INTI International University & Colleges

FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2021**
Programme	:	Diploma in Information Technology (DITN) Diploma in Computer Science (DCS) Diploma in Electrical and Electronic Engineering (DEEI)
Course	:	**ICT2113: Object-Oriented Programming** **CSC2181: Object-Oriented Programming in Java**
Date of Examination	:	29 July 2021 (Thursday)
Time	:	4.00pm – 6.30pm Reading Time : Nil
Duration	:	2 Hours 30 Minutes

Special Instructions :

This paper consists of **SEVEN (7)** questions. Answer **ALL** questions in your own writing pad.

Material permitted :

Nil

Materials provided :

Nil

Examiner(s)	:	**Lai Kim Min,** Ng Ruoh Ling**,** Nursyarizan Mohd Akbar
Chief Moderator	:	Siti Hajar Khairuddin

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

DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING PROGRAMME (DEEI)
ICT2113: OBJECT-ORIENTED PROGRAMMING
CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA
FINAL ALTERNATIVE ASSESSMENT: APRIL 2021 SESSION

Instruction: This paper consists of **SEVEN (7)** questions. Answer **ALL** questions in your own writing pad.

SECTION A (40%)

Question 1

(a) Given the following declaration:

```
int p=1, q=5, r=4, s=12;
```

Provide the steps to show the calculation of the following assignments:

(i) `p = p++ + ++q;`
(ii) `s%= 3 + --r * 2;`

(4 marks)

(b) Write a Java statements to perform the following tasks:

(i) Declare a variable called `number` as Integer wrapper class type. Initialize the variable with the value 10.
(ii) Create a class member constant called `FACTOR` with an initial value 0.6.
(iii) Use a `printf` statement to print out the message "`5 % 2 = 2`". The `5` and `2` values are stored in variables `number1` and `number2`.

(6 marks)

(Total: 10 marks)

Question 2

Write a fragment of code to calculate a parking charge by reading the hours parked by a car using the charge rate given below:

Hours	**Charge ($)**
First 2 hours	$2
Every additional hour	$1
10 hours or above	$10

If the input hour is 2.4, it is considered 3 hours. Display the charge on console mode with 2 decimal places. Assuming all the packages are imported (hint: use Math class).

(Total: 10 marks)

Question 3

Provide statement with appropriate built-in method and arguments to fulfil the required output for each of the following:

(i)

```
String message="Covid-19 Pandemic";
String sub;
//extract characters "-19 Pan" from message to sub using String method
System.out.println(sub);
//output is -19 Pan
```

(ii)

```
char [] letter = {'a','b','c','d','e','f','g'};
String s = "aeiou";
//extract "ei" from s and assign to array letter from 3rd element using String method
for(char c:letter)
    System.out.print(c);
//output is abeiefg
```

(iii)

```
String numbers="one two three four";
int i;
//assign the index of second o in String numbers to i using String method
System.out.println(i);
//output is 6
```

(iv)

```
int num;
//assign a random integer between -5 and 5 to num
System.out.println(num);
//output is any integer between -5 and 5
```

(v)

```
int pax=55;//number of people is 55
int roomCount;
int capacity=20;//1 room can accommodate 20 people
//calculate and assign the number of rooms needed to roomCount using Math method
System.out.println(roomCount);
//output is 3
```

(Total: 10 marks)

Question 4

Write a fragment of code to declare a one-dimensional char array size 20 called **arr1** and a two-dimensional char array size 4 by 5 called **arr2.** Assign the first 20 letters (`a` to `t`) to **arr1** using a loop and a char variable. Assign the 20 letters from **arr1** to **arr2** using a nested loop.

(Total: 10 marks)

SECTION B (60%)

Question 5

The following class is used to record the active daily cases of COVID-19 for a particular country:

```
class Country {
   private String countryName;
   private int activeCase;
   public String getCountry()     { return countryName;}
   public double getActiveCase()  { return activeCase; }
}
```

i) Create the setter methods for all the instance members.

(4 marks)

ii) Implement an instance method named `isRedZone` which returns `true` if the `activeCase` of the country is greater than `500` and `false` otherwise.

(4 marks)

iii) Write a driver class named `COVIDTest`. Declare an array named `countryList` in the main method that holds 200 `Country` objects.

(4 marks)

iv) Implement a class method named `countRedZoneCountry` that accept the `countryList` array and returns the numbers of a country with red zone status.

(8 marks)

(Total: 20 marks)

Question 6

Consider the following class definition:

```
class Bullet {
      private boolean active;

      public boolean isActive() {return active;}
      public void setActive(boolean a) {active = a;}
}
```

i) Create a class called `Gun` with the following information:

- A private instance variable named `model` (string).
- A private instance variable named `shootingLength` (int).
- A private instance array variable named `bullets` as `Bullet` types.
- A constructor to initialize the model, shooting length and the size of the bullets. Set all the bullets active status to true.

(10 marks)

ii) The following code illustrates the implementation of the `Gun` object in a driver class.

```
//AK47 with shooting length 200 meters + 50 bullets
Gun gun = new Gun("AK47", 200, 50);
Gun.shot(); // print "Bang" or "Reload"
```

Use the following algorithm to implement the `shot` method:

```
if first bullet is not active
    print "Reload"
else
   print "Bang"
   move to the last active bullet and set it to false
```

(10 marks)

(Total: 20 marks)

Question 7

(a) Answer the following questions based on the concept of interfaces in Java:

(i) What type of attribute can be created in an interface?
(ii) Can interface extends another interface?
(iii) Must the subclass implement all the methods in an interface?
(iv) Does the interface have a constructor?
(v) What type of child class can choose not to implement abstract methods in the parent interface?

(5 marks)

(b) Answer the questions based on the following interface:

```
public interface RemoteControl {
    String brand="OEM";
    public void on();
    public void off();
    public default void noPower(){
        System.out.println("No power");
    }
}
```

(i) Can the child class of this interface changes the value of attribute `brand`?
(ii) Which method(s) must be implemented by the child class of the interface?
(iii) Given the following child classes:

```
class TVRemoteControl implements RemoteControl{
    public void on(){
        System.out.println("On the TV");
    }
    public void off(){
        System.out.println("Off the TV");
    }
}
class DroneRemoteControl implements RemoteControl{
    public void on(){
        System.out.println("On the drone");
    }
    public void off(){
        System.out.println("Off the drone");
    }
    public void noPower(){
        System.out.println("Change battery");
    }
}
```

What is the output of the statements below?

```
TVRemoteControl tv=new TVRemoteControl();
tv.noPower();
DroneRemoteControl drone=new DroneRemoteControl();
drone.noPower();
```

(5 marks)

(c) Given the following class:

```
public abstract class Room {
    protected String name;
    protected float width, length, height;

    public Room(String name, int width, int length, int height) {
        this.name=name;
        this.width = width;
        this.length = length;
        this.height=height;
    }
    public abstract float volume();
}
```

Design and write a child class named `Storeroom` that has a private object variable named `type(int)`. It has a parameterized constructor that takes data for all the attributes except `name` and assigns the data "Store room" to attribute `name`. The volume of a storeroom depends on its `shape`. If the `shape` is 1, it is a rectangular shape, if the `shape` is 2, it is a triangular shape.

Formula to calculate the volume of rectangular and triangular are provided below:
Rectangular volume = width * length * height
Triangular volume = width * length * height * 0.5

(10 marks)

(Total: 20 marks)

~THE END~

ICT2113_CSC2181 (F)/ April2021 Session/ formatted