INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**APRIL 2019**
Programme	:	Diploma in Information Technology (DITN)
Course	:	**ICT1103: Structured Programming**
Date of Examination	:	26 July 2019, (Friday)
Time	:	11:00am -1:00pm Reading Time : Nil
Duration	:	2 Hours

Special Instructions :

SECTION A: This section consists of **FOUR (4)** questions. Answer **ALL** questions in the answer booklet provided.

SECTION B: This section consists of **TWO (2)** questions. Answer **ALL** questions in the answer booklet provided.

Materials permitted :
Non-programmable calculator

Materials provided :
Nil

Examiner(s) : **Lai Kim Min** and Siti Hajar

Moderator : **Siti Hawa Binti Mohamed Said**

This paper consists of 7 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTN)
DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
ICT1103: STRUCTURED PROGRAMMING
FINAL EXAMINATION: APRIL 2019 SESSION

SECTION A (60 marks)

Instruction: This section consists of **FOUR (4)** questions. Answer **ALL** questions in the answer booklet provided.

Question 1

(a) Evaluate the following expressions:

(i) `3 * 6 / 2 - 15`
(ii) `15 + 18 % 2 - 20 / 6`
(iii) `6 - static_cast<int>(6.5) % 3 + 2 - 6;`
(iv) `static_cast<double>(6/4.0) * 4 / 2;`

(4 marks)

(b) Assume a char array has been defined as follows:

```
char address[80];
```

(i) Write a statement that reads in a line of text (including spaces) into `address` array.
(ii) Write a statement to print out the total characters in the `address` array.
(iii) Write a statement to convert the first character of `address` into uppercase.

(6 marks)

(c) Write a simple `for` loop to produce the following output:

```
Ready 10
Ready 8
Ready 6
Ready 2
Ready 0
```

(5 marks)

(Total: 15 marks)

Question 2

(a) Suppose a and b are `int` variables and x and y are `double` variables. Assume the following input data:

```
40  15.15  63  17.29
```

Identify the value is assigned to a, b, x and y after the execution of the following statement:

```
cin >> x >> a >> y >> b;
```

(4 marks)

(b) Write a fragment of code with `while` loop to prompt user to enter a line of text until "END" word is entered. Declare a string variable to hold the user's inputs.

(4 marks)

(c) The following array stored a set of students marks. Write a fragment of code to display the average mark and total students above average mark. Show the average mark in 2 decimal places and assume that all the variables have been defined.

```
double marks[] =
      {65.5,78.1,34.2,55.3,60.1,88.6,70.0,46.3,56.0,62.00};
```

(7 marks)

(Total: 15 marks)

Question 3

(a) Trace the output of the following program segment:

```
int x = 10;

void tryOne(int& a, int b)
{
     int x = a - b;
     if (a > b)
        a = 2 * b + 5;
     else
        b = 2 * a - 4;
}

void tryTwo(int y, int& z)
{
      y = ++z;
      z = z * y;
      x = y + z;
}

int main() {

    int a = 1, b = 2;
    tryOne(a,b);
    cout << a << " " << b << " " << x << endl;
    tryTwo(b,a);
    cout << a << " " << b << " " << x << endl;
    return 0;
}
```

(6 marks)

(b) Write a nested for loop that displays the following output. Hint: The ASCII code for letter 'A' is 65.

```
A12345
B1234
C123
D12
E1
F
```

(5 marks)

(c) Write a switch case statements to represent the following requirements:

code	description
1	Display "Win"
2	Display "Lose"
Other values	Display "Game Over!"

(4 marks)

(Total: 15 marks)

Question 4

(a) Given the following code:

```
int a;
double b;
int x[] = {1,2,3};
int * ptr1;
double * ptr2;
```

State the following statements as valid or invalid. If a statement is invalid, explain why.

i) `ptr1 = a;`
ii) `ptr1 = *x;`
iii) `ptr2 = &b;`
iv) `a = *(x + 2);`

(6 marks)

(b) Write a function called `getRange` that accepts 3 integer parameters. Calculate and return the difference between the lowest value and highest value from the given parameters. Use some math functions to help you to derive the highest and lowest values. For example:

```
getRange(5,1,10); //return 9 because 10 - 1
getRange(3,6,2);  //return 4 because 6 - 2
```

(5 marks)

(c) Based on the following declaration:

```
ofstream gameFile;
double highscore = 100;
```

Write a fragment of code to open the file `gameLog.txt` using the `gameFile`. Write the game high score to the file in fixed form with two decimal places.

(4 marks)

(Total: 15 marks)

SECTION B: 40 marks

Instruction: This section consists of **TWO (2)** questions. Answer **ALL** questions in the answer booklet provided.

Question 1

Write a program to calculate and display the rental for a car based on the information provided in the table below (rental fee in daily basis). The program should prompt user to enter the car type (either SEDAN or MPV), the insurance type (either Normal-N or Premium-P) and number of rental days.

Car Type	Insurance Type N	Insurance Type P
SEDAN	120	200
MPV	170	300

The program should have the following functions:

- `inputCarRental` that receives 3 reference type of arguments namely car type, insurance type and the total day. Use this function to capture the user inputs. You must validate the total rental day so that only the values in range 1 to 30 (inclusive) are accepted.

- `calculateRental` that receives the car type, insurance type, total rental days and returns the total rental fee as `int` type. If any invalid car type or insurance type received, the `SEDAN` or `Insurance Type N` values will be selected as default values.

```
Sample output:
Enter car type [SEDAN/MPV]: SEDAN
Enter insurance type [N/P]    : N
Enter rental day [1-30]       : 31
Enter rental day [1-30]       : 3

The rental price is: RM 360
```

(Total: 20 marks)

Question 2

You are required to design and write a simple program with structure type to model a simple 2D game object.

(i) Create a structure called `GameObject` that stores the following information:

`name`	: Game object name as string type (e.g. Mario)
`x`	: X-axis location in screen as integer type
`y`	: Y-axis location in screen as integer type
`hp`	: Health point as integer type
`alive`	: Object still active as bool type.

(3 marks)

(ii) Declare an array called `enemy` that can store up to 20 game object records.

(2 marks)

(iii) Write a function called `getEnemy` that return back a game object. Set the game object with the following values:

- Set the name as "`Enemy`"
- Set the `x` value with random value in range 1-800
- Set the `y` value with random value in range 1-600
- Set the `hp` value with random value in range 0-10
- Set the `alive` field either true or false randomly

(8 marks)

(iv) Write a code fragment with for loop to display all the game objects in `enemy` array if the `hp` value is 0 and `alive` is false.

(7 marks)

(Total: 20 marks)

~THE END~