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INTERNATIONAL COLLEGE PENANG (507232-U)
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper
(COVER PAGE)

Session : JANUARY 2014

Programme : DIPLOMA IN ELECTRICAL AND ELECTRONICS
ENGINEERING

Course : CSC 2181: OBJECT ORIENTED PROGRAMMING IN
JAVA

Date of Examination : 11 MARCH 2014

Time : 8.00am – 10.00am 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 :

Answer Booklet

Examiner(s) :

LIM CHAI KIM

Moderator :

ANNIDA SAID

This paper consists of 9 printed pages, including the cover page

INTI INTERNATIONAL COLLEGE PENANG
DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA

FINAL EXAMINATION: JAN 2014 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) Java is said to be a "Write Once Run Anywhere" programming language. Explain what this means. (4 marks)
- b) Write a full Java program that prints the Fibonacci series up to a user input number. Your program must contain the definition and calling of a recursive method. The following is a sample input output of the program:

```
Enter number up to which Fibonacci series to print:
7
Fibonacci series up to 7 numbers :
1 1 2 3 5 8 13
```

(8 marks)

- c) The following declaration is found in a main method:

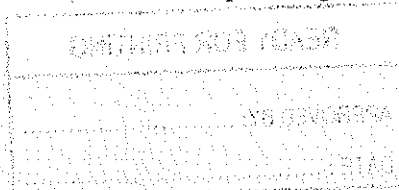
```
Student a = new Student( );
Student b = new Student("John", "Doe");
Student c = new Student ("Jane", "Dane", "DEEI");
```

Write a declaration of class Student with private attributes and public constructors.

(6 marks)

- d) Explain what a mutator method is. State **ONE (1)** benefit of defining mutator methods in a class. Write the code for a mutator method, expressing the benefit, using the class definition given in question 1(c) above.

(7 marks)



Question 2

a) Trace the output of the following code:

```

int x = 9;
int y = 2;
int z = 3;

System.out.println("9 / 2 = " + (x/y));
System.out.println("9 % 2 = " + (x%y));
System.out.println("9 + 2 * 3 = " + (x+y*z));
System.out.println("9 + 2 / 3 = " + (x+y/z));

```

(4 marks)

```

b) 1 public TestQ {
    2
    3     public static double calculateY(double a, double b){
    4         c = (a * b) / 2;
    5     }
    6
    7     public static void main(String args) {
    8
    9         int y = calculateY(2, 3);
   10         system.out.println(y);
   11     }
   12
   13 }

```

Identify **FIVE (5)** syntax errors in the code above. Rewrite the code with correction.

(5 marks)

```

c) public interface Animal{

    public void makeNoise();
    public boolean isCarnivore();

}

```

Define a class, Dog that implements the above interface.

(5 marks)

```

d) public int add(String input1, String input2)
{
    int i = 0, j=0;
    i = Integer.parseInt(input1);
    j = Integer.parseInt(input2);
    return i+j;
}

```

Explain the exception that will be triggered by this code if input1 or input2 is not an integer but a floating point number. Then, write the try catch statement to catch this exception.

(5 marks)

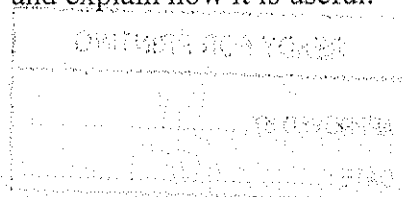
e) Draw the output of the following code:

```
public class Java2DExample extends JApplet{
    public void init(){
        setSize(400,400);
    }
    public void paint(Graphics g){
        g.drawRect(getWidth()*2/8, getWidth()*2/8,
            getWidth()*4/8, getWidth()*4/8);
        g.drawRect(getWidth()*3/8, getWidth()*3/8,
            getWidth()*2/8, getWidth()*2/8);
        g.drawLine(getWidth()*4/8, 0,
            getWidth()*4/8, getHeight());
        g.drawLine(0, getHeight()*4/8,
            getWidth(), getHeight()*4/8);
        g.drawLine(getWidth()*3/8, getHeight()*3/8,
            getWidth()*5/8, getHeight()*5/8);
        g.drawLine(getWidth()*5/8, getHeight()*3/8,
            getWidth()*3/8, getHeight()*5/8);
    }
}
```

(6 marks)

Question 3

- a) List **FOUR (4)** names that **CANNOT** be used as an identifier (variable or method name) for different reasons. Briefly state the reason it is invalid. (4 marks)
- b) List and explain using examples **THREE (3)** types of comments in the Java language. (6 marks)
- c) Write code to show an example of method overloading. (5 marks)
- d) Write code to show an example of method overriding. (5 marks)
- e) Define the term “package” and explain how it is useful. (5 marks)



Question 4

- a) Write a full Java program to calculate the sum of integers. Using `java.util.Scanner`, get the user's input of integers. The user can input any amount of integers. To stop, the user keys in "Quit". Here is an example output of the program:

```
Integer summation program.
Enter as many integers as desired.
To stop input of integers and display the sum, type "Quit".
Enter integer:
1
Enter integer:
2
Enter integer:
3
Enter integer:
Quit
Sum: 6
```

(8 marks)

- b) Trace the output of the following program:

```
int[] array = new int[10];
for (int i = 0; i < 10; i++) {
    array[i] = 100 + i;
}

for (int i = 9; i >= 0; i = i - 2) {
    System.out.println(array[i]);
}

int i = 0;
while (i < 10) {
    System.out.println(array[i] + array[i + 1]);
    i = i + 2;
}
```

(5 marks)

- c) Describe **ONE (1)** difference between checked and unchecked exceptions. List **FOUR(4)** checked exceptions in Java.

(4 marks)

```
d) public interface Movement {
    public void move();
}

public abstract class Animal {
    public abstract String favoriteFood();
}
```

Class Frog uses both Animal and Movement. Write a possible definition for class Frog.

(5 marks)

- e) Write **ONE (1)** executable statement within an Applet's paint() method which draws a circle with its center on the center of the Applet canvas. Assume:
- the diameter of the circle is stored as an instance field, named 'd', in the same class.
 - the input parameter of the paint method is 'g'

(3 marks)

Question 5

- a) Rewrite the following code using a "switch" flow structure:

```

if(type==1)
{
    System.out.println("Type A");
}
else if(type==2)
{
    System.out.println("Type B");
}
else if(type==3)
{
    System.out.println("Type O");
}
else if(type==4)
{
    System.out.println("Type AB");
}
else
{
    System.out.println("Unknown type");
}

```

(5 marks)

- b) Trace the output of the following code:

```

char[] copyFrom = {'r', 'e', 'd', 'c', 'a', 'b', 'r', 'e', 'd',
                  'c', 'a', 'r'};
char[][] copyTo = new char[5][5];
for (int i = 0; i < 5; i++) {
    for (int j = 0; j < 5; j++) {
        if (i == 0 || i == 4) {
            copyTo[i][j] = '-';
        } else {
            copyTo[i][j] = '|';
        }
    }
}
for (int i = 0; i < 3; i++) {
    System.arraycopy(copyFrom, i * 3, copyTo[i + 1], 1, 3);
}
for (int i = 0; i < 5; i++) {
    System.out.println(new String(copyTo[i]));
}

```

(5 marks)

c) Explain what passing a parameter to a method "by value" means. Provide example code with comments to explain code. (7 marks)

d) List the **TWO (2)** class-level access modifiers (2 marks)

e)

```
public class Plant {
    private String species;
    private String category;

    //Constructor
    public Plant(String species, String category) {
        this.species =species;
        this.category = category;
    }
}
```

Given the class Plant, write a program segment to create and instantiate an array of Plant sized 5. Use a Scanner object to get user input of species and category. The prompt for user input must be numbered sequentially from Plant 1 to Plant 5. Example:

```
Animal #1 Species:
Animal #1 Category:
Animal #2 Species:
Animal #2 Category:
(and so on...)
```

(6 marks)

Question 6

a) Trace the output of the following code:

```
for (int i = 1; i <= 10; i++) {
    System.out.print(i + " || ");
    for (int j = 1; j <= i; j++) {
        if (i % 2 == 0) {
            break;
        }
        System.out.print(j + " | ");
    }
    System.out.println();
}
```

(5 marks)

b) Write a static method rollDice() to return an array of 2 random numbers from 1 to 6.

(4 marks)

- c) Write a class definition for the following scenario. You have to write a class called MyFraction which works on fractions of the form a/b where a represents the numerator and b represents the denominator. Both a and b are integers (i.e. if $a = 1$ and $b = 2$, then the fraction will be $1/2$). Your class should perform the following operations:
- Create two constructors – (1) with no parameter that sets $a=0$ and $b=1$; and (2) with 2 integer parameters that sets both a and b .
 - Write an instance method for addition which receives a MyFraction object and returns a MyFraction resultant object. [Hint $a/b + c/d = (ad + bc)/bd$]
 - Write a static method for multiplication which returns a MyFraction resultant object. [Hint: $a/b * c/d = ac/bd$]
 - Write a static main() that allocates two Fractions, $1/2$ and $3/4$ and stores their sum in a third variable.

(10 marks)