International College of Manitoba

Quiz 1 Answer Key

Version: 1

Date: Feb 1, 2024 **Time: 45 Mins**

Course No and name: COMP1020 and Introductory Computer Science 2

Instructor: Tadepalli Sarada **Page : 1 of 8**

Student name : _____

Student ID : _____

Signature(**in ink**) : _____

(I understand cheating is a serious offense)

I. Short Answer Questions [10 marks]

Q1) Which of the following is/are the invalid variable names and why? [2M]

a) this

b) urgent!

c) Time_Horton

d) MaryJane

a) this : it is a reserved keyword.

b) urgent! : ! is a not symbol and should not be used within the variable name

Each 1 mark

Q2) Find errors (if any) in the following Java statements, otherwise write "No errors". [2M]

a)
```
int k = 'a'+ true;
System.out.println(k);
```

Error: Character and Boolean type cannot be added/concatenated.

b)
```
String q = "true"+ 'a';
System.out.println(q);
```

No Error: output is **truea**

Each 1 mark

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Q3) What is the output? **[2M]**

```
public class Q3 {
   public static void main(String[] args) {
      String s = new String("Hello");
      String t = new String("Hello");

      System.out.println(s == t);
   }
}
```

False

Because the address of s and t are different.

Q4) Complete the Java code according to the given comments. **[2M]**

```
class classA {
   public int var1;
   public static int var2 = 0;   }


public class Q4 {
   public static void main(String[] args) {
      // Create an instance of classA called ca.
                  classA ca=new classA();
      // Printing the value of var1.
      System.out.println(ca.var1);
      // Printing the value of static variable var2.
      System.out.println(classA.var2);
     // Checking if var2 is equal to var1 and printing the result (true or false).
      System.out.println(ca.var1==classA.var2);
   }
}
```

Each 0.5 mark

Q5) What is the output for the following Java code? **[2M]**

```
public class Q5 {
  static void f1(int[] arr, int index1, int index2) {
     int temp = arr[index1];
     arr[index1] = arr[index2];
     arr[index2] = temp;
  }

  static void f2(int[] arr, int index1, int index2) {
     int temp = arr[index1];
     arr[index1] = arr[index2];
     arr[index2] = temp;
  }

  public static void main(String[] args) {
     int[] arr = { 4, 5, 6 };
     f1(arr, 0, 1);
     f2(arr, 1, 2);
     System.out.println(arr[2] - arr[0] - arr[1]);
  }
}
```

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I. Long Answer Questions [10 marks]

Q6) Write a program that checks if **a given year is a leap year or not**. **[4M]**

- Create an array called **years** : [1808, 1849, 1900, 1916, 2000, 2013].
- Create an integer array called **leapYear** which the same size as of **years** array.
- Write a function **leapOrNot(int[] array, int[] leapYear)** to update the **leapYear** array with only leap years.
- The main function should display the result: **1808, 1916, 2000**

A leap year is either:

- Divisible by 4 but not divisible by 100, or
- Divisible by 400.

```
public class Q6 {
public class Q6 {
    static int l = 0;

    public static void main(String[] args) {

        int[] years = { 1808, 1849, 1900, 1916, 2000, 2013 };
        int[] leapYear = new int[years.length];

        leapOrNot(years, leapYear);
        String s = "[";
        for (int i = 0; i < l; i++) {
            s += leapYear[i];
            if (i < l - 1)
                s += ", ";
        }
        s = s + "]";
        System.out.println(s);    }

    public static void leapOrNot(int[] array, int[] leapYear) {
        for (int i = 0; i < array.length; i++) {
            if (array[i] % 4 == 0 && array[i] % 100 != 0)
                leapYear[l++] = array[i];
            else if (array[i] % 4 != 0 && array[i] % 100 == 0)
                leapYear[l++] = array[i];
            else if (i % 4 != 0 && i % 100 == 0)
                leapYear[l++] = array[i];
            if (i % 400 == 0)
                leapYear[l++] = array[i];
        }    } }
```

Function 2 Marks and creation of array and display of result 2marks

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Q7) Create a Java class named **Student** to track student performance. The **Student** class should have the following attributes: **[6M]**

1. **studentId**: An integer representing the unique identifier of the student.
2. **studentName**: A String representing the name of the student.
3. **mark1** and **mark2**: Doubles representing the marks obtained by the student in two subjects.
4. **averageMark**: A double representing the average of the two marks.
5. **totalStudents**: A static integer representing the total number of students.

Implement the following methods in the **Student** class:

1. **Constructor**:
   - Define a constructor to initialize the **studentId**, **studentName**, **mark1**, and **mark2** attributes to the values passed as parameters. Calculate the **averageMark** as the average of **mark1** and **mark2**.
   - Increment the **totalStudents** attribute by 1 each time a new student object is created.
2. **getAverageMark method**:
   - Method signature: **public double getAverageMark()**
   - This method returns the average mark of the student.
3. **getTotalStudents method**:
   - Method signature: **public static int getTotalStudents()**
   - This method returns the total number of students.

(Testing the class with main() not required, i.e., no need to create objects.)

Variables (5 *0.5 Mark = 2.5 Marks)

Constructor (1.5 Marks)

Methods 1 mark each (2*1 Mark = 2 Marks)

```java
public class Student {

    private int studentId;
    private String studentName;
    private int marks1, marks2;
    private double averageMark;
    private static int totalStudents = 0;

    public Student(int studentId, String studentName, int marks1, int marks2) {
        this.studentId = studentId;
        this.studentName = studentName;
        this.marks1 = marks1;
        this.marks2 = marks2;
        averageMark = (this.marks1 + this.marks2) / 2;
        totalStudents++;
    }

    public double getAverageMark() {
        return averageMark;
    }

    public static int getTotalStudents() {
        return totalStudents;
    }

}
```