UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	COMPUTER ALGORITHM
COURSE CODE	:	DAT13303
PROGRAMME	:	DAT
DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	3 HOURS
INSTRUCTIONS	:	ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **NINETEEN (19)** PAGES

SECTION A

Q1 Choose the **correct** rules when naming variables and constants.

i. The first character must be a letter.
ii. A combination of letters and numbers can be used from the second character onwards.
iii. Characters representing operators can be used as part of the name.
iv. Numbers can be used as the first character.

A. i and ii
B. i and iii
C. i, ii and iii
D. All the above

Q2 Choose the **incorrect** relational operator.

A. <
B. >=
C. =
D. !=

Q3 Name the type of operators used in condition below.

```
If number > 0 OR number < 10 Then
```

A. Relational and Logical
B. Logical and Arithmetic
C. Relational and Arithmetic
D. Concatenation

Q4 Determine which comparison expression evaluated **true**. Assume `apple = 10`, `orange = 20` and `lemon = -5`.

i. `apples <> oranges`
ii. `lemon <= 5`
iii. `apples = lemon`
iv. `oranges > 10`

A. i and ii
B. i and iii
C. i, ii and iii
D. i, ii and iv

Figure Q5 is created to solve the problem below. Refer **Figure Q5** to answer **Q5** and **Q6.**

A shop owner wants to develop a program for mega sales season. Each item bought get a 25% discount. The program will calculate and display discount and discounted price.

Q5 Substitute X, Y and Z.

A. X = discounted price, Y = discount, Z = item price
B. X = item price, Y = discount, Z = new price
C. X = item price, Y = discount, Z = item price
D. X = discount, Y = discounted price, Z = item price

Q6 Formulate Z.

A. item price = item price - discount
B. discounted price = discounted price - discount
C. discounted price = discount - discounted price
D. discounted price = item price – discount

Q7 Identify the expected value of b at **Figure Q7**.

A. 10
B. 10.79
C. 10.8
D. 11

Q8 Given the following pseudocode. Determine the car park charge if the condition evaluates false.

```
Start
  Set charge = 0
  Input entry_time, exit_time
  period = exit_time - entry_time
  If period > 1 Then
     charge = 2 + (period * 1)
  Else
     charge = 2
  End if
End
```

A. RM 3
B. RM 1
C. RM 0
D. RM 2

Q9 Choose a suitable problem which can be solved using the repetition control structure.

A. Determine whether a given year is a leap year or not.
B. Calculate the sum of integers.
C. Determine whether a number is odd or even.
D. Keep asking for the password until the correct password is given.

Refer **Table Q10** to answer **Q10** and **Q11**.

Q10 Choose the most suitable data type when declaring the `price` variable.

A. String
B. Integer
C. Real
D. Boolean

Q11 Choose the **true** statement about the loop in Line 4 through 8.

i. It is a counter-controlled loop.
ii. It is a sentinel-controlled loop.
iii. It will cause the program to hang or crash.
iv. It ensures the data entered by the user is valid.

A. i and iii
B. i and iv
C. ii and iii
D. ii and iv

Q12 Choose the **true** statement about the `&&` operator.

i. Connects multiple conditions together.
ii. Concatenate expression into a single string for output.
iii. Requires both conditions to be true before executing statement(s) within the selection or iteration structure.
iv. Requires at least one condition to be true before executing statement(s) within the selection or iteration structure.

A. i and ii
B. i and iii
C. i, ii and iii
D. All the above

Refer the following pseudocode to answer **Q13** and **Q14**.

```
Start
  Set a = 0
  Set b = 0
  Set c = 0
  Set index = 0
  While (index < 40)
    Read data
    c = c + data
    If data > 0
      b = b + data
    End if
    If (data % 2 == 0) then
      a = a + 1
    End if
    index = index + 2
  End while
  Display "message1: ", a, newline
  Display "message2: ", b, newline
  Display "message3: ", c
End
```

Q13 Determine the number of times the loop iterates.

A. 19
B. 20
C. 21
D. 22

Q14 Replace `message1` with a meaningful message.

A. Sum of positive numbers
B. Number of even numbers
C. Number of odd numbers
D. Sum of all numbers

Refer **Table Q15** to answer **Q15, Q16** and **Q17**.

Q15 Choose the correct statement to complete Line 4.

A. `i = 1; i< 20; i++`
B. `i = 1; i<= 20; i++`
C. `counter = 1; counter < 20; counter++`
D. `counter = 1; counter <= 20; counter++`

Q16 Choose the correct statement for Line 7.

A. `total = weight + total`
B. `total = total + weight`
C. `sum = sum + weight`
D. `sum = weight + sum`

Q17 Choose the correct loop structure which give the similar iteration.

A.
```
i=1
While (i<= 20)
   Display "input weight: "
   Input weight
   i++
End While
```

B.
```
i=1
While (i< 20)
   Display "input weight: "
   Input weight
   i++
End While
```

C.
```
i=1
Do(i<= 20)
   Display "input weight: "
   Input weight
   i++
End While
```

D.
```
i=1
Do
   Display "input weight: "
   Input weight
   i++
While (i< 20)
```

Q18 Given a pseudocode. Determine the output if the values entered are 15, 5, and 10.

```
z = 15
For (x = 5;y <= z,x += 5)
   Display "Enter value"
   Input value
   If (value !=10) Then
      If (value < 15) then
         Display "Super"
      Else
         Display "High"
      End If
   Else
      Display "Quality"
   End If
Next
```

A. Super, High, Quality
B. High, Super, Quality
C. Quality, Super, High
D. High, Quality, Super

Q19 Illustrate the correct output for the following pseudocode.

```
Start
   Set out = 1
   While (out ≤ 2)
      Set inner = 1
      While (inner ≤ 3)
         Display "*"
         Add 1 to inner
      EndWhile
      Display newline
   Add 1 to out
   EndWhile
End
```

A.
```
***
***
```
B.
```
**
**
**
```
C.
```
***
```
D.
```
***
**
```

Q20 Choose the **correct** statement to describe infinite loop.

i. Sequence of statements that loops endlessly.
ii. The loop structure has a terminating condition.
iii. Repeat a set of instructions until a specific condition is met.
iv. The loop structure does not have a terminating condition.

A. i and ii
B. i and iii
C. i and iv
D. i, ii and iv

Refer the following pseudocode to answer **Q21** and **Q22.**

```
Start
   total = 0
   For (i = 0,i<=5,i++)
      total += i
   EndFor
   Display total
End
```

Q21 Determine the number of iteration.

A. 4
B. 5
C. 6
D. 7

Q22 Determine the output displayed.

A. 11
B. 14
C. 15
D. 16

Refer **Table Q23** to answer **Q23** and **Q24**. The pseudocode in **Table Q23** display all odd numbers and their sum between two numbers entered by user, inclusive of the first and last number. The user entered 1 and 5 is given.

Q23 Choose the correct statement to complete Line 4.

A. `begin % 2 == 1`
B. `begin % 2 == 0`
C. `begin % 2 != 1`
D. `begin % 2 != 2`

Q24 Identify a value of `begin`.

A. 0
B. 1
C. 3
D. 5

Refer the segment of a pseudocode to answer **Q25**, **Q26**, **Q27** and **Q28**.

```
Constant Integer SIZE = 5
Declare Integer numbers[SIZE] = {3, 22, 1, 10, 9}
```

Q25 State the subscript of the first element in the array.

A. 0
B. 1
C. 3
D. 9

Q26 State the subscript of the biggest element in the array.

A. 0
B. 1
C. 3
D. 9

Q27 State the value stored in `numbers[2]`.

A. 0
B. 1
C. 3
D. 9

Q28 State the value stored in `numbers[3 * 2 - 2]`.

A. 0
B. 1
C. 3
D. 9

Refer **Table Q29** to answer **Q29**, **Q30** and **Q31**.

Q29 There are 30 students in a Programming class. Each one of them is required to sit for three tests. Choose the correct declaration of an array to store the students' scores.

A. `score[30]`
B. `score[3]`
C. `score[30][3]`
D. `score[29][2]`

Q30 Identify S and Q.

A. 29, 2
B. 30,3
C. 29,3
D. 30,2

Q31 The pseudocode used to read and store the score of each student. Choose the correct answer to complete the statement at Line 5.

A. `score[m][m]`
B. `score[m][n]`
C. `score[n][m]`
D. `score[n][n]`

Q32 Identify the value of `StudScore[2]` in the following statement.

```
Declare StudScore[4] As Integer
StudScore = {98, 97, 96, 95, 94}
```

A. 98
B. 97
C. 96
D. 95

Q33 Given the following two-dimensional array. Choose the correct output for the following pseudocode.

```
Start
    Declare mytable[2][2]={{1,2}, {3,5}}
    Display mytable[1][1)
End
```

A. 1
B. 2
C. 3
D. 5

Q34 Choose the correct statements to describe multidimensional array.

i. Static.
ii. Not limited to two indices.
iii. Amount of memory needed for an array increases exponentially with each dimension.

A. i and ii
B. i and iii
C. ii and iii
D. i, ii and iii

Q35 Choose the **incorrect** statement to describe the following pseudocode.

```
Start
   Set index with 0
   While (index < 10 )
     Display mark[index]
     Increase index by 1
   endWhile
End
```

A. The array name is `mark`.
B. The purpose of the pseudocode is to display the entire array.
C. The size of array is10.
D. The loop will repeat 9 times.

Q36 Given the following pseudocode. Predict the value of `totalScore` if input for `mark` is 88.56.

```
Start
  Display "Input mark"
  Input mark
  Call accumulate(mark)
End
Module accumulate(score)
  Declare totalScore As Integer
  TotalScore = 0
  totalScore += score
Return
```

A. 0
B. 88.56
C. 88
D. 89

Q37 Given a pseudocode to convert Ringgit Malaysia to Euro. Identify the correct output if the value for `ringgit` is 100.

```
Start
   Declare ringgit As Decimal
   Display "Input value of ringgit"
   Input ringgit
   Call money_conversion (ringgit)
End
Module money_conversion (ringgit)
   money_conv = ringgit * 0.236
Return
```

A. 23.6
B. 0.236
C. 23.60
D. 100

Refer the following pseudocode to answer **Q38**, **Q39** and **Q40**.

```
Main module
Start
  num [4] = {20, 1, 6 90}
  Display "Original data: "
  For(j = 0, j < 4, j++)
     Display  num[j], "    "
  next
  Display newline
  Display newline

  Call swap (num[0], num[1])
  Call swap (num[2], num[3])

  Display "After process: "
  For(j = 0, j < 4, j++)
     Display num[j], "    "
  Next
End
Module swap (in_out data1, in_out data2)
  temp = data1
  data1 = data2
  data2 = temp
Return
```

Q38 Identify values of `num` passed as arguments in the first module called.

A. 20 90
B. 20 1
C. 20 6
D. 20 90

Q39 Identify values of `num` passed as arguments in the second module called.

A. 1 90
B. 6 1
C. 20 6
D. 6 90

Q40 Choose the correct number displayed after module called.

A. 1 20 90 6
B. 20 1 6 90
C. 1 6 20 90
D. 90 20 6 1

SECTION B

Q41 Given the following pseudocode.

```
Start
    Display "Enter temperature:"
    Read temp
    If temp > 32 Then
         If temp > 80 Then
              Display "Hot"
         Else
              Display "Moderate"
         End If
    Else
         Display "Freezing"
    End If
End
```

(a) Convert the pseudocode into a flowchart.

(5 marks)

(b) Trace the pseudocode using a tracing table and display the expected screen if the input is 80.

(5 marks)

Q42 The flowchart in **Figure Q42** calculate the total salary for five employees.

(a) Using For Loop, convert the flowchart into a pseudocode.

(7 marks)

(b) List initialization statements in **Q42(a)**.

(1 mark)

(c) Declare two arrays to store all input values of `hoursworked` and `salary`.

(2 marks)

(d) Rewrite the statements in **Q42(a)** which can apply the array declared in **Q42(c)**.

(2 marks)

Q43 (a) Write a pseudocode to find the best mark for the first test in a class. Assume that the number of student is unknown. The process stops when the user enters an invalid mark.

(13 marks)

(b) Trace the pseudocode **Q43(a)** using a tracing table and display the expected screen for the input of test marks: 50, 90 and 80.

(5 marks)

Q44 Draw flowcharts to ask user to enter a choice of operation and perform an appropriate operation. The solution should contain:

(i) Main module which calls **Q44(ii),** accept user input of choice, call **Q44(iii)** or **Q44(iv)** based on the input of choice.

(ii) Module to display the following menu:

Choice	Operation
R	Calculate and display the area of a rectangle
T	Calculate and display the perimeter of a triangle

(iii) Module to receive input, calculate and display the area of a rectangle.

(iv) Module to receive input, calculate and display the perimeter of a triangle.

(20 marks)

-END OF QUESTION -

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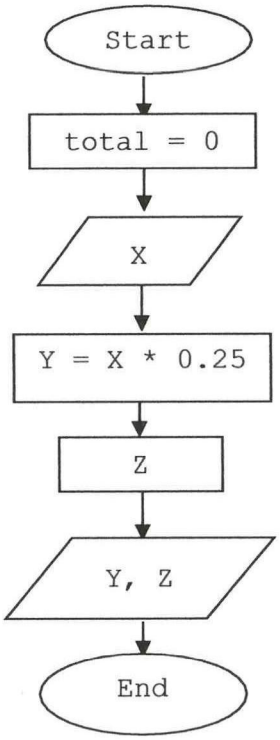

Figure Q5

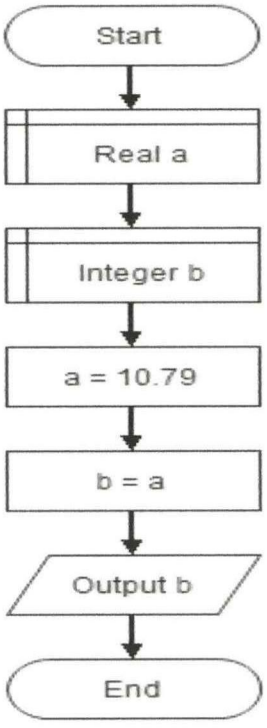

Figure Q7

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Table Q10

```
1   Start
2     Display "Enter the total weight (kg): "
3     Read weight
4     While weight < 0
5       Display "Weight must be a positive value"
6       Display "Enter the total weight (kg): "
7       Read weight
8     End while
9     If weight > 15
10      price = weight * 5.8
11    Else if weight >= 10 AND weight <= 15
12      price = weight * 6.4
13    Else
14      price = weight * 8.0
15    End if
16    Display "Total price: RM", price
17  End
```

Table Q15

```
 1  Start
 2    Declare weight, sum, i As integer
 3    Set sum = 0
 4        For (__________________)
 5          Display "input weight: "
 6          Input weight
 7          ____________________________
 8        EndFor
 9        average = sum/20
10    Display " Average of 20 weight=", + average
11  End
```

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Table Q23

```
1  Start
2    Input begin
3    Input end
4    Do
5      Display "Odd numbers:"
6      If _____________________Then
7        sum += begin
8      Display " " + begin + " "
9    End If
10     begin += 1
11   While (begin <= end)
12   Display "Sum: " + sum
13 End
```

Output	Odd numbers: 1 3 5 Sum: 9

Table Q29

```
1  Start
2   For m = 0 to S
3     For n = 0 to Q
4       Display "Score student ",(m + 1)," quiz ",(n + 1),":"
5       Read ___________
6     End for
7   End for
8  End
```

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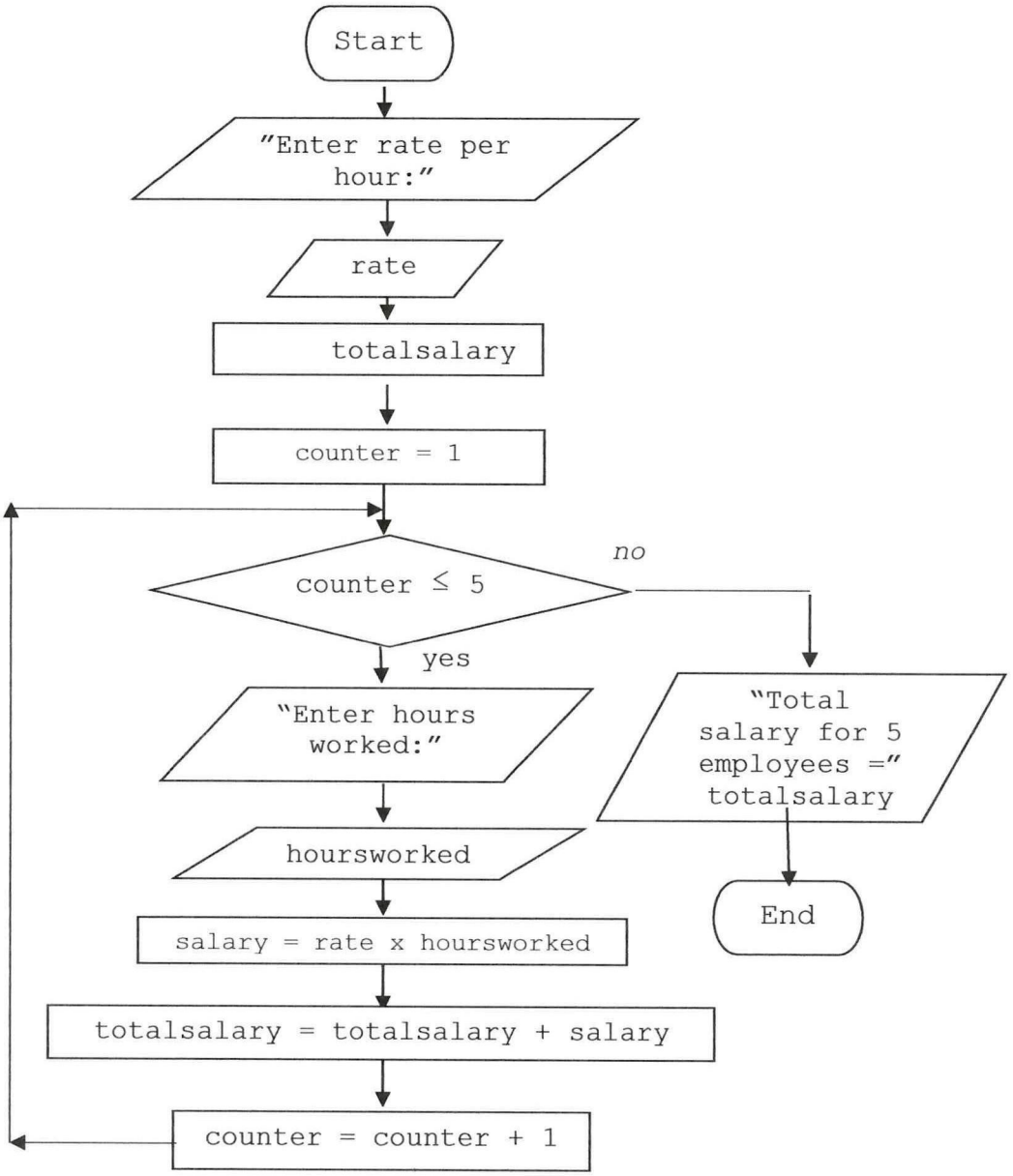

Figure Q42