BUSINESS COMPUTER PROGRAMMING 1

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Time Allowed: **THREE** hours

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

Question 1 carries 34 marks, all other questions carry 22 marks.
You should spend no longer than 1 hour on question 1.

SECTION A

Q1.

A ticket station sells tickets for 'bus', 'train', or 'boat' trips around a large zoo. Trip prices vary depending on the age of the customer (as children receive a 50% reduction on the standard adult price), and also depend upon the chosen travel method (bus, train, or boat). The station management requires a software program to track the number and type of tickets (that is, bus, train, or boat) sold at the end of each working day, as well as the associated monies taken in at the ticket station on a daily basis. The software program will be installed on the solitary ticket seller's computerised till at the ticket station. For each transaction the system produces a customer's printed receipt for the ticket(s) bought, showing the total overall price of the ticket(s), the number of ticket(s) bought (for example, a person bringing their family on a trip may buy 2 adult and 3 child tickets in a single transaction), and the total price spent in that transaction. The ticket seller's screen display should also show this information.

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

Write the source code necessary for the functioning of your user interface design.

(34 marks)

SECTION B

Q2.

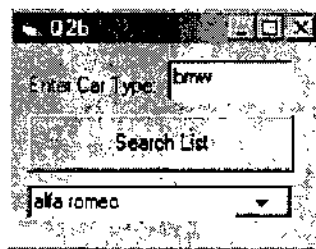
(a) Write **pseudocode** for the following scenario (do NOT write actual code):

A program is required to read four single-digit numbers, validate that each number is single-digit, then add them together, print and display their total, as well as calculating and displaying their average and displaying the smallest number entered.

(8 marks)

(b) The form below shows a Visual Basic program at run-time. The form contains a text box, a command button, and a combo box containing various types (brands) of car. The program allows the user to enter a particular type of car into the text box: when the user clicks the 'Search List' button, the program searches the combo box for that entry. If the entry is present in the combo box's list, the program informs the user of its presence in the list; if the entry is not present the program informs the user of its absence.

Write a sub procedure in Visual Basic to properly manage the behaviour of the 'Search List' button.



(7 marks)

(c) Write an If statement (in Visual Basic or C) to display the *Conclusion* corresponding to the value of yearly Euro *Profits* as given in the following table. Assume that the value of *Profits* is a number rounded to 1 decimal place.

Profits (million)	Conclusion
≥ 10	Exceptional performance
7 – 9.9	Really good performance
3 – 6.9	Average performance
< 3	Relatively poor performance

(7 marks)

Q3.

(a) Give a *full* explanation of what each of the following separate pieces of code is doing. Include a *complete* description of all line(s) of each piece of code.

- (i) Private Sub mnuHelpAbout_Click()
 MsgBox "Tax Calculation Program" & vbCrLf _
 & "v 1.0", vbOKOnly, "About Tax Calculations"
End Sub
- (ii) # include <ctype.h>
- (iii) lblPrice = FormatCurrency(curPrice, 2)
- (iv) Private Function intAge(ByVal dtmCurrentDate As Date, _
 dtmBirthDate As Date) As Integer
- (v) lstSalaries.AddItem txtSalaries

(10 marks)

(b) The Visual Basic 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 binItemFound       As Boolean  
    Dim intItemIndex       As Integer  
  
    binItemFound = False  
    intItemIndex = 0  
  
    'lstItems is a list box containing a list of items  
  
    Do Until binItemFound Or intItemIndex == lstItems.ListCount  
        If txtNewItem = lstItems.List(intItemIndex)  
            binItemFound = True  
        End If  
        intItemIndex + 1 = intItemIndex  
    Loop  
  
    If binItemFound 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
```

(12 marks)

Q4.

Describe in detail **each** of the following terms, and give *examples* of how they are used (separately in each case with respect to **one** of the following: Visual Basic, C, or Delphi's Object Pascal):

- (a) While loops (b) Datafile management (c) Variable scope

(22 marks)

Q5.

(a) Create a Visual Basic, C, or Delphi program that asks a user to enter a positive integer, and informs the user whether the sum of all that number's digits is even or odd. For example, if the user enters 3241, the program would inform the user that the digit total is odd (as the digits 3+2+4+1 add to 10). The program should not inform the user of the actual digit total (in the above example, the program should not display the number 10).

Note: This program doesn't determine if the number entered by the user is even or odd, only whether the total of that number's digits is even or odd.

(14 marks)

(b) As expenses, a travelling sales representative receives 40c per mile for the first 300 miles she travels, and 50c for any remaining miles travelled. Using a programming language of your choice write a function to calculate the monetary amount due to the sales representative, using the number of miles travelled as argument. *(The function should return a value correct to two decimal places, for example, 35.78).*

(8 marks)

Q6.

(a) Create a C program that asks the user to input a salary amount in euro and cent (for example 419.27, rather than €419.27), then calculates and displays the tax due, and the net amount remaining after tax is deducted. Tax is calculated at the following rates: No tax is due on the first € 100; 20% is due on the next € 250, and 42% is due on subsequent amounts.

The output may resemble:

Enter salary please: 640.60
Total Tax due: 172.05
Remaining Amount: 468.55

(10 marks)

(b) In Accountancy the 'Debtors Payment Period' represents the average number of days taken by debtors (credit customers) to pay monies owed to a company. This payment period is represented by the formula:

$$\text{Debtors Payment Period} = \left(\frac{d}{c}\right)365$$

where d = Debtors, and c = Credit Sales. So for example, with a total Debtors amount of € 10,000 and a Credit Sales figure of € 100,000, the debtors payment period would be 36.5 days.

Create a program, which prompts the user to enter the total Debtors amount and the total Credit Sales amount, and then calculates and displays the resultant Debtors Payment Period in days.

(12 marks)

Q7.

(a) Give the output from the following program, and state the value of the variable p after the code below has run.

```
#include <stdio.h>
void main(void)
{
    int p;
    for (p = 12; p >= 1; p -= 2)
        printf("%i\n", (p * 3) + 2);
}
```

(4 marks)

(b) The code below represents an implementation of the inefficient BubbleSort algorithm to sort five numbers from smallest to highest. The code (line-numbered from 1 to 48) has **six** separate syntactical errors (excluding comments), on six separate line numbers. Indicate the line numbers where the errors are located, and give the correct line of code in each case.

The (corrected) program's output resembles that of the following example:

```
Enter 5 integers in any order:
4
5
8
3
7

Pre-sort:
4 5 8 3 7
4 5 3 8 7
4 5 3 7 8
4 3 5 7 8
3 4 5 7 8

Post-sort:
3 4 5 7 8
```

```
1  #include stdio.h
2  #define TOTAL 5
3
```

```

4 void printTheLot(int array[ ]);
5
6 void main(void)
7 {
8     /*start main*/
9     int myArray[TOTAL] = {0}; /*initialise all 5 entries to zero*/
10    int temp, position, start_value, i;
11
12    printf("\nEnter 5 integers in any order:\n");
13    for (i=0; i<TOTAL; i++) do
14    {
15        scanf("%d", &myArray[i]);
16    }
17
18    printf("\nPre-sort: \n");
19    printTheLot(myArray);
20    printf("\n");
21
22    for(start_value = TOTAL-1; start_value>0; --start_value)
23    { /*begin matching values*/
24        for (position=0; position<start_value; ++position)
25        {
26            if(myArray[position+1]<myArray[position])
27                /*if TRUE then SWAP their positions*/
28                {
29                    temp = myArray[position];
30                    myArray[position] = myArray[position+1];
31                    myArray[position+1] = temp;
32                    printTheLot(myArray)
33                    printf("\n");
34                }
35        }
36    }
37    printf("\nPost-sort: \n");
38    printTheLot(myArray);
39    printf("\n");
40 }; /*end main*/
41
42 void printTheLot(int array[ ]) /*function body*/
43 {
44     int i; /*local variable*/
45     for (i=0; i<=TOTAL; ++i)
46         print("%d ", array[i]);
47     printf("\n");
48 } /*end function*/

```

(18 marks)