Software Development Techniques

December 2015

Sample Examination Paper

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

		Marks

Answer ALL questions

Question 1

a) Some programs written in high level programming languages are compiled. Briefly explain what is meant by *compilation*. **4**

b) Draw ONE (1) diagram that shows the compilation of a program written in a high level language. **3**

c) Draw ONE (1) diagram that shows the compilation of a program written in assembly language **and** outline how it differs to the compilation of a program written in a high-level language. **3**

Total: 10 Marks

Question 2

a) Define the term *algorithm* **and** briefly explain what is meant by inputs and outputs. **4**

b) Identify TWO (2) properties of a good algorithm **and** provide a short explanation for each property. **4**

c) State TWO (2) reasons why we would use pseudocode to write an algorithm. **2**

Total: 10 Marks

Questions continue on next page

Question 3

a) The following pseudocode algorithm calculates the area of a floor so that a carpet **10** can be fitted that is the correct size.

Perform a desk-check on this algorithm using a table to show the values in each variable after the execution of each line. You should assume an input value of 50 for length and 50 for width.

1. data width as whole number
2. data length as whole number
3. data area as whole number
4. output "Welcome to the carpet area calculator"
5. output "What is the width of your floor"
6. input width
7. output "What is the length of your floor"
8. input length
9. area = length * width
10. output "For your floor you will need a carpet that is:"
11. output area
12. output "Thankyou for using this program."

Total: 10 Marks

Question 4

a) State TWO (2) questions that should be considered when choosing a data type. **2**

b) State what data types should be used for the following variables and explain your answer:

i)   The name of a student   **2**
ii) The phone number of a student   **2**
iii) The age of a student   **2**
iv) The height of a student in metres   **2**

Total: 10 Marks

Questions continue on next page

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Question 5

a) Briefly explain the difference between a bounded loop and an unbounded loop **4**
and provide ONE (1) example of when we might use each type of loop.

b) Write a short pseudocode program that will print out the multiplication table up to **6**
10 for a given input value. For example, if I used the input value of 3 my output
would be:

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12
5 x 3 = 15
6 x 3 = 18
7 x 3 = 21
8 x 3 = 24
9 x 3 = 27
10 x 3 = 30

Total: 10 Marks

Question 6

a) Write a pseudocode algorithm that determines if a given input value is an odd **6**
number. It should make appropriate use of variable names and data types.

b) Using a nested if statement, write pseudocode that implements the following rule: **4**

If it is raining, wear a "raincoat" and if it is raining and not windy take an umbrella.

You should use the following variables: (1) data coat as String; (2) data umbrella
as Boolean; (3) data raining as Boolean; and (4) data windy as Boolean;

Total: 10 Marks

Questions continue on next page

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Question 7

a) Construct a truth table for the logical equation A OR B AND C. **8**

A	B	C	A OR B	(A OR B) AND C
False	False	False		
False	False	True		
False	True	False		
False	True	True		
True	False	False		
True	False	True		
True	True	False		
True	True	True		

b) Explain the effect of brackets on the solution to the equation A OR (B AND C). **2**
You do **not** need to create a truth table for this question, although it may help
your explanation.

Total: 10 Marks

Question 8

a) State FOUR (4) advantages of using functions in programming. **4**

b) The following pseudocode program is used to display the times table of the **6**
user's choice:

1. data userChoice as whole number
2. output "Please enter the times table you would like to calculate:"
3. input userChoice
4. call timesTable(userChoice)
5. output "Goodbye!"

The program uses a function called "timesTable()" to create and display the times
table specified in an argument. Write the contents of the function timesTable() in
pseudocode.

Total 10 Marks

Questions continue on next page

Question 9

a) Explain the difference between Black box testing and White Box testing.   **5**

b) Briefly discuss why we should perform both black box testing and white box testing.   **2**

c) The following code tests the value in the variable i to ensure that it is greater than or equal to zero: **3**

1. Input i
2. If (i >= 0) Then
3.   output studentGrade[i]
4. Else
5.   output "value out of range"
6. End if

State THREE (3) values would you use as input if you had to perform a simple boundary test on i.

Total: 10 Marks

Question 10

a) The following class is used to describe objects of type FoodItem. These objects would appear in a menu application for a restaurant. The class is incomplete as it does not contain accessor functions. Write pseudocode accessor functions for this class.   **8**

Class FoodItem
      data name as String
      data price as whole number

      // Accessor functions to be written here

End Class

b) Briefly explain why we use Accessor functions in classes.   **2**

Total: 10 Marks

End of Examination Paper