INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**August 2014**
Programme	:	Diploma In Information And Communication Technology (DICTN /DICTI)
Course	:	**ICT1103 / CSC1103 : Structured Programming**
Date of Examination	:	December 5, 2014
Time	:	3:00pm – 5:00pm Reading Time: Nil
Duration	:	2 Hours
Special Instructions	:	

Answer any **FOUR (4)** questions.

Materials permitted : Nil

Materials provided : Nil

Examiner (s) : **Mr. Chern Huey Rong,** Ng Ruoh Ling.

Moderator : Ms. Siti Hawa Mohamed Said

This paper consists of 8 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY (DICTN)
ICT1103 /CSC1103: STRUCTURED PROGRAMMING
FINAL EXAMINATION: AUGUST 2014 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) Trace and write out the output of the following program:

```
#include <iostream>
using namespace std;
void main()
{
        int p=1;
        int sum=0;
        while(sum<=10)
        {       sum=sum+p;
                cout<<sum<<endl;
                p++;
        }
        system("pause");
}
```

(5 marks)

(b) Explain and fix the syntax or runtime errors of the following program fragments:

(i)
```
void total(int x, int y)
{  return x+y;
}
```

(ii)
```
float sales=25000;
int interest= sales*0.15;
```

(iii)
```
int counter=1,sum=0;
while(counter<5)
{  sum+=counter;
   cout<<sum;
}
```

(6 marks)

(c) Rewrite the following program by replacing the *if/else* statements with *switch* statements. Rewrite only the *if/else* blocks.

```
#include <iostream>
using namespace std;

int main()
{
        int x, y,selection;
        int result;

        cout<<"Enter two integers:";
        cin>>x>>y;
        cout<<"What operation do you want to perform for the "
            <<"two input integers?"<<endl
                <<"1. Add\n2. Subtract\n3. Multiply\n4. Divide"<<endl
                <<"Enter your selection (1/2/3/4):";
        cin>>selection;

        if (selection==1) result=x+y;
        else if(selection==2) result=x-y;
        else if(selection==3) result=x*y;
        else if(selection==4) result=x/y;
        else
        {   cout<<"Invalid input. Can't perform the operation"<<endl;
            system("pause");
                return 0;
        }

        cout<<"Result of the selected operation is "<<result<<endl;

        system("pause");
        return 0;
}
```

(5 marks)

(d) Write a program that prints the sum, difference & product of any **TWO (2)** numbers entered by the user.

(5 marks)

(e) Write a program that asks the user to type 2 integers A and B and exchange the value of A and B.

(4 marks)

Question 2

(a) Write a program to find and display the number of times a letter occurs in a given sentence. Read the letter and the sentence from the user.

(8 marks)

(b) Write a C++ function that accepts a positive integer in the argument and displays all the factors of the integer in the function. A factor is a whole number which divides exactly into another whole number, leaving no remainder. For example, 13 is a factor of 52.

(6 marks)

(c) Write a C++ program that reads the score of an exam (0 – 100) and displays the grade of the exam based on the information given below:

Exam score	**Grade**
0 to 65	F (fail)
66 to 79	P (pass)
80 to 89	M (merit)
90 to 100	D (distinction)

(7 marks)

(d) Write a program that asks the user to type an integer and writes "YOU WIN" if the value is between 56 and 78 (both included). In the other case it writes "YOU LOSE".

(4 marks)

Question 3

(a) Write a program to read in 10 numbers from the user. However, if the user entered a negative value, your program will not continue to read in the rest of the numbers from the user even though it has not reached 10 values. Your program will calculate the total and the average of the previous input numbers.

(7 marks)

(b) An ice cream shop sells ice-cream in two different sizes of containers weight in gram. The price for each container is given in the table below:

Container (in Gram)	Charge ($)
500	$45
1000	$80

Write a program that reads in the weight of the ice-cream ordered by customer and display the ice-cream price. Your program will calculate the best combination of the containers to provide the lowest price. For example, if the customer orders 2 kg of ice-cream, then the program should use 2 1000gram's container instead of 4 500gram's container.

(8 marks)

(c) A company wants to transmit data over the telephone, but they are concerned that their phones may be tapped. All of their data are transmitted as four-digit integers. They have asked you to write a program that encrypts their data so that it can be transmitted more securely. Your function should read a four-digit integer and encrypt it as follows: Replace each digit by (the sum of that digit plus 7) modulus 10. Then, swap the first digit with the third, swap the second digit with the fourth and print the encrypted integer. Write a separate function that inputs an encrypted four-digit integer and decrypts it to form the original number.

(10 marks)

Question 4

(a) Write a program with main function that randomly generates an integer between 1 and 100. The program then asks the user to guess if the generated number is even or odd by reading 1 for odd and 2 for even from the user. Create another function in the program that takes the generated number and the guess value from the user. The function then displays the message "You have guessed right" or "You have guessed wrong" depending on the answer. The generated number is also displayed after the message. In the main function, call the function and pass the values over.

(10 marks)

(b) An integer is said to be a perfect number if the sum of its factors, including 1 (but not the number itself), is equal to the number. For example 6 is a perfect number, because 6 = 1+ 2 + 3. Write a function **perfect** that determines whether parameter **number** is a perfect number. Use this function in a program that determines and prints all the perfect numbers between 1 and 1000.

(8 marks)

(c) A right triangle can have sides whose lengths are all integers. The set of three integer values for the lengths of the sides of a right triangle is called a Pythagorean triple. The lengths of the three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Write an application to find all Pythagorean triples for side1, side2 and the hypotenuse, with each sides no larger than 500.

Example: 3, 4, 5
5, 12, 13
etc

(7 marks)

Question 5

(a) (i) Define a structure named Person to keep the following information:
- Name in string
- Weight in floating point value
- Height in floating point value

(4 marks)

(ii) Write the main function to declare an array of struct Person to handle 10 records. The program will ask the user to input name, weight in kilograms and height in meter for 10 people into the structure array. The program then displays the BMI of each of the 10 persons. The formula for BMI calculation is bmi = weight in kg / (height x height in meter)

(8 marks)

(b) (i) Explain the concept of recursive function.

(4 marks)

(ii) Trace and write out the output of the following program:

```
#include <iostream>
using namespace std;

void function(int);
void main()
{
        cout<<"Beginning of main"<<endl;
        function(3);
        cout<<"End of main"<<endl;
}
void function(int n)
{
        cout<<"N = "<<n<<endl;
        if(n>0) function(n-1);
        cout<<"N = "<<n<<endl;
}
```

(5 marks)

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

(i) total score
(ii) 2subjects
(iii)#grade
(iv)question?

(4 marks)

Question 6

(a) Identify **FIVE (5)** types of operators in C++ and provide **TWO (2)** operators of each type.

(5 marks)

(b) A burger stall sells 3 types of burger with the following prices:

Burger	**Price**
Chicken burger	3.50
Beef burger	4.00
Lamb burger	3.80

Write a program to read in the number burgers sold in a day for the three types of burgers. Calculate and display the income for each burger. Use a single-subscripted array to store the data of the prices. Use another array to keep the quantity sold for each burger. Use loop structure to perform the input and output.

(8 marks)

(c) Write a program that reads three nonzero values entered by the user and determines and prints whether they could represent the sides of a triangle.

(4 marks)

(d) Identify and explain **FOUR (4)** shortcomings of procedure oriented approach?

(8 marks)

--THE END--