

VANCOUVER ISLAND UNIVERSITY  
CSCI 112 — FINAL EXAMINATION  
11 December 2018, 13:00 — 16:00

TO BE ANSWERED IN BOOKLETS

DURATION: 180 Minutes

INSTRUCTOR: H. Liu

**Instructions**

- Students must count the number of pages in this examination paper before beginning to write, and report any discrepancy immediately to the invigilator.
- This examination paper consists of 4 pages.
- This is a CLOSED BOOK examination. You are allowed to bring one piece of letter-sized and double-sided note.
- Calculators are NOT permitted.
- Remember to state any assumptions and show rough work.
- Note carefully the weight of each question, and answer appropriately.
- Attempt all questions. All questions relate to material covered in the lectures, labs and assignments.

1. (15 Marks) Answer the following questions succinctly (briefly and clearly).

- (a) Explain the difference between a pre-testing loop statement and a post-testing loop statement in VBA.
- (b) Explain the difference between a subroutine and a function in VBA.
- (c) In a VBA program, the statement `MsgBox "ABC" + 123` would cause a “Type mismatch” error, but the statement `MsgBox "ABC" & 123` can be successfully executed. What’s wrong with the first statement? What result would we get when executing the second statement?
- (d) Given the following two segments of VBA code:

<pre>If x &gt;=10 Then     y = 3 End If If x &lt; 10 Then     y = 5 End If (segment A)</pre>	<pre>If x &gt;= 10 Then     y = 3 Else     y = 5 End If (segment B)</pre>
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Are they logically the same? Which one is better (more efficient and less error prone) and why?

- (e) Using VBA code to declare a variable called `resultSheet` and make it represent the worksheet named “Summary Results” in the active workbook.

2. (10 Marks) Write a segment of VBA code to first declare an array variable called `OddNumbers`, and then store the sequence of (50) numbers 1, 3, 5, . . . , 99 into `OddNumbers`, one number in each element of the array.

3. (a) (10 Marks) A specialized bookstore records the data of the (more than 2000) books it sells in an Excel worksheet named “Book Info”:

	A	B	C
1	<b>BOOK TITLE</b>	<b>UNIT PRICE</b>	
2	The Joy of Cooking	\$5.99	
3	Mastering the Art of French Cooking	\$8.25	
4	The Mediterranean Diet Cookbook	\$9.99	
5	Delia’s How to Cook	\$12.59	
.	...	...	

As shown above, the actual book data starts from row 2, and goes on continuously (i.e, there is no blank rows in the data area). And each book’s title is guaranteed to be unique.

Develop a VBA function, called `findUnitPrice`, that takes the title of a book (a string) as its parameter, and finds and returns the unit price of the given book.

Your function should return -1 if the title is not valid. The raw data stored in column B are guaranteed to be floating point numbers.

- (b) (10 Marks) Assuming that the above mentioned function `findUnitPrice` has already been properly developed.

The same bookstore also records the order data in another Excel worksheet named “Order Info” in the same workbook. In this worksheet, from column A to column D, each row stores an order’s ID (A), the name of the customer who made this order (B), the title of the book (C), and the number of copies ordered (D) respectively. The area that stores the actual order data is from row 5 to row 3586.

Develop a VBA subroutine, called `processOrderCharges` to calculate the payment amount for all the orders and write the result into column E of the corresponding rows.

Your subroutine should use the function `findUnitPrice` to find the unit price of book involved in each order. And the payment of each order is simply calculated as the multiplication result of the unit price and the number of copies.

4. (15 Marks) A survey company did a survey sampling 4000 people as participants and recorded the result in an Excel worksheet as shown below:

	A	B	C	D
1	<b>ID</b>	<b>age</b>	<b>Smoking</b>	
2	1	63	no	
3	2	34	yes	
.	...	...		
4000	3999	75	no	
4001	4000	42	yes	

You are asked to develop a VBA program to find out that, among the people whose ages are between 25 and 55 (inclusive), the percentage of these people that are smokers (i.e., answered yes to the smoking question).

You can assume that the survey result worksheet is the active worksheet and there are no errors in the data collection.

5. (15 Marks) An organization records the monthly precipitation (rainfall) data collected from 255 different locations for one year. (Any snow fall amount has been converted to corresponding rainfall amount already.) In the active worksheet, column A stores the id of each location, column B stores the address (or description) of each location, and the monthly precipitation amounts (in cm) are stored in column C to column N (12 columns altogether), one month's amount in each column respectively. The first row is a title row, the actual data starts from row 2. Each location's data occupies one row.

Develop a VBA program to find and display (using MsgBox) the id and address (or description) of the location with the smallest yearly precipitation amount.

You can ignore the possible scenario that two or more locations may have the same smallest yearly precipitation amount. You only need to find and display one such location.

6. A small food outlet provides the following lunch combo choices:

- Pizza combo (with 2 slices of any typed pizza plus a soft drink) priced at \$8.99
- Sushi combo (with one 8-piece Sushi package plus a soft drink) priced at \$10.99

Each customer must order at least one of the above combo first. Then, in addition, the customer can add one or many items from the following list:

- Fries (Medium) at \$1.99
- Side Salad at \$2.99
- A dessert Item of the Day at \$2.49

The tax rate on any food item is 5 percent.

You are asked to do the following tasks:

- (a) (10 Marks) Design a userform to collect the following order information from the customer:
- the lunch combo type and the amount ordered for each type
  - any additional items, and the amount ordered for each item

The userform should have three command buttons, captioned “Calculate Charge”, “Clear Choices” and “Exit” respectively.

**Draw a rough picture to show the userform and its controls. For each control, clearly identify its name, type and caption if a caption is needed.**

- (b) (10 Marks) Develop a VBA subroutine to handle the command button click event of clicking the command button captioned “Calculate Charge”.

To calculate the charge, sum the price of all items ordered by the customer, plus the 5 percent tax charge.

For this subroutine, you need to at least perform the following user input validation:

- the amount of any item ordered must be expressed as a valid numeric value (i.e., greater than or equal to zero);
- the customer ordered at least one combo choice.

- (c) (3 Marks) Develop a VBA subroutine to handle the command button click event of clicking the command button captioned “Clear Choices”.

This subroutine should reset the userform to its initial state so that the next customer can start to select and order food items.

- (d) (2 Marks) Develop a VBA subroutine to handle the command button click event of clicking the command button captioned “Exit”. This subroutine should remove (unload) this userform out of the memory.