INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**APRIL 2019**
Programme	:	Diploma In Information And Communication Technology (DICTN) Diploma In Information And Technology (DITN)
Course	:	**ICT2100: Object Oriented Programming**
Date of Examination	:	28 July 2019, (Sunday)
Time	:	5:00pm – 7:00pm Reading Time : Nil
Duration	:	2 Hours

Special Instructions :

SECTION A: Answer **FOUR (4)** questions.
SECTION B: Answer **THREE (3)** questions.

Materials permitted :
Non-programmable Calculator

Materials provided :
Nil

Examiner(s) : **Ng Ruoh Ling**, Siti Hajar and Lai Kim Min

Moderator : Siti Hawa

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

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTN)
ICT2100 : OBJECT-ORIENTED PROGRAMMING
FINAL EXAMINATION: APRIL 2019 SESSION

Instructions: This paper consists of **SEVEN (7)** questions. Answer ALL questions in the answer booklet provided.

SECTION A (40%)

Question 1

(a) Trace the output for the following statements:

```
System.out.println("A" + "B" + 'C' + 1);
System.out.println('A' + 10 + "A" + 5);
System.out.println(10 + 1.27f + "A" + "B");
System.out.println(1/2 + 1/2.0 - 2);
System.out.println(1/2f + 1d/2 - 2);
```

(5 marks)

(b) Declare a `String` variable called `warningText` that holds a text message "`You have almost reached maximum limit!`". Write a fragment of code to display the following message box:

(5 marks)

Question 2

(a) By using a loop, write a code fragment to print out integers 1 to 20. The output should display 5 integers per line and each single digit value is prefixed with 0. Use newline and tab characters in formatting the output. Below shows the output for the code fragment:

```
01    02    03    04    05
06    07    08    09    10
11    12    13    14    15
16    17    18    19    20
```

(7 marks)

(b) Provide the output for the following program fragment:

```
String s1 = "int", s2 = s1;
s1 += "i";
System.out.println(s1 + " " + s2 + " " + (s1 == s2));
```

(3 marks)

Question 3

(a) Differentiate between local variables, instance variables and class variables.

(6 marks)

(b) Given the following method:

```
public static int getAnswer(int[] list) {
  int x = 0;
  for (int i = 1; i < list.length; i++) {
    int y = list[i] - list[0];
    if (y > x) {
      x = y;
    }
  }
  return x;
}
```

What value does the method return when receives each of the following arrays:

(i) `{4, 2, 10, 8}`

(ii) `{8, 2, 10, 4, 10, 9}`

(4 marks)

Question 4

(a) Given the program below:

```
package samepackage;
public class A {
    public int x;
    protected int y;
    private int z;
}
package samepackage;
public class B extends A{
     protected int t;
     int w;
}
package otherpackage;
public class C {
     A a = new A();
     B b = new B();
}
```

(i) What is the relationship between class `A` and class `B`?
(ii) Which attributes in class `A` are accessible by object of `B`?
(iii) Which attributes in class `B` are accessible by object of `A`?
(iv) Which attributes in class `A` are accessible by object `a` defined in class `C` if class `C` is defined in a different package as class `A`?
(v) Which attributes in class `B` are accessible by object `b` defined in class `C`?
(vi) Provide the import statement in class `C` in order to create object of `A`.

(6 marks)

(b) Explain the **FOUR (4)** keywords/statements used in exception handling.

(4 marks)

SECTION B (60%)

Question 5

(a) Write a program that reads 10 integers from user into an array. The program then determines and displays the smallest integer and the biggest integer among the inputs.

(10 marks)

(b) Trace the output for the following program:

```
public class Q5b {
    public static void main(String[] args) {
        int n1=2, n2=5, x=1;
        First f=new First(n1--, --n2, ++x);
        Second s=new Second(n1,n2,x);
        System.out.println(First.x);
    }
}
class First{
    static int x;
    public First(int n1, int n2, int x)
    {   First.x=x;
        System.out.println(n1);
        System.out.println(n2);
        System.out.println(x);
    }
}
class Second extends First{
    static int x;
    public Second(int n1, int n2, int x)
    {
        super(++n2, n1++,x+1);
        Second.x=x;
        System.out.println(n1);
        System.out.println(n2);
        System.out.println(x);
    }
}
```

(10 marks)

Question 6

(a) Write two overloaded recursive methods that return the sum of values from 1 to `n` or `min` to `max`. For examples, if n is 4, the return is 10 (1+2+3+4), if the min and max are 3 and 6, the return is 18 (3+4+5+6)

```
public static int sum(int n)
public static int sum(int min, int max)
```

(8 marks)

(b) Given the following object instantiations:

```
Pen p1 = new Pen ("Marker pen", 3, "Blue");
Pen p2 = new Pen ("Ball pen", 0.7);
Pen p3 = new Pen ("Fountain pen");
```

where "Marker pen" or "Ball pen" or "Fountain pen" are referring to the pen type, 3 or 0.7 are referring to the thickness of the pen tip and "Blue" is referring to the pen color.

Design and write the class `Pen` with necessary private attributes, overloading constructors which allow the three different ways of object instantiation in the code provided above where the default pen color is set to "black" and the default thickness is set to 0.5.

(8 marks)

(c) Given the following method:

```
public static int stringToInteger(String input)
{
    int output=Integer.parseInt(input);
    return output;
}
```

Re-write the method so that the method can handle the exception if variable `input` cannot be converted to type `int`.

(4 marks)

Question 7

(a) Consider the following class definition:

```
public class Ticket {
    private String number;
    private double price=30;
    public Ticket(String number) {
        this.number = number;
    }
    public String getNumber(){ return number;}
    public double getPrice() { return price; }
}
```

(i) Create an interface called `TicketDiscount`. Include a method called `getDiscountRate()` that returns a discount rate (`double`). Example of a discount rate is 0.15 (15%).

(2 marks)

(ii) Define a class called `VIPTicket` that serves as a subclass of class `Ticket` and implements the interface `TicketDiscount`. The class `VIPTicket` has a private attribute `VIPType` (String). The normal price of a ticket is RM30. VIP gets a different discount rate based on the `VIPType` as follows:

- Silver - 10%
- Gold - 20%
- Platinum - 30%

Provide the constructor, `getPrice` and `getDiscountRate` methods in the class.

(12 marks)

(b) You deposit RM1,000 into a Fixed Deposit account where the yearly interest rate is 2.5% and the interest amount is compounded (add to balance) monthly. The monthly interest amount is calculated with the formula: current balance * interest rate / 12. Write a program fragment with variables declaration and a nested loop to display the balance every month (12 months) after the interest is added for 3 years.

(6 marks)

-THE END-