INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2015**
Programme	:	Diploma In Information And Communication Technology (DICTN/DICTI/DNSI)
Course	:	**ICT2100 / CSC2100** **Object-Oriented Programming /JAVA Programming**
Date of Examination	:	August 4, 2015
Time	:	11:00am – 1:00pm 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

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Moderator : Dr. Ang Tan Fong

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY
ICT2100: OBJECT-ORIENTED PROGRAMMING
CSC2100: JAVA PROGRAMMIMG
FINAL EXAMINATION: APRIL 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) Write a program that reads two positive integers. The program then displays if one integer is the factor of the other integer. Test the integers both ways to see if the first integer is the factor of the second integer or if the second integer is the factor of the first integer. The checking is done using a separate method that takes two positive integers and return true if the first integer is the factor of the second integer.

(12 marks)

(b) Write a nested for loop to display the following series of numbers:

1
22
333
4444
55555

(5 marks)

(c) Differentiate between the two terms in the following:

(i) an object and a class
(ii) a constructor and a method
(iii) an object variable and a class variable
(iv) an abstract class and a concrete class

(8 marks)

Question 2

(a) Explain the situation when the access specifier **final** is used on the following:

(i) A variable
(ii) A method
(iii) A class

(6 marks)

(b) Write a program that will generate a 4-digit number to be displayed on screen. The 4-digit number is created by generating and combining four 1-digit numbers range between 0 and 9. Use random function to generate the four 1-digit numbers. Use *String* variable to combine the four numbers to produce a 4-digit number as *String*.

(5 marks)

(c) Given the information:

Grade	A	B	C	D	Else
Output message	Excellent	Good	Average	Poor	Invalid

Write a program that reads a grade (character A to D) from the user and display the matching output message two times using **TWO (2)** different structures:

(i) if/else
(ii) switch

(9 marks)

(d) Suppose we have the following declarations and expression in our program:

```
int a = 10, b = 20, c = 15, d = 8, e = 40;
int z = ( a + b / ( c - 5 )) / (( d + 7 ) / ( e - 37 ) % 3 );
```

Calculate the answer for the above expression by writing out all the steps.

(5 marks)

Question 3

(a) Given the class below:

```
public class Toy {
    private double cost;
    private String category;
}
```

(i) Provide one default constructor that takes no arguments and assign "N/A" to category and 0 to cost. Overload the constructor with another constructor that takes full arguments for both attributes cost and category and assign data accordingly.

(4 marks)

(ii) Provide the setter and getter methods for both private attributes. The cost value cannot be negative.

(5 marks)

(iii) Provide a **calculatePrice** method that returns the price of a toy. The price is the value of the cost mark up by 40%.

(3 marks)

(iv) Provide the **toString** method that returns all the details of the object.

(3 marks)

(b) With regards to the question in 3(a), write a program to instantiate two objects of **Toy**. The data for the attributes of both objects are as follow:

First toy: cost is RM 36.50 and category is "Soft toy"
Second toy: cost is RM 45.90 and category is "Remote car"

Create the first toy object using the default constructor, then initialize the data using setter methods. Create the second toy object using the second constructor by giving necessary arguments. Display the detail of both objects using **toString** method and also their prices using **calculatePrice** method defined in class **Toy**.

(10 marks)

Question 4

(a) The following arrays show the coldest and the hottest temperature in a day from Sunday to Saturday in a particular week in a city.

```
float coldest[] ={15.8f, 12.4f, 17.1f, 20.2f, 19.6f, 18.5f,
16.6f};
float hottest[] ={23.8f, 20.6f, 25.3f, 26.8f, 24.2f, 24.1f,
22.8f};
```

Write a code to identify the coldest and the hottest temperature in that week and state the difference between the coldest and the hottest temperature in the week.

(11 marks)

(b) Write a program that has an array of size 10 to store 10 sentences. Use loop structure to read 10 sentences from the user. Determine and display which sentence is the longest by displaying the sentence on screen. Then, copy half of the sentence into an array of *char*.

(14 marks)

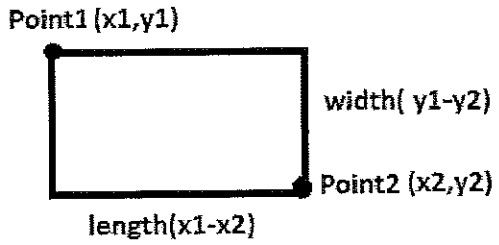
Question 5

(a) Write the following classes to demonstrate the concept of object composition. To simplify the coding, all attributes of the classes are not set to private.

(i) A class named **Point** that has two attributes **x** and **y** (both type *int*) which are used to keep the value of the coordinate x and y of a point.

(2 marks)

(ii) A class named **Rectangle** has two attributes: **point1** and **point2** (type **Point**) which are pointing to the upper left corner of a rectangle and the lower right corner of the same rectangle. Class **Rectangle** has a method named **area** that is able to return the area of a rectangle. The area of a rectangle is calculated by multiplying the width and the length of the rectangle. The width and the length of the rectangle is calculated using the attributes **point1** and **point2.** The calculation is shown in the diagram below. Use the Math method **abs()** to return positive value for both the width and length calculations.



(7 marks)

(iii) Based on the class **Rectangle** created above, create a program that instantiates two rectangle objects. Initialize the points (**point1** and **point2**) for both rectangle using the data below:

First rectangle: coordinate (12, 40) for point1 and coordinate (50,15) for point2
Second rectangle: coordinate (35, 55) for point1 and coordinate (70, 35) for point2

Display the area of both rectangles and state which rectangle is bigger (first or second).

(8 marks)

(b) Given the code below:

```
int a[ ] = new int[5];
int i;

for ( i = 0; i <= 5; i++) {
      a[i] = Integer.parseInt(JOptionPane.showInputDialog(
      "Enter a number"));
}
```

(i) Identify **TWO (2)** possible exceptions that can be triggered by the above code.

(2 marks)

(ii) Provide the try catch statement to catch these exceptions.

(6 marks)

Question 6

(a) A pet shop is selling two types of pets: dog and hamster.

Write an abstract class named **Pet** with the following members:

- protected object variable **species** that keeps the species of a pet
- protected object variable **monthOld** that stores the age of a pet in months.
- constructor that takes the data for species and the age of a pet for initialization
- an abstract method **pricing** that has a return type of double
- a **toString** method that returns the species and the age of the pet in String

(7 marks)

(b) Based on the class **Pet**, create two final subclasses: class **Dog** and class **Hamster** where both have the following members:

- A constructor that accepts the data of how many months old the pet is and assign the fixed data "dog" or "hamster" to the variable species accordingly.

The price for both **Dog** and **Hamster** is calculated based on their age in months. For a dog, the price is the age times 80. For a hamster, the price is the age times 15. For instance, if a dog is 3 months old, then it is priced at RM240 (3 months x 80). Override the method **pricing** in both subclasses to return their prices using the correct formulas respectively.

(12 marks)

(c) With regards to questions (a) and (b), create a client program that instantiates one **Dog** object and one **Hamster** object. Set the age of the dog to 2 months old and the age of the hamster to 5 months old. Demonstrate the concept of polymorphism by creating a separate method called **display** that accepts a **Pet** as its parameter. In the **display** method, displays the details of a pet using the **toString** method declared in the parent class and the pet's price using the **pricing** method defined in both child classes.

(6 marks)

--THE END--

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