UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: DCT1094
COURSE	: OBJECT ORIENTED PROGRAMMING
SEMESTER/SESSION	: 1-2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 8 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Write an algorithm (either pseudocode or flowchart) for the following program in Figure 1. (4 marks)

```
import java.util.Scanner;
public class Main
{
 public static void main(String[] args) {
     Scanner input = new Scanner(System.in);
     double ticketPrice;
    System.out.print("Please enter age: ");
     int age= input.nextInt(); // input age
     if (age >= 13)              // determine age category
       ticketPrice=10.00;     //set ticket price to 10
    else
       ticketPrice=7.00;    // set ticket price to 7

  System.out.printf ("Your Ticket Price is RM
  %.2f",ticketPrice);
     }
}
```

Figure 1

b) The following Java program (Figure 2) use a `switch-case` statement to input country code and prints its names based on Table 1. Rewrite the program using `if-else-if` statement. (6 marks)

Table 1

Code	Name
1	Canada
60	Malaysia
62	Indonesia
66	Thailand

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    int country_code;
    System.out.println("Please enter country code ");
    country_code = input.nextInt();    //get input
```

```
        switch(country_code)  {
         case 1:  System.out.println("Canada");
         break;
         case 60: System.out.println("Malaysia");
         break;
         case 62: System.out.println("Indonesia");
         break;
         case 66: System.out.println("Thailand");
         break;
        } //switch
      }
    }
```

Figure 2

c) Write a Java `for` loops code segment to print odd numbers from 1 to 15. Here is output sample (Figure 3): (3 marks)

```
1 3 5 7 9 11 13 15
```

Figure 3

QUESTION 2

a) Identify and correct **ONE (1)** error in each of the following methods definition (Question i) and ii))

i) (2 marks)

```
// This method has an error!
public static void progInfo();{
    System.out.println("DCT 1094");
}
```

ii) (2 marks)

```
// This method has an error!
public static void average(int N1, int N2) {
    return ((N1+N2)/2.0);
  }
```

b) Consider the following method header in figure 4.

```
public static void printMonth (int year, int
month)
```

Figure 4

i) How many parameters do the method `printMonth` have? (2 marks)

ii) Write the return type of method `printMonth`? (2 marks)

c) Explain method overloading. (3 marks)

d) Consider the following program in Figure 5.

```
public class Main {
public static void main (String [] args){
    System.out.println(methodMisteri(2.0,5.0));
    }

    public static double methodMisteri(double N1,
    double N2){
       return N1*N2;
    }

    public static int methodMisteri(int N1, int
    N2){
       return N1+N2;
    }
}
```

Figure 5

i) Write the output for the program. (2 marks)

ii) Write the output for the program if the statement (2 marks)
`System.out.println(methodMisteri(2.0,5.0));` is replaced with
`System.out.println(methodMisteri(2,5));`

iii) Identify whether the following method call is valid. Give a reason. (3 marks)
`System.out.println(methodMisteri (2.0,5.0,3.0);`

iv) Identify whether the following method call is valid. Give a reason. (3 marks)
`System.out.println(methodMisteri ("2",5.0);`

e) Write a method that returns an average of a three given integers. (3 marks)
Use the following method header.
public static double avgThree(int N1, int N2, int N3)

f) Write a test program (main method) that prompts the user to enter three numbers and invokes the method in e) and print the average. (5 marks)

Here is a sample run:

```
Please enter three integers:
2<enter>
3<enter>
10<enter>

The average for three integers is 5.0
```

QUESTION 3

a) List the four pillars of object-oriented programming. (4 marks)

b) Procedural programming is called as a "Spaghetti code" for the interdependencies among the separated variable and function. Explain how object oriented programming concept overcomes the problem. (3 marks)

c) Consider the following Java Program in Figure 6.

```
class bulatan{
    private double jejari;

    bulatan(){
      jejari =1.5;
    }

    public void setJejari(double newJejari){
        jejari= newJejari;
    }

    public double getJejari(){
        return jejari;
    }
}
public class Main
```

```
{
    public static void main(String[] args) {
        bulatan bulat1 = new bulatan();
        bulatan bulat2 = new bulatan();
        System.out.println("Jejari bulatan pertama :"+
        bulat1.getJejari());
        bulat2.setJejari(7.0);
        System.out.println("Jejari bulatan kedua
        :"+bulat2.getJejari());
    }
}
```

Figure 6

i) Write the output for the program. (3 marks)

ii) Explain an error if `setJejari` visibility method is changed from `public` to `private` as follows (Figure 7): (3 marks)

```
Public private void setJejari(double newJejari){
        jejari= newJejari;
    }
```

Figure 7

QUESTION 4

a) Design a class named rectangle to represent a rectangle. The class contains: (10 marks)

- Two integer data fields named width and height that specify the width and height of a rectangle. The default values are 10 for both width and height.
- A no-arg constructor that creates a default rectangle.
- A constructor that creates a rectangle with the specified width and height.
- A method named getArea that returns the area of this rectangle.
  - Area= width x height
- A method named getPerimeter that returns the perimeter of this. rectangle.
  - Perimeter= 2(width + height)

The UML class diagram for rectangle is given as follows (Figure 8).

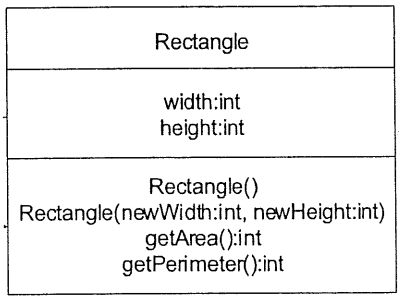

Figure 8

b) Write a test program that creates two Rectangle objects- one with width 20 and height 30 and the other one with width 100 and height 200. Display the area and perimeter of each rectangle. (6 marks)

QUESTION 5

Use the following java program in figure 9 to support your answer in the following question a), b), c), d) and e).

```
class circle {
    int radius;

    double getArea(){
        return (3.14*(radius*radius));
    }
}

class cylinder extends circle{
    int height;

    double getArea(){
     return ((2*3.14*radius*height)+2*(super.getArea()));
    }
}
public class Main
{
     public static void main(String[] args) {
         cylinder cil1= new cylinder();
         cil1.radius=2;
         cil1.height=3;
         System.out.println(cil1.getArea());
     }
}
```

Figure 9

a) Draw a UML Class Diagram for the java program in Figure 9. (4 marks)

b) State the number of classes and the number of objects defined in the program. (3 marks)

c) Explain inheritance and how inheritance promotes code reusability. (6 marks)

d) Explain superclass and derived class. (6 marks)

e) Explain method overriding. (5 marks)

f) Explain super keyword. (5 marks)

----------**End of question**----------