



FINAL
Examination Paper

(COVER PAGE)

Session : January 2014

Programme : Diploma In Information And Communication Technology
(DICTN/DICTI)

Course : ICT2100 / CSC2100: Object-Oriented Programming

Date of Examination : March 10, 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, Koo Lee Chun.

Moderator : Dr. Ang Tan Fong

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

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DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN/DICTI)
DIPLOMA IN NETWORKING AND SECURITY (DNSI)
ICT2100/CSC2100 : OBJECT-ORIENTED PROGRAMMING
CSC2114 : JAVA PROGRAMMING
FINAL EXAMINATION: JANUARY 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) Assuming all variables used are declared and initialized, identify the syntax errors in the following statements. Write the correct statement for each.

(i)

```
int num1=2;
float num2=num1*0.5;
```

(ii)

```
if (age>=65);
    System.out.println("Senior citizen");
else
    System.out.println("Not senior citizen");
```

(iii)

```
int [] num1;
num1=new int [10];
int [] num2;
num2={1,2,3,4,5};
```

(iv)

```
double balance=1234.55;
int value=(double)balance;
```

(v)

```
public void add( int a, int b, int c) {
    a=b+c;
    return a;
}
```

(vi)

```
class A extends B {
    int x;
    public A() {
        x = 20;
        super(10);
    }
}
```

(12 marks)

- (b) A bottle drink is sold in package of 6 (1 package consists of 6 bottles). Each package is RM 24.50. Write a program that reads the number of bottles needed. The program then calculates and displays how many packages to purchase and the total charge. (8 marks)
- (c) Write a program with loop statement that will print the following series of numbers with only one print statement:
0 2 6 12 20 30 42 (5 marks)

Question 2

- (a) A company is selling X brand water filter at the price of RM 979 per unit. The salespersons receive a commission of 5% from the total sales (total sales = selling price * units sold) they perform. On top of that, they are also given a basic salary of RM700 per month. Write a program that inputs the number of units sold by a salesperson in a month and display his/her commission earned and total salary (basic + commission) received for the month. (8 marks)
- (b) Given that the values on a series are: 8, X, 5, -2, 7, -9, 16,
8 and X are base numbers. 5 is derived from 8 - X. Write a complete java program with two methods: main method and recursive method. Use main method to read in the position of the series requested by the user and display the value accordingly. Use the recursive method to calculate and return the value of the position required by the user. For example, if the user wishes to know the value of position 7 on the series, the recursive method will return "16". (10 marks)
- (c) Given

```
public class MusicRoom extends Classroom
{
    public String getRoomSize( )
    {
        return setRoomSize(setFurnitureNum());
    }
}
```

With the class above, write the corresponding superclass with

- a method **setFurnitureNum()** that is used to read and return the user-input for the number of furniture
- a method **setRoomSize()** that is returning the String "big" if there are more than 5 furniture and "small" otherwise.

(7 marks)

Question 3

(a) Trace the output of the following program:

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

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

class B {
    public B(int b) {
        System.out.println("B's constructor is called");
        System.out.println(b);
    }
}
```

(6 marks)

(b) Complete the following requirements in the same program.

- (i) Write a program to read in 10 students' record with 4 subjects for each student into a two dimensional array called **marks [10][4]**.
(4 marks)
- (ii) Store the total marks of 4 subjects for each student in a single dimensional array called **total [10]**.
(2 marks)
- (iii) Determine and store the best score among 4 subjects for each student in a single dimensional array called **best[10]**.
(2 marks)
- (iv) Display the total score and best score for each student.
(2 marks)

(c) Distinguish between abstract class and concrete class.

(4 marks)

- (d) Given an interface and an abstract class as below:

```
public interface Swim {
    public void swimmingStyle();
}

public abstract class Animal{
    public abstract void howToMove();
}
```

Write a class called **Human** that inherits from class **Animal** and implements interface **Swim**. The **Human** class displays the message "Free style" for method **swimmingStyle** and the message "Walk with legs" for method **howToWalk**.

(5 marks)

Question 4

- (a) The Computer Science Division will be organizing a software design competition and you are required to create an application to capture the registration information. You are required to create the following class named **CompetitionEntry**. The class has the following members:

- two private attributes : **projectTitle** (*String*) and **teamSize**(*int*)
- one static attribute **feePerParticipant** (double) with initial value of RM6.50
- a non-argument constructor that initializes the attributes as below:


```
projectTitle = "N/A";
teamSize = 0;
```
- An overloading constructor that initializes the attributes using the incoming arguments (3 marks)
- Mutator and accessor method for attribute **teamSize**. Ensure that **teamSize** takes only positive value.
- A **computeTeamFee()** method that returns the total fee by multiplying **teamSize** with **feePerParticipant**

(15 marks)

- (b) Write a program to create **CompetitionEntry** object defined above and initialize the object (using constructor) with the following values: "Super Tech" for title and team size is 5. Display the total team fee on screen. Change the team size to 6 and display total team fee again. All changes and display should go through object methods.

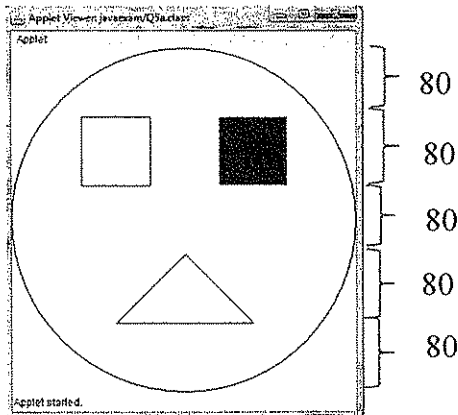
(6 marks)

- (c) Differentiate between *break* and *continue* statements.

(4 marks)

Question 5

- (a) Code the paint method inside the Applet class that will produce the following smiley face drawing:



Set the applet size to 400 by 400. Draw a round face sized 400 x 400 in the middle of the frame. Draw the eyes (filled and unfilled rectangles, sized 80 x 80) inside the face with the gap of 80 in between. Draw the mouth (triangle) in the middle, below the eyes where the left and right edges of the mouth are right below the middle point of each eye.

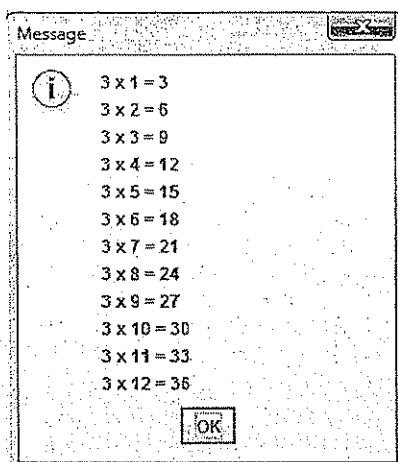
(10 marks)

- (b) Explain the following String methods:

- (i) `charAt`
- (ii) `substring()`
- (iii) `regionMatches()`
- (iv) `replace()`
- (v) `trim()`

(10 marks)

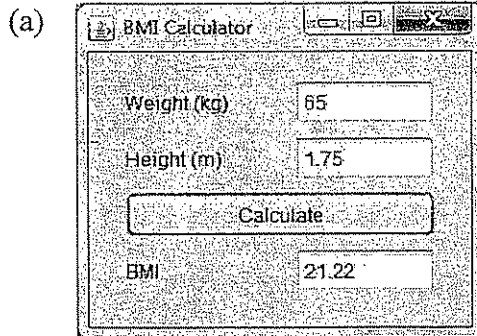
- (c) Write a program that uses loop structure to produce the multiplication table of 3 and print it in a message box as shown below:



Hint: accumulate the output using variable String in the loop body.

(5 marks)

Question 6



The above application will calculate and display the Body Mass Index (BMI) by reading the height and the weight entered by the user. The formula of BMI is

$$\text{BMI} = \text{weight in kg} / (\text{height in meter})^2$$

Given that the names of the textfields of the application above are: `tfWeight`, `tfHeight`, and `tfBMI`, provide the code within the `ActionPerformed` method for the Calculate button. Give the BMI result in 2 decimal places.

(8 marks)

(b) Given the following program:

```
import java.util.*;
public class Q6b {
    public static void main(String arg[])
    {
        Scanner scan=new Scanner(System.in);
        String [] months={"January", "February", "March",
            "April", "May", "June", "July", "August",
            "September", "October", "November", "December"};

        //loop statement
    }
}
```

Write the loop statement for the above program that consists of the following:

- Input statement to read an integer between 1 and 12 from the user and display the name of the month by accessing the array `months`. Note that value 1 will access "January" and value 2 will access "Feb" and so on.
- The exception handling that is used to handle the assessment of array element if the integer provided by the user is not between 1 and 12 by giving a message "Invalid input" in the catch block. The loop statement stops if there is no exception.

(7 marks)

- (c) A class **Door** has one private attribute **material** (*String*). The class has constructor that takes data for attribute **material**. It has **toString** method that returns in *String* the information of a door.

A class **GlassDoor** is the child class of class **Door**. Class **GlassDoor** has private attribute **type** (*String*). It has a constructor that assigns the **material** to "glass" and takes argument for attribute **type**. It has **toString** method that returns the information of a glass door's material (by accessing parent class's **toString** method) and type.

Write the code for both classes.

(10 marks)

--THE END--

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