INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**August 2015**
Programme	:	Diploma In Information And Communication Technology (DICTN/ DICTI)
Course	:	**ICT2100/ CSC2100: Object Oriented Programming / Java Programming**
Date of Examination	:	December 9, 2015
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** and Mr. Shahriman Mohd Said

Moderator : Dr. Ang Tan Fong

This paper consists of 7 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY
ICT2100 : OBJECT-ORIENTED PROGRAMMING
CSC2100: JAVA 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) A fruit shop sells a few types of Tropical fruits and the price for each fruit is shown in the table below:

Fruit	**Price (RM) per kilogram**
Durian	16
Mango	5
Rambutan	4.50
Mangosteen	6

Write a program that helps the shop to calculate how much a customer should pay by reading the fruit type and the kilogram the customer purchases. The program displays the total charge.

(12 marks)

(b) Write a nested *for* loop to display the following series using the loop counter.

5 6 7 8 9
6 7 8 9 10
7 8 9 10 11
8 9 10 11 12

(5 marks)

(c) Write the following functions:

(i) A function that takes two integers, **min** and **max**. The function returns a random integer between the **min** and the **max**.

(5 marks)

(ii) A function that takes two Strings: **s1**, and **s2** and returns whichever String that is greater. Assuming both Strings are different.

(3 marks)

Question 2

(a) Assuming all packages are imported and variables used are declared and initialized, identify and correct the errors in the following statements:

(i)
```
if (age>=65)
      charge=10;
      System.out.println("Senior citizen");
else
      charge=25;
      System.out.println("Not senior citizen");
```
(2 marks)

(ii)
```
class Coordinate {
      int x;
      static int y;
      public static void display() {
            System.out.println("x = "+x);
            System.out.println("y = "+y);
      }
}
```
(2 marks)

(iii)
```
class Employee {
      double basicSalary;
      String name;
      public abstract double monthlySalary();
}
```
(2 marks)

(iv)
```
switch(grade) {
      case 1:
      case 2: System.out.println("Good"); break;
      case 2:
      case 3: System.out.println("Average"); break;
      case 3:
      case 4: System.out.println("Poor"); break;
      default: System.out.println("Invalid grade");
}
```
(2 marks)

(v)
```
float tax;
Scanner scan=new Scanner(System.in);
System.out.println("Enter salary : ");
int salary = scan.nextInt();
if (salary > 2500) tax = 0.5f;
else if (salary <= 2500)
tax =0.0f;
```
(2 marks)

(b) An institute calculates students' CGPA by taking the average points of all subjects obtained by a student. The point given is based on the subject grade as shown below:

Grade	Points
A	4
B	3
C	2
D	1
F	0

If a student obtains 2As, 2Bs and 1C in 5 subjects, his/her CGPA is (4+4+3+3+2)/5 = 3.2.

Write a program that will read 10 students' grades for 5 subjects each into a two-dimensional array. The program then calculates and displays the CGPA for each student.

(15 marks)

Question 3

(a) List any **FIVE (5)** Java primitive data types.

(5 marks)

(b) The following questions are relevant to the class given below:

```
public class Cat{
      private String name;
      private double weight;
      private String color;
}
```

(i) Provide a constructor for the class above that takes **name, weight** and **color** for a new object initialization.

(3 marks)

(ii) Provide the toString method that returns all the data for a cat object in String.

(3 marks)

(iii) Explain the use of accessor in a class.

(2 marks)

(iv) Provide the accessor and mutator for the attribute weight. The weight for a cat should be positive.

(4 marks)

(c) Trace the output of the following program:

```
class trace  {
   public static void main(String args[]) {
      String str1="I_am_taking_an_exam";
      String str2=str1.substring(7);
      System.out.println(str2);
      String str3=str1.substring(3,10);
      System.out.println(str3);
      String str4=str2+str3;
      System.out.println(str4);
      System.out.println(str4.length());
      char symbol = str1.charAt(12);
      if(Character.isLetter(symbol))
            System.out.println(symbol+" is a letter");
      else
            System.out.println(symbol+" is a not letter");
      int index=str2.indexOf('a');
      System.out.println("Letter a occurs in index "+index);
      for(int i=0; i<str3.length(); i++)
      {   if(i%2==0)
                System.out.print(str3.toUpperCase().charAt(i));
          else
                System.out.print(str3.toLowerCase().charAt(i));
      }
   }
}
```

(8 marks)

Question 4

(a) The following shows the ingredients needed to make a one kilogram chocolate cake:

200 gram butter
220 gram sugar
4 eggs
175 raising flour
50 gram cocoa powder

The price for each kg is charged RM28.

Write a class for the above chocolate cake with the following members:

- private object variable **kg** to keep the weight of a cake to be made
- A constructor that takes the value kg for new object initialization
- getter and setter methods for the private attribute
- a method named **price** that returns the price for a chocolate cake based on the weight. The examples of valid weights are 1kg, 2.5kg, and 5kg.
- A method named **ingredients** that returns all the ingredients (in String) needed based on the weight

(13 marks)

(b) Based on the class created in 4(a), write a client program that will create an array to store the data of 5 chocolate cakes with the weight of 0.5kg, 1kg, 2kg, 3kg and 5 kg respectively. The program then shows the price and ingredients for each cake.

(8 marks)

(c) Explain the following concept in object-oriented programming:

(i) Polymorphism
(ii) Abstraction

(4 marks)

Question 5

(a) (i) Differentiate between overloading methods and overriding methods.

(4 marks)

(ii) Write a program to demonstrate overloading methods and overriding methods.

(9 marks)

(b) Given the code below:

```
Scanner scan=new Scanner(System.in);
System.out.println("Enter a string");
String input=scan.nextLine();
System.out.println("Enter the position in number to find a "
        + "character in the string entered previously: ");
int index=scan.nextInt();
char character=input.charAt(index-1);
System.out.println("The character is " + character);
```

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

(4 marks)

(ii) Rewrite the code so that the program will handle the possible exceptions and prompt proper error messages to the user. The user is then asked to reenter the values if any error occurs.

(8 marks)

Question 6

(a) Given the following code:

```
public interface Printing{
     public String printingTechnique();
     public String printingSpeed( );
}
```

Write a class named **Printer** that implements the above interface. Design the Printer class for printer object that has information of the printer brand and the dot per inch printing resolution. Set the attributes to private and provide a constructor that takes needed arguments for new object initialization. The class overrides the above methods as abstract members but does not implement the details of the methods from the interface.

(7 marks)

(b) With regards to question 6(a), design and write two child classes that derive from the above **Printer** class. The first child class is for Ink Jet printer where it has private attribute to store the number of cartridge used. The second child class is for Laser printer where it has private attributes to store whether it supports color or not. Both classes also implement the constructor needed for object initialization and the methods from the interface with the following data:

	printingTechnique	printingSpeed
InkJet	"Spray ink through cartridge nozzle on paper"	"13 to 15 pages per minute"
Laser	"Roll a heated drum that selectively collects electrically charged powdered ink on paper to transfer the image over"	"Between 21 to 42 pages per minutes"

(18 marks)

~THE END~