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 INTERNATIONAL COLLEGE PENANG (507232-U)
 LAUREATE INTERNATIONAL UNIVERSITIES

**FINAL Examination Paper
 (COVER PAGE)**

Session : AUG 2012

Programme : DIPLOMA IN ELECTRICAL AND ELECTRONICS
 ENGINEERING

Course : CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA

Date of Examination : 10 December 2012

Time : 11 a.m. – 1 p.m. 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 :

Examiner(s) : Chern Huey Rong

Moderator : Lim Chai Kim

This paper consists of 11 printed pages, including the cover page.

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DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

CSC2181: OBJECT-ORIENTED PROGRAMMING IN JAVA
FINAL EXAMINATION: AUG 2012 SESSION

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Question 1

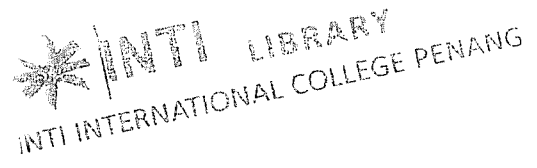
(a) if (grade == 'A') { }

 else if (grade == 'B') { }

 else if (grade == 'C') { }

 else if (grade == 'D') { }

 else if (grade == 'F') { }



Convert the command above to the **switch** case format.

(4 marks)

(b) There is a piece of declaration in main method.

```
Cat a = new Cat();
Cat b = new Cat("Tom", "Black");
Cat c = new Cat("Tom", 21, "Black");
```

Write a proper declaration of class **Cat** with the attributes and constructors.

(5 marks)

(c) Write down the output when the following code is compiled and run.

```
public static void main(String[] args) {
    for(int i = 0; i < 3; i++) {
        for(int j = 3; j >= 0; j--) {
            if(i == j) break;
            System.out.println(i + " " + j);
        }
    }
}
```

(6 marks)

(d)

```
public class Human {
    private String Name;
    private int Age;
}

public class Warrior extends Human {
    private String Weapon;
    private String Armor;
}
```

Define the constructors of class Warrior and class Human with full code declaration.

(5 marks)

(e) Write a java program to receive a character input, then draw a pyramid based on the character.

Input: @

Pyramid:

```
@
@@
@@@
@@@@
@@@@@
```

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(5 marks)

Question 2

(a) Given the code:

```

public class Machine
{
    public void go()
    {
        System.out.println("I must be going!");
    }
    public void go(int x)
    {
        System.out.println("Hi there! - your number is " + x);
        go();
    }
}
public class SpecialMachine extends Machine
{
    public void go(int x)
    {
        System.out.println("Hello!");
        super.go(x + 1);
    }
}

```

and the following code fragment:

```

Machine x = new SpecialMachine();
x.go(9);

```

what is printed when the above fragment is run?

(5 marks)

(b) You can use a **for loop** to print this series.

1 2 3 4

Modify the for loop so it prints * instead of the numbers

* ** *** ****

(5 marks)

```

(c) public class Packet {
        private int SourceAddress;
        private int DestinationAddress;
    }

```

Complete the code so the user can construct an object, update and retrieve the fields of the object.


(5 marks)

(d) Explain the difference between the public and private access modifier.

(5 marks)

- (e) Write a program that asks the user to type 10 integers of an array and an integer V . The program must search if V is in the array of 10 integers. The program writes " V is in the array" if V is found.

(5 marks)

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Question 3

- (a) X is a subclass of Y. Will the last two assignments below produce a compile-time error?

```
X x = new X();
Y y = new Y();
y = x;
x = y;
```

(5 marks)

- (b) Explain with example the use of constructor overloading.

(6 marks)

- (c) The overtime rate for Engineer is 2.5 while the overtime rate for Engineering Director is 3.0.

Assume class EngineeringDirector extends Engineer.

Show method overriding using the concept above.

(5 marks)

- (d) Square root of a given integer, M can be determined by the following formula

$$x(n+1) = 1/2 * (x(n) + M/x(n))$$

when n approaching infinity, x(n) is the square root of M. Write a function to compute square root of M using the above formula (to the precision of 4 decimal).

(9 marks)

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Question 4

```
(a) public class Program {
        public static void main(String args[ ]) {
            Greeting( );
        }
        public void Greeting( ) {
            System.out.println("Hi");
        }
    }
```

This code will have an error. Identify the error and fix it.

(4 marks)

```
(b) public interface move {
        public void swim();
        public void run();
    }

    public class Turtle implements move {
        public void swim() {
            System.out.println("I can swim");
        }
    }
```

Identify the error in the Java code above. Modify the code to fix the error.

(5 marks)

(c) Identify errors in the following program and state the reasons:

```
1 class QW1 {
2     private int a;
3     private int b;
4     public QW1(int i, int j) {a = i; b = j;}
5     public QW1(int i) {a = i; b = i;}
6     public void show() {
7         System.out.println(a);
8         System.out.println(b);
9     }
10
11     public static void main() {
12         final int ARRAY_SIZE;
13         int a[] = new int[ARRAY_SIZE];
14         int b[] = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9};
15
16         for (int i = 0; x <= b.length; i++) {
17             System.out.println(b[i]);
18         }
19         b += 10;
20         show();
21     }
22 }
```

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(6 marks)

- (d) 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 parameters that set $a = 0$ 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.
[int: $a/b + c/d = (ad + bc)/bd$]
 - 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)

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Question 5

```
(a) public class Animal {
        private String species;
        private String category;
        //Constructor
        public Animal(String species, String category) {
            this.species =species;
            this.category = category;
        }
    }
```

Given the class `Animal`, write the program segment to create and instantiate the Array of `Animal` sized 50.

(4 marks)

(b) Based on the question in 5(a), assume the category for the animals are set to “land” or “water”. Now separate all the species based on their category and display them on screen. Assume all the accessors have been declared and are called `getSpecies()` and `getCategory()`.

(5 marks)

```
(c) public abstract class Tax {
        public abstract float TaxPayable(float YearlyIncome);
    }
```

Assume if a person’s yearly income is less than 24000, there is no tax, otherwise there is a 10% tax.

```
public class Engineer {
    private String Name;
    private float yearlyincome;
}
```

Modify this code so the class `Engineer` inherits from class `Tax` and write a possible declaration for method `TaxPayable()`.

(5 marks)

(d) Without using an `if` statement, find the largest value between 5 numbers.

(5 marks)

```
(e) public abstract class Money {
        public abstract float conversionRate(String country);
    }

    public interface Currency {
        public String symbol(String country);
    }
```

Class `Bank` uses both abstract class `Money` and interface `Currency`. The currency rate for US is 3.8 and the currency rate for UK is 5.4. The symbol for US is “USD” and the symbol for UK is “Pound”. With this information, complete class `Bank`.

(6 marks)

Question 6

- (a) Write a single Java statement to find the largest value of three integer variables a, b and c.

(5 marks)

(b)

```
public class Human {
    public Human(String name) {
        super(name);
    }
}
```

Explain why this declaration is not valid.

(5 marks)

- (c) An airline system can allow a passenger to order food and drinks. A person can order nothing, order food and drinks or drinks only. Write a possible code to show method overloading using this situation.

(5 marks)

(d)

```
public interface Movement {
    public void Swim();
}

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

Class Cat uses both Movement and Food. Write a possible code for class Cat.

(5 marks)

- (e) What are the characteristics of an object?

(5 marks)

--THE END--

csc2181(F) August 2012

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