INTI International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL Examination Paper

(COVER PAGE)

Session	:	AUGUST 2016
Programme	:	DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
Course	:	CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA
Date of Examination	:	9 December 2016 (Friday)
Time	:	2:00pm – 4:00pm Reading Time : Nil
Duration	:	2 Hours
Special Instructions	:	

This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Materials Permitted : NIL

Materials Provided : NIL

Examiner(s)	:	Chern Huey Rong
Moderator	:	Dr. Vincent Khoo

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

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
CSC2181: OBJECT-ORIENTED PROGRAMMING
FINAL EXAMINATION: AUGUST 2016 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) Write a java function that will take a sequence of positive integer numbers as input from the keyboard and find the summation of the odd numbers only.

(6 marks)

(b) Write a while, a do-while and a for loop that will count backwards from 20 to 10.

(10 marks)

(c) Show a code example of constructor overloading.

(5 marks)

(d) List **TWO (2)** differences between an abstract class and an interface.

(4 marks)

Question 2

(a) Write the codes to demonstrate the method overloading in calculating the area. Use the following codes as a guideline:

```
public class MethodOverLoading {
public static void main(String[] args) {

double Answer1 = Area(5, 6); //  area of rectangle ( width x length)
double  Answer2 = Area(7);   //  area of circle ( 3.14 x radius and
radius)
double  Answer3 = Area(7,3,5); // area of trapezium (0.5 x width x (base +
top))

System.out.println(''Area of Rectangle = '' + Answer1);
System.out.println(''Area of Circle  = '' + Answer2);
System.out.println(''Area of trapezium  = '' + Answer3);

 }// end main
}// end class MethodOverLoading
```

And the sample output is as follows:

```
Area of Rectangle = 30.0
Area of Circle  = 153.86
Area of trapezium  = 28.0
```

(6 marks)

(b) Create a super class called Car. The Car class has the following fields and methods. Define the constructor.

- int speed;
- double regularPrice;
- String color;
- double getSalePrice();

Create a sub class of Car class and name it as Truck. The Truck class has the following fields and methods. Define the constructor.

- int weight;
- double getSalePrice();//If weight>2000,10%discount.Otherwise, no discount.

(13 marks)

(c) State what is printed to the screen by the following code segments.

```
int i = 0;
int s = 1;
int[] = {10, 20, 30, 40, 50, 60} ;
for (i=0; i<a.length; i++){
  if(a[i]%3 == 0) {
     s = s + (a[i]/s);
       a[i]++;
  }
  System.out.println(s);
}
```

(6 marks)

Question 3

(a) (i) Create a class called Invoice that a hardware store might use to represent an invoice for an item sold at a hardware store. An Invoice should include four pieces of information as instance variables: a part number(type String),a part description(type String),a quantity of the item being purchased (type int) and a price per item (double). Your class should have a constructor that initializes the four instance variables.

(7 marks)

(ii) Provide a set and a get method for each instance variable. In addition, provide a method named getInvoiceAmount that calculates the invoice amount (i.e., multiplies the quantity by the price per item), then returns the amount as a double value. If the quantity is not positive, it should be set to 0. If the price per item is not positive, it should be set to 0.0.

(8 marks)

(iii) Write a test application named InvoiceTest that demonstrates class Invoice's capabilities.

(2 marks)

(b) Is it possible to declare a class using only variables or using only methods? Justify your answer.

(8 marks)

Question 4

(a) The class Rectangle contains the instance variables height, width, and colour. It implements the following methods:

```
1. Rectangle();
2. Rectangle( int size ) ; // Creates a square where height = width = size
3. Rectangle( int height, int width );
4. Rectangle( int height, int width, Colour colour );
5. Rectangle( Rectangle otherRectangle );
6. void set( Colour colour );
7. void set( int size );
8. void set( int height, int width ) ;
9. void set( int height, int width, Colour colour ) ;
10. void draw( Board board );
11. String toString();
```

(i) Give the line number (or numbers) of all the methods that demonstrate overriding.

(ii) Explain whether Rectangle could implement the following pair of methods: Explain why or why not.

```
int get();
Colour get();
```

(iii) Explain whether Rectangle could implement the following pair of methods: Explain why or why not.

```
int get( int whichField );
Colour get();
```

(6 marks)

(b) Complete the method below that takes an array of integers as an argument and returns true if the array is in sorted order (non-decreasing) and false otherwise. An empty array or an array with just one element is considered sorted. The signature is as follows:

```
public  boolean inSorted (int array[]) {

}
```

The main looks like below:

```
public static void main(String[] args) {

  int[] array = { 3, 5, 2, 8, 3, 6, 7, 9, 10};
  System.out.println("Is sorted?: " + isSorted(array));
  int[] sortedArray = { 1, 3, 4, 4, 5, 6, 7, 7, 7, 9, 10};
  System.out.println("Is sorted?: " + isSorted(sortedArray));
  int[] emptyArray = {};
  System.out.println("Is sorted?: " + isSorted(emptyArray));
  int[] arrayWithOneElement = { 4};
  System.out.println("Is sorted?: " + isSorted(arrayWithOneElement));
}
```

And the sample output is as follows:

```
Is sorted?: false
Is sorted?: true
Is sorted?: true
Is sorted?: true
```

(6 marks)

(c) One simple way to encrypt text is to write all of the even-index (starting at 0) characters, followed by all of the odd- index characters, ignoring punctuation and whitespace. For example, we might encode "I love CS133" as "IoeS3lvC13". Write a method called encrypt that takes a String as a parameter and returns a new String object that represents the result of encrypting the parameter String.

(13 marks)

Question 5

(a) (i) What is the highest-level superclass in the Java language? What does this mean?

(ii) What type of variables can a class consist of?

(iii) State the advantage of an interface over an abstract class.

(9 marks)

(b) For each of the following java expressions (A to D), provide the respective data type and the value.

	Expression
A	5 > 6
B	"2" + 1 + 0.009
C	!(5.0 >= 6 - 1.0 && !(5.0 != 5))
D	Math.min(6, ("int" + 98).charAt(3))

(8 marks)

(c) For each of the following conditions, write a boolean expression that evaluates to true if and only if the condition expressed in English is true.

(i) The character stored in variable c of type char is a digit.

(ii) The value stored in variable i of type int is a multiple of the value stored in the variable j of type int, or vice versa.

(iii) The two String objects s1 and s2 contain exactly the same sequence of characters.

(iv) The two double values stored in d1 and d2 are approximately equal, i.e. they differ by at most 0.0001.

(8 marks)

Question 6

(a) What does the following program print?

```
public class Mystery3 {
      public static void main( String args[] )
      {
            int row = 10, column;
            while ( row >= 1 ) {
                  column = 1;
                  while ( column <= 10 ) {
                        System.out.print( row % 2 == 1 ? "<" :
                        ">" );
                        ++column;
                  }
                  --row;
                  System.out.println();
            }
      }
}
```

(10 marks)

(b) (i) What is an exception? Why do we need to handle exception?
(ii) What is a finally block? When and how is it used?

(8 marks)

(c) Write a function multiplyArrays to multiply the corresponding elements in two arrays, returning the array of the products.

(7 marks)

--THE END--