ARUSHA TECHNICAL COLLEGE

DEPARTMENT OF ICT

CSU07316: OBJECT-ORIENTED PROGRAMMING

PRACTICAL QUESTIONS

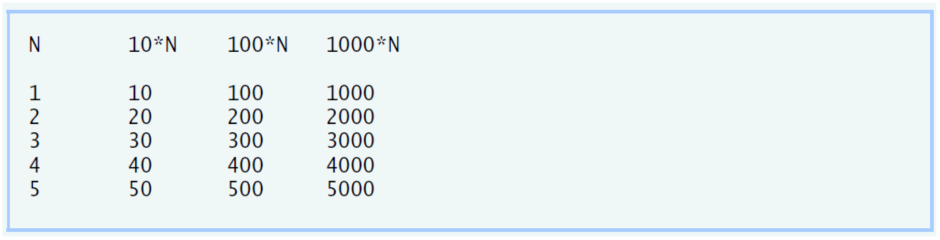
Topics: Introduction to OOP, Introduction to Java and Java Operators

1. Modify the Java first program so that the program displays your name.
2. Write Java application that displays the sum of two integers.
3. Write Java application that obtains two integers typed by a user at the keyboard, computes the sum of these values and outputs the result.
4. Write an application that inputs three integers from the keyboard and prints the sum, average, product and the biggest number of these numbers.
5. Write an application that asks user to enter the radius of a circle, calculates the area and outputs the result.

Topic: Control Statements

6. Write a Java application that checks whether the number entered by user is an odd.
7. Write a Java application that divides two numbers but checks whether the divisor is not zero.
8. Write Java application which mimics Vodacom's USSD services. [Note: The services that are displayed when you press *149*01# on your mobile phone].
9. Write a Java application that displays even numbers between 1 and 100.

10. Write a Java application that calculates the sum of the first 200 counting integers.
11. Write a Java application that uses looping to print the following table of values:



```
N       10*N    100*N   1000*N

1       10      100     1000
2       20      200     2000
3       30      300     3000
4       40      400     4000
5       50      500     5000
```

Topic: Arrays

12. Write an application that initializes all array elements to 10.00.
13. Write Java application that obtains data from keyboard and write into an array.
14. Write Java application that displays all elements of an array.
15. Write Java application that calculates and displays the sum and average of all elements of an array.
16. If the float array numbers is initialized as follows: float [] numbers = {50, 10, 20, 60, 120, 90}; Write an application that displays the smallest and largest elements in the float array numbers.

Topic: Classes and objects

17. Create a class called Box that includes three pieces of information as instance variables – a length, a width and a depth. Your class should have a constructor that initializes the three instance variables. Provide a method called calculateVolume for calculating the volume of the box. Write a test application named BoxTest that demonstrates class Box's capabilities.
18. Create a class called Arithmetic that includes two pieces of information as instance variables – a number1 (type float) and number2 (type float). Your class should have a constructor that initializes the two instance variables. Provide a method called add that

calculates the sum of two numbers. Provide another method called divide which calculates the quotient of the two numbers. Write a test application named ArithmeticTest that demonstrates class Arithmetic's capabilities.

19. Create a class called Invoice that a hardware store might use to represent an invoice for an item sold at the 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. 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. Write a test application named InvoiceTest that demonstrates class Invoice's capabilities.

Topic: Inheritance and Exception Handling

20. Create a class called Box that includes three pieces of information as instance variables – a length, a width and a depth. Your class should have a constructor that initializes the three instance variables. Provide a method called calculateVolume for calculating the volume of the box. Create another class WeightBox that inherits from the class Box. The class WeightBox includes one more piece of information as its instance variable – weight. Write a test application named WeightBoxTest that demonstrates class WeightBox's capabilities.
21. Create a class called Employee that includes three pieces of information as instance variables – a personal file number (type String), a full name (type String) and salary (type double). Your class should have a constructor that initializes the three instance variables.

Provide a method called printEmployeeDetails for displaying employee’s details. Create another class called Programmer that inherits all attributes and behaviour from class Employee and defines one more additional piece of information as its instance variable – bonus (type int). Write a test application named ProgrammerTest that demonstrates class Programmer’s capabilities.

22. Draw an inheritance hierarchy for students at a university. Use Student as the superclass of the hierarchy, and then extend Student with classes UndergraduateStudent and GraduateStudent. Continue to extend the hierarchy as deep (i.e., as many levels) as possible. After drawing the hierarchy, write a test application called StudentTest that creates objects of each class (Student, UndergraduateStudent and GraduateStudent) and tests their member methods.
23. Write a Java application that prompts the user for two integers, calculates the sum, and prints the sum. The application uses the exception handling so that if the user makes a mistake, the program catches and deals with an exception that arises – in this case, allowing the user to try to enter the input again.