INTI International University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session	:	**AUGUST 2019**
Programme	:	Diploma In Information And Communication Technology (DICTN) Diploma In Information And Technology (DITN)
Course	:	**ICT2100: Object Oriented Programming**
Date of Examination	:	December 7, 2019 (Saturday)
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) : **Lai Kim** Min and Ng Ruoh Ling

Moderator : Siti Hawa

This paper consists of 7 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: AUGUST 2019 SESSION

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

SECTION A (40%)

Question 1

(a) Consider the following program:

```
1   public class LanguageDemo {
2     public static void display() {
3        System.out.println("Java or C++?");
4        System.out.println("------------");
7      }
8
9      public static void main(String[] args) {
10       System.out.println("The OOP languages:");
11       display();
12     }
13  }
```

What would happen if each of the following changes was made to the Example program?

(i) Change line 1 to: `public class Demonstration`
(ii) Change line 9 to: `public static void MAIN(String[] args) {`
(iii) Change line 2 to: `public static void printMessage() {`

(6 marks)

(b) Declare a variable with meaningful name and appropriate data type that can hold the following data:

(i) The symbol of an arithmetic operator
(ii) The return of the `Math.random()` method
(iii) A password that is alphanumeric
(iv) If a student is an international student

(4 marks)

(Total: 10 marks)

Question 2

(a) Given the following declarations:

```
int a=2, b=2;
double d=1.0;
```

Provide the result for the following expressions respectively:

(i) `d=a+(d/0.5);`
(ii) `d=5.5+d/b*(a%3);`
(iii) `d=++a+5/b;`
(iv) `d*=--d+(--a);`

(4 marks)

(b) Write a fragment of code to prompt user to enter a shorthand of color code ('R' for Red, 'G' for Green, and 'B' for Blue) and print the colour name accordingly. Ensure your program can accept lowercase or uppercase colour code. Display an error message if user types other than 'R', 'G' or 'B'. Example:

```
Enter Colour Code: r
You have chosen Red
```

(6 marks)

(Total: 10 marks)

Question 3

(a) Assuming that the following variables have been declared:

```
String str1 = "Q.E.D.";
String str2 = "Arcturan Megadonkey";
String str3 = "Sirius Cybernetics Corporation";
```

Evaluate the following expressions:

(i) str1.length()
(ii) str1.indexOf(".")
(iii) str2.toLowerCase().substring(9, 13) + str3.substring(18, str3.length() – 7)

(4 marks)

(b) Write a class method that accepts two positive integers, `base` and `exponent` and returns $base^{exponent}$. You are NOT allowed to use Math function to solve the problem.

(6 marks)

(Total: 10 marks)

Question 4

(a) Based on the following class definition:

```
public class RGB {
     int red, green, blue;

  public RGB() {
     red=0;
     green=0;
     blue=0;
  }

  public RGB(int r, int g, int b) {
     red=r;
     green=g;
     blue=b;
  }

  public void printRGB() {
     System.out.println(red + ", " + green + ", " + blue);
  }
}
```

Write a Java statement to accomplish each of the following tasks:

(i) Create a `RGB` object without initialization and name the object `basecolor`.
(ii) Assign 255 to `red` and 255 to `blue` attributes of `basecolor` object
(iii) Create another `RGB` object with the data 125 for `red`, 105 for `green` and 85 for `blue` and name the object `forecolor`.
(iv) Create a statement that displays the values of the attributes for `basecolor` object.
(v) Create a statement that displays the number of `RGB` objects created.

(5 marks)

(b) Consider the following code fragments:

```
int x[]={1,2,3,4,5};
//start your code from here
```

Write a program fragment after the code above that declares another two single-dimensional arrays `y` and `z` that have the same array size as array `x`. Write a loop that will assign the values shown below to elements of array `y` and `z` using the values from array `x`.

y	3	6	9	12	15
z	0.5	1	1.5	2	2.5

(5 marks)

(Total: 10 marks)

SECTION B (60%)

Question 5

(a) Consider the following class definition:

```
public class Pilot {
     private String id, name;

      public Pilot(String i, String n) {
           id = i;
           name = n;
      }
    /*Assume all getter and setter methods had been defined here*/
}
```

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

- Define the following private instance variables in the `Flight` class:

  - `flightNumber`: An unique number for a flight as string type
  - `origin`: flying from (e.g. KL)
  - `destination`: flying to (e.g. Perth)
  - `pilot`: an pilot object
  - `seats`: total seats in the flight as integer type

- Create a non-default (parameterized) constructor to initialize the `Flight` object.
- Create a getter and setter methods of `pilot` attribute.
- Override the `toString` method to return the flight number and pilot name.

(11 marks)

(ii) Create a driver class to exercise the `Flight` class. Create a `Flight` object called `todayFlight` with the following information:

Flight Number: F102145ZXS
Origin : Penang
Destination : Phuket
Pilot : {id = "P112233", name = "Jeremy"}
Seats : 200

(3 marks)

(iii) Use the `todayFlight` object in previous question, write Java statements to change the pilot name to "`Serena`" and display the updated flight number and pilot name.

(2 marks)

(b) What is a wrapper class? Describe the difference between an `int` and an `Integer` with appropriate Java code. (4 marks)

(Total: 20 marks)

Question 6

(a) Inheritance and Polymorphism are the main features in object oriented programming. Answer the following question

(i) Write an abstract class named `Building`. Provide the following details in this class:

- Provide two protected members: building type (`String`) and construction year (`int`).
- Include a non-default constructor with parameters.
- Include a method called `setBuilding` to set all the fields in a `Building` object.
- Include an abstract method called `display` with `void` type in argument and return value.

(8 marks)

(ii) Write a derived class from class `Building` named `School`. Provide the following details in this class.

- Provide two private members: address (`String`) and number of class rooms (`int`).
- Include a non-default constructor with parameters. Initialise all the members.
- Override the `display` method and display all the building details.

(8 marks)

(b) Based on the scenario in part (a), class `Building` is a parent class and class `School` is a derived class. Assume default constructors are created in both class. State the validity (valid or invalid) for the following statements:

(i) `Building b = new Building();`
(ii) `Building b = new School();`
(iii) `School s = new School();`
(iv) `School s = new Building();`

(4 marks)

(Total: 20 marks)

Question 7

(a) Rewrite the following fragment of code with try and catch block. Identify and provide appropriate exception handlers in handling the exceptions that might be thrown during program execution.

```
Scanner sc = new Scanner(System.in);
double number[] = new double[2];

System.out.println("Enter numerator: ");
number[0] = sc.nextDouble();

System.out.println("Enter denumerator: ");
number[1] = sc.nextDouble();

number[2] = number[0]/number[1];
System.out.printf(number[0] +  "/" +
                  number[1] +  "=" +
                  number[2]);
```

(9 marks)

(b) Based on the following method header, write a recursive method called `printNums` to print out the first n integers starting with 1 in sequential order and separated by commas.

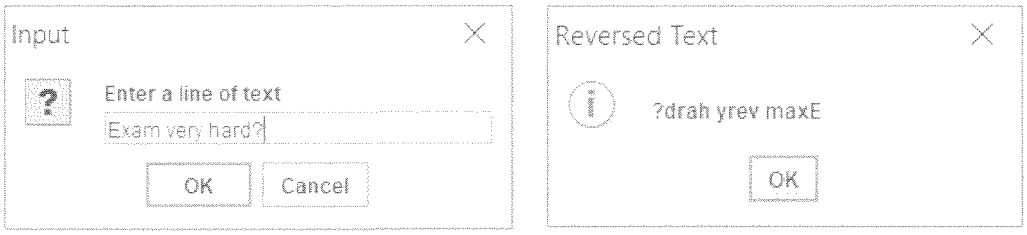
```
public static void printNums(int n)
```

For example:

```
printNum(5); //1,2,3,4,5
printNum(8); //1,2,3,4,5,6,7,8
```

(4 marks)

(c) Write a program to read in a String using `JOptionPane` object and display them in reverse order. Hint: use `charAt` method to extract each character. For example:



(7 marks)

(Total: 20 marks)

~The End~