INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2014**
Programme	:	Diploma In Information And Communication Technology (DICTN/DICTI)
Course	:	**ICT2100 / CSC2100: Object-Oriented Programming**
Date of Examination	:	July 24, 2014
Time	:	2:00pm – 4:00pm 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) : **Ms. Ng Ruoh Ling,** Lim Chai Kim.

Moderator : Dr. Ang Tan Fong

This paper consists of 6 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN/DICTI)
ICT2100/CSC2100 : OBJECT-ORIENTED PROGRAMMING
FINAL EXAMINATION: APRIL 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) Write a program to input two alphabets (a to z lowercase) from the user and output them in descending order. For example: if the inputs are k and p, the output should be p and k.

(7 marks)

(b) Write a program to read in two positive integers, **x** and **y** in main method. Pass the data **x** and **y** into a separate method named **power**. Inside the **power** method, calculate and display the result of **x** exponent **y** (x^y). Use the Math class method to compute the result.

(8 marks)

(c) Write a program with loop statement that will print the following series of numbers with only one print statement:

0 3 12 21 33 48 66

(5 marks)

(d) Identify whether the following variable names are valid. Explain the reason if it is not valid.

(i) Char

(ii) total score

(iii) 123

(iv) ice-cream

(v) question?

(5 marks)

Question 2

(a) In year 2014, 1st of July falls on Tuesday. Based on this information, write a program that creates a *String* array named **days** that stores the days (Monday, Tuesday, until Sunday) of a week. The program then requests the user to enter a particular date (between 1 and 30) of July 2014 and displays which day of a week it falls on. For example: if the input date is 9, then the day is Wednesday.

(8 marks)

(b) Trace the output of the following code:

```
public static void main(String [] arg)
{     int p=1;
      int sum=0;
      while(sum<30)
      {     sum=sum + (++p);
            System.out.println(sum);
            p++;
      }
}
```

(5 marks)

(c) Determine the appropriate data type that you should use to declare the following data:

(i) the student number

(ii) the average of two tests

(iii) the alphabet block code for a building

(iv) the name of a student

(v) the married status of a couple

(vi) the amount of money

(6 marks)

(d) Explain the following Math's methods with examples:

(i) ceil(x)

(ii) abs(x)

(iii) sqrt(x)

(6 marks)

Question 3

(a) Write a program that reads a word from the user. The program then displays the number of vowel characters, the number of consonant characters and the total number of characters in the word.

A sample of input and output of the program is shown below:

```
Enter a word :
character
The number of characters in "character" is 9
The number of vowels is 3
the number of consonants is 6
```

Hint: use the String's method to perform the trimming of extra spaces, conversion of cases, counting of characters and extracting character from a string.

(12 marks)

(b) Differentiate between variable and constant.

(4 marks)

(b) Trace the output of the following program:

```
public class Q3a{
    public static void main(String arg[]) {
           A obj1 = new A(5,6);
           B obj2 = new B(2,4);
    }
}

class A{
    public A(int a, int b) {
      System.out.println("A's constructor is called");
      System.out.println(++a);
      System.out.println(b++);
    }
}

class B extends A{
    public B(intx, int y) {
      super(y, x);
      System.out.println("B's constructor is called");
      System.out.println(y++);
      System.out.println(++x);
    }
}
```

(9 marks)

Question 4

(a) Define a class named **Square** that consists of the following members:

- attribute **length** (int)
- **area**( ) method that returns the area of a square (length * length)
- **perimeter**( ) method that returns the circumference of a square (4 * length)

(5 marks)

(b) Write a program with main method that instantiates an object of **Square**. Read the length of the square from the user. Display the length, the area and the perimeter of the square on screen through the use of object attribute and object methods declared in class **Square**.

(5 marks)

(c) Define a class named **Cube** that derives from the class **Square**. Override the **area** method in the class **Cube** to return the correct calculation of the area of a **Cube** (6 * area of square). Include an additional object method in the class called **volume( )** which is used to return the volume of a **Cube** object (length * length * length).

(5 marks)

(d) Write a program with main method that creates and array of Cube to store 5 Cube objects. Read the lengths of the 5 cubes from the user. Display the average area and average volume of the 5 cubes on screen. The area and volume calculation of each cube object should be through the use of the methods defined in class Cube.

(10 marks)

Question 5

(a) Trace the output of the following program:

```
class Numbers {
      public static void main( String args[ ] )
      {
            int sum1=0, sum2=0;
            for (int i=1, j = 2; i< 20 ; i +=2 , j++)
            {
                  sum1 += i;
                  sum2 += j*i;
                  if (sum1 % 4 == 0 )
                        System.out.println("sum = " + sum1);
                  if ( (sum2-sum1) % 5 == 0 )
                        System.out.println("sum = " + sum2);
            }
            System.out.println("Sum = " + (sum1+sum2) );
      }
}
```

(10 marks)

(b) Write the following classes to demonstrate the concept of inheritance and abstraction:

(i) Define an interface named **Capabilities** with a method named **skills** that returns String.

(2 marks)

(ii) Define an abstract class named **Employee** with an abstract method named **jobScope** that returns String.

(3 marks)

(iii) Define a child class of class **Employee** named **Salesperson** that implements the interface **Capabilities**. Salesperson's job scope is to "sell product" and skill required is "communication skill".

(5 marks)

(iv) Define another child class of class **Employee** named **Manager** that also implements the interface **Capabilities**. Manager's job is to "lead and manage subordinates" and skill required is "leadership skill".

(5 marks)

Question 6

(a) Identify and Explain **THREE (3)** characteristics of object-oriented programming.

(9 marks)

(b) Provide **TWO (2)** benefits of creating interfaces.

(4 marks)

(c) (i) Explain binary searching technique.

(2 marks)

(ii) Write a method named **binarySearch** that takes a sorted array and a search key as the argument and return the index of the search key found in the array. If the search key is not found in the array, a -1 value is returned. The method should apply binary search technique.

(10 marks)

-THE END-

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