

National College of Ireland

BSc (Hons) in Computing - Year 1 - Full-time & Part-time – BSHC 1 & BSHCE 1
BSc (Hons) in Business Information Systems Year 1 - Full-time & Part-time BSHBIS 1 & BSHBISE 1
Higher Certificate in Computing Applications & Support - Year 1 Full-time & Part-time – HCC 1 &
HCCE 1
BA (Ord) in Management of Technology in Business Year 1 - Full-time – BAMTB 1

Semester One Examinations – 2011/2012

Monday 9th January, 2012
6.30pm – 8.30pm

Introduction to Programming

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Mr. Ciaran O'Leary
Dr. Thomas Newe
Ms. Frances Sheridan
Mr. Michael Bradford

Answer Section A and One Question from Section B

Duration of exam: 2 hours

Attachments: None

Section A (60 marks)

Question 1.

- a) Given that `Vehicle` is a predefined instantiable class, how do you declare an instance of the `Vehicle` class named `oldBanger`?

- (i) `oldBanger Vehicle;`
- (ii) `Vehicle oldBanger;`
- (iii) `oldBanger = Vehicle;`
- (iv) `new Vehicle oldBanger;`

(10 marks)

- b) Write code segments for **two** of the following:

- (i) Declare a string variable and assign it the following string: "Java is a type of coffee"
- (ii) Declare a constant named `PI` set to the value `3.14`.
- (iii) Declare two integer variables and initialise them both to the value `15`.
- (iv) Declare a boolean variable and initialise it to the value `false`.

(10 marks)

- c) Develop a method, which determines whether or not a given integer value is even or odd. The value of the integer should be passed as a parameter to the method and the method's return type should be a boolean.

(20 marks)

- d) The `DistanceConversion` class is listed in **Appendix A**. The purpose of the class is to convert a distance specified in miles to kilometres and vice versa. Develop a class that uses an instance of the `DistanceConversion` class. Show clearly how each of its methods can be invoked to perform the following conversions:

- (i) Convert 10 miles to kilometers.
- (ii) Convert 32 kilometers to miles.

(20 marks)

Section B (40 marks)

Question 2.

- a) Develop a code segment, which allows the user to enter 5 numbers, and calculate the product of the numbers (i.e., the result of multiplying the numbers together).

(10 marks)

- b) The purpose of the following method is to determine if two doubles (num1 and num2) are within a certain range (num3) of each other. The method returns a value of either true or false. Some code has been omitted. Fill in the missing code:

```
public _____ inRange(double num1, double _____, double num3){  
  
    double _____;  
    boolean result = false;  
    difference = Math.abs(num1 - num2); // calculate absolute value  
    if (difference <= num3) {  
        _____ = true;  
    }  
    _____ result;  
}
```

(10 marks)

- c) A T-shirt store has an application that calculates and displays the price of an order. The user enters the number of T-shirts they wish to buy. The total cost is calculated based on the assumption that each T-shirt costs €15.50.

Develop an instantiable class for this application which includes:

- (i) A class definition
- (ii) Suitable data members (instance variables)
- (iii) A constructor
- (iv) A set method (mutator) to set the number of T-shirts ordered
- (v) A compute method to calculate total order cost
- (vi) A get (accessor) method that returns the total order cost

(20 marks)

Question 3.

- a) Develop a code segment, which allows the user to enter 2 numbers, and calculate whether the sum of the two numbers is an odd or an even number.

(10 marks)

- b) The purpose of the following program is to output the message "Hello World!" to the screen. Some code has been omitted. Fill in the missing code:

```
public _____ HelloWorldApp {  
    public _____ void main(_____ args[]){  
        _____ .out. _____ ("Hello World!");  
    }  
}
```

(10 marks)

- c) A geometry application calculates and displays the area of a circle. The user enters the radius value of the circle. The area is then calculated using the formula:

$$\text{area of circle of radius } r = \pi * r * r \quad (\text{with } \pi = 3.14).$$

Develop an instantiable class for this application which includes:

- (i) A class definition
- (ii) Suitable data members (instance variables)
- (iii) A constructor
- (iv) A set method (mutator) to set the radius value of the circle
- (v) A compute method to calculate area of the circle
- (vi) A get (accessor) method that returns the area value

(20 marks)

Appendix A.

```
/*
 * DistanceConversion.java
 *
 * Written by: MB
 *
 * Written on: Semester 1
 */

class DistanceConversion {

    private double miles;
    private double kilometers;

    public DistanceConversion(){
        miles = 0;
        kilometers = 0;
    }

    public void setMiles(double m){
        miles = m;
    }

    public double getMiles(){
        return miles;
    }

    public void setKilometers(double k){
        kilometers = k;
    }

    public double getKilometers(){
        return kilometers;
    }

    public void convertMilesToKilometers(){
        kilometers = miles * (8/5);
    }

    public void convertKilometersToMiles(){
        miles = kilometers * (5/8);
    }

}
```