INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**August 2015**
Programme	:	Diploma In Information And Communication Technology (DICTN)
Course	:	**ICT1103: Structured Programming**
Date of Examination	:	December 6, 2015
Time	:	8.00am – 10.00am Reading Time : Nil
Duration	:	2 Hours

Special Instructions :

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

Materials permitted :

Nil

Materials provided :

Nil

Examiner(s) : **Mr. Chern Huey Rong,** Ms. Ng Ruoh Ling, Ms. Shee Fui Chie

Moderator : Ms. Siti Hawa Binti Mohamed Said

This paper consists of 9 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN)
ICT1103: STRUCTURED PROGRAMMING
FINAL EXAMINATION: AUGUST 2015 SESSION

Instructions: 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) Show the steps and result for the following expression:

(i) int a = 5 + 27 % 4 * 2
(ii) int b = 46 % 6 + 4 * 3 – 2
(iii) int c = 20 / 100 * 8 + 3

(6 marks)

(b) Write a C++ program to produce the output as shown below:

x value	y value	expressions	results
10	5	x=y+3	x=8
10	5	x=y-2	x=3
10	5	x=y*5	x=25
10	5	x=x/y	x=2
10	5	x=x%y	x=0

(8 marks)

(c) Write a program which takes 2 arrays of 10 integers each, a and b. c is an array with 20 integers. The program should put into c the appending of b to a in which the first 10 integers of c from array a, the latter 10 from b. Then the program should display c.

```
Type numbers into array A:
1 2 3 4 5 6 7 8 9 10
Type numbers into array A:
21 22 23 24 25 26 27 28 29 30
Numbers in array C:
1 2 3 4 5 6 7 8 9 10 21 22 23 24 25 26 27 28 29 30
```

(11 marks)

Question 2

(a) Write a program to convert degrees Fahrenheit to degrees Celsius. The conversion formula is °C = 5/9 * (°F - 32).) Use it to print a Fahrenheit-to-Centigrade table for -40 to 220 degrees Fahrenheit, in increments of 10 degrees. You must apply *for* loop for the iteration.

(7 marks)

(b) Write a function to compute the factorial of a number. The result has to return to the caller program.
The factorial of a nonnegative integer n is written n! (pronounced "n factorial")
and is defined as follows:
$n! = n \cdot (n-1) \cdot (n-2) \cdot \ldots \cdot 1$ (for values of n greater than 1)
and
$n! = 1$ (for $n = 0$ or $n = 1$).
For example, $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$, which is 120.

(8 marks)

(c) Write a program that determines a student's grade. The program will read three types of scores (quiz, mid-term, and final scores) and determine the grade based on the following rules:

-if the average score =90% => grade=A
-if the average score >= 70% and <90% => grade=B
-if the average score>=50% and <70% => grade=C
-if the average score<50% => grade=F

(10 marks)

Question 3

(a) Trace the output of the following program:

```
#include <iostream>
using namespace std;
int x = 10;
void change1();
void change2(int *, int);
void main()
{
   int x = 5, y=10;
   cout << "x = " << x << endl;
   change1();
   cout << "x = " << x << endl;
   change2(&x, y);
   cout << "x = " << x << endl;
   system("pause");
}
void change1()
{
   x = x + 20;
   cout << "x = " << x << endl;
}
void change2(int *a, int b)
{
   *a = *a - 5;
   b = b + 2;
   cout << "X = " << *a << endl;
   cout << "Y = " << b << endl;
}
```

(6 marks)

(b) Write a function that takes an *int* array and use pointer to calculate the sum of all the integers and display the average of the integers inside the array.

(8 marks)

(c) Write a **recursive** function to print a triangle with a given side length. Example:
Enter the side length: 4

```
*
**
***
****
```

(7 marks)

(d) What is the output when the following code fragment is executed?

(i)

```
int n, k = 5;
n = (100 % k ? k + 1 : k - 1);
cout << "n = " << n << " k = " << k << endl;
```

(ii)

```
int n = 5;
if (n = 0) // NOTE THE OPERATOR!!!
   cout << "n is zero" << ".\n";
else
   cout << "n is not zero" << ".\n";
cout << "The square of n is " << n * n << ".\n";
```

(4 marks)

Question 4

(a) Write a program to declare an array named **num** that can store 10 integers. Read the 10 integers from the user. Your program then copies all the integers into another array named **copy** by placing all the odd integers first before the even integers. For example, if the values inside array **num** are 6, 3, 5, 8, 4, 12, 7, 13, 2, 20 and 8, then the values inside array **copy** should be 3, 5, 7, 13, 20, 2, 12, 4, 8 and 6 where odd integers are before even integers. Lastly the program prints the integers from array **copy** on screen.

(8 marks)

(b) Trace the output of the following program:

```
#include <iostream>
using namespace std;
void mystery1(int, int &);
void mystery2(int *, int);

void main()
{    int a=3,b=6;

     mystery1(a,b);
     cout<<a<<"\t"<<b<<endl;
      int *p=&a, q=b;
      *p=q+a;
      q=q-*p;
      cout<<*p<<"\t"<<q<<endl;
      cout<<a<<"\t"<<b<<endl;
      mystery2(p,q);
      cout<<*p<<"\t"<<q<<endl;
      cout<<a<<"\t"<<b<<endl;
}
void mystery1 (int x, int &y)
{    x    = x * x;
     y    = y * y;
}
void mystery2( int *j, int k)
{    *j   =*j + *j;
     k    = k + k;
}
```

(10 marks)

(c) Write a function that compares two null-terminated character arrays to determine how many of the initial characters match. Sample output below:

```
Enter first word: hello
Enter second word: helloworld
5 characters matched!
```

(7 marks)

Question 5

(a) You must use nested loop to write a program to display the following output:

```
A B C D E
B C D E F
C D E F G
D E F G H
E F G H I
```

(8 marks)

(b) Write a program using a function to add two fractions and display the result fraction. Your program will prompt the user to input fraction 1 and fraction 2. You will need to use a C++ structure to define a fraction. The structure has two members: numerator and denominator.

(8 marks)

(c) Write a program to find out whether the input character is a number character or an uppercase character.

For example, '3', '7' are Number character
'F', 'P' are Uppercase character

(9 marks)

Question 6

(a) What is the output for the following?

(i) pow(4,3);

(ii) atoi("100");

(iii) fabs(-78.98);

(iv) strcmp("abc","abc");

(v) strcpy("abc","abc");

(5 marks)

(b) Write a program to read information of the articles stored in a text file called "document.dat". The information of the articles consists of author (max 25 characters), title (max 35 characters), day (integer), month (integer) and year (integer). Display the articles information to screen for user viewing. Sample file content:

```
Paul Deitel
C++ How to Program
01
01
2012
```

(10 marks)

(c) (i) What are the definitions of the ``Boolean" values true and false in C++?

(ii) Name three uses for the semicolon in C++.

(iii) Approximately what is the line #include <iostream.h> at the top of a C++ source file for?

(iv) How many elements does the array int year[10] contain? Which is the first element? The last?

(v) What are the four important parts of a function definition? Which three does a caller need to know?

(10 marks)

~ THE END ~