INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	August 2016
Programme	:	Diploma in Information And Communication Technology (DICTN)
Course	:	**ICT1103: Structured Programming**
Date of Examination	:	08 December, 2016 (Thursday)
Time	:	5:00pm – 7:00pm Reading Time : Nil
Duration	:	2 Hours

Special Instructions :

Answer any **FOUR (4)** questions in the answer booklet provided.

Materials permitted :

Non-programmable calculator

Materials provided :

Nil

Examiner(s)	:	**Ng Ruoh Ling**, Shee Fui Chie, Lai Kim Min and Chern Huey Rong
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)
ICT1103: STRUCTURED PROGRAMMING
FINAL EXAMINATION: AUGUST 2016 SESSION

Instruction: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Rewrite the following program fragment using `switch` selection structure which produces the same result:

```
char grade;
cout << "Enter your grade:";
cin >> grade;
if (grade == 'a' || grade == 'A') cout << "Excellent";
else if (grade == 'b' || grade == 'B')cout << "Good";
else if (grade == 'c' || grade == 'C')cout << "Average";
else if (grade == 'd' || grade == 'D')cout << "Poor";
else cout << "Invalid grade input.";
```

(7 marks)

(b) A bank's ATM (auto-teller machine) is able to eject notes of RM100, RM50, RM20, RM10, RM5 and RM1 with the least number of notes based on the withdraw amount (in integer only). For example, if the withdrawal amount is RM160, the ATM will eject three RM50 and one RM10 notes. Write a program that reads the withdrawal amount and display the quantity of each note that is ejected. Below shows the sample:

```
Enter the withdrawal amount (RM): 97
Notes ejected:
RM50  x  1
RM20  x  2
RM5   x  1
RM1   x  2
```

(10 marks)

(c) Write a C++ expressions that represent the given English expressions:

(i) at least one of x or y is non-negative
(ii) t is strictly from 3.0 to 4.0
(iii) x is 1 or x is equal to y
(iv) at least one of x or y is odd

(8 marks)

Question 2

(a) What is the output of the following program fragment?

```
char letter = 'm';
cout << letter << endl;
cout << ++letter <<endl;
letter = 't';
cout << letter++ << endl;
cout << letter << endl;
cout << ++letter << endl;
```

(5 marks)

(b) Write a C++ program that will read up to ten positive integers and print the average of the input integers. However, if the user enters a non-positive integer (negative value or zero), the reading will discontinue and the program prints the average of the previously entered positive integers.

```
Enter ten positive integers to calculate the average,
place a negative integer to end the reading anytime.

Number 1: 10
Number 2: 20
Number 3: 36
Number 4: 9
Number 5: -9
The average is 18.75
```

(12 marks)

(c) Identify if the following variable names are valid. If invalid, explain why.

(i) total score
(ii) #grade
(iii) question?
(iv) Average-marks

(8 marks)

Question 3

(a) A program reads two positive integers and displays which is bigger. The sample of the program is shown below:

```
Enter two integers:
First number: 5
Second number: 12
12 is bigger.
```

Given that the determination of the bigger integer is done using a separate function called `isBigger` that takes two integers `x` and `y` in its parameters and return the bigger integer, write the code(s) for the following:

(i) declare the function prototype of `isBigger`
(ii) the complete function `isBigger`
(iii) an output statement that calls `isBigger` function and shows the result.

(9 marks)

(b) Write a recursive version of the following function:

```
void display(int small, int big)
{     for (int i = small; i <= big; i++)
      {
            cout << i << endl;
      }
}
```

(6 marks)

(c) What is the difference between a static local variable and an automatic local variable?

(4 marks)

(d) Determine the values/results of the following expressions:

(i) $7 + 3 * 6 / 2 - 1$
(ii) $2.0 * 3.0 / 4.0 * 10.0 / 4.0$
(iii) $3 * (4 \% 6) + 6$
(iv) $5 > 2 \;\&\&\; 6 != 4 \;\&\&\; 2.5 == 10 / 4$
(v) $5 / 2 * 6 / 4.0 + 2$
(vi) $7 \% 6 - 6 \% 7$

(6 marks)

Question 4

(a) A company stores its employees' records using a structure. The data include employee name, department and salary (`float`).

(i) Design a structure named `Employee` to store the records

(4 marks)

(ii) Write a statement to declare an array of `Employee` named `employeeArray` for 55 employees.

(2 marks)

(iii) Write a loop that reads employee's data from user and store them into the `employeeArray`.

(6 marks)

(iv) Assuming necessary headers are included, write a loop that will read through the data in the `employeeArray` and save only records into a text file named `records.dat` if the salary is greater than or equal to RM4500. Declare the objects needed to output data into `records.dat`.

(8 marks)

(b) What is the output of the following program fragment?

```
int list[5];
for (int i = 0; i<5; i++)
{
      list[i] = 2 * i + 5;
      if (i % 2 == 0)
            list[i] = list[i] - 3;
      cout << list[i] << endl;
}
```

(5 marks)

Question 5

(a) Write a function that takes a sorted array of integer and its array size through its parameter, the function then displays

(i) the smallest integer
(ii) the biggest integer
(iii) the average
(iv) the median

of the values in the array. Median is the middle value in a list of array.

(13 marks)

(b) Explain and correct the syntax errors in the following statements:

(i)
```
if(t>=9)
    cout<<x;
    total+=x;
else
    cout<<y;
    total+=y;
```

(ii)
```
int counter = 1;
do(counter <= 5)
{     cout << counter << endl;
      counter++;
}while;
```

(iii)
```
for (int index = 12; index <= 6; index += 2)
{     cout << index << endl;
}
cout << index << endl;
```

(iv)
```
if(x>10) && (x<20)
     total=x+x;
```

(12 marks)

Question 6

(a) Given the following array:

```
char message[25] = "a story about Peter Pan";
```

Write a program fragment that converts all the letter 'a' in `message` to uppercase and shows the output "A story About Peter PAn".

(6 marks)

(b) Explain the situations below:

(i) When a break statement is used in a switch block?
(ii) How do you update/send multiple values back from a function?
(iii) When should you use global variable instead of local variable?

(6 marks)

(c) Write a statement to accomplish each of the following:

(i) Declare two variables of type integers, `x` and `y` and assign values 13 to variable `x` and 8 to variable `y`

(ii) Declare one array of type int named `num` with 5 elements and initialize with values 1, 2, 3, 4 and 5

(iii) Declare three integer pointers named `p1, p2` and `p3`.

(iv) Make `p1` points to variable `x`, `p2` points to variable `y` and `p3` points to array `num`.

(v) Display the value of `x` using pointer `p1`.

(vi) Increase the value of `y` by 3 using pointer `p2`.

(vii) Decrease the third element of `num` by 1 using pointer `p3`.

(viii) Assign the addition of `x` and `y` to the fourth element of `num` using pointer `p1`, `p2` and `p3`.

(8 marks)

(d) Provide the range of acceptable values for each of the following type:

(i) `unsigned char`
(ii) `short int`
(iii) `unsigned short int`
(iv) `long int`
(v) `unsigned long int`

(5 marks)

~ The End ~