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UNIVERSITY
A Dynamic Centre of Academic Excellence

SCHOOL OF PROFESSIONAL STUDIES

BACHELOR OF INFORMATION COMMUNICATION TECHNOLOGY/BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

UNIT CODE/NAME: BCT 211/ BBIT 314: OBJECT ORIENTED PROGRAMMING

January- April 2021/2022 Special/Supplementary Exam - Time: 2 Hours

Instructions: Answer Question ONE (Compulsory) and any other TWO questions.

QUESTION ONE

a) Explain the meaning of the following OOP terms:

i) Class

ii) Method

iii) Object

iv) Program **(4Marks)**

b) Highlight any four characteristics of Objected Oriented Programming. **(4 Marks)**

c) Differentiate between primitive and reference variables. **(2 Marks)**

d) Highlight the purpose of keyword new and explain what happens when this keyword is used in an application. **(2 Marks)**

d) Describe the three access specifiers in Java. **(3Marks)**

e) Discuss the seven software development stages involved in object oriented design of a program in Java. **(7 Marks)**

f) Consider the following Rectangle class which has private integer attributes length and width, and both the default and parameterized constructors. It has methods that calculate perimeter and area of the rectangle. It also has accessor and mutator methods for both length and width and lastly has to String() method for each Rectangle to define itself appropriately.

(i) Sketch a class diagram for the Rectangle class. **(2 Marks)**

(ii) Write a Java program to illustrate the Rectangle class. **(4 Marks)**

(iii) Write a program with the main() method to test the class Rectangle. **(2 Marks)**

QUESTION TWO

a) Identify the two types of comments in Java programs and illustrate how they are indicated in a program. **(2Marks)**

b) Describe the role of the final keyword and give a guideline for when it should be used. **(3Marks)**

c) i) Describe a constructor? **(2 Marks)**

ii) Highlight three differences between a method and a constructor. **(3 Marks)**

d) Write a Java program to overload the function **calculate Area()** with one method calculating the area of a circle and the other the area of a rectangle. **(5 Marks)**

QUESTION THREE

a) Describe the following terms as used in OOP.

i) Polymorphism

ii) Dynamic binding

iii) Encapsulation

iv) Operator overloading **(4 Marks)**

b) What is the output of the following expressions

i) int(7.9 + 3.8)

ii) int(7.9) + int(3.8)

iii) "6" + "8"

iv) "The total is =" 4.5 + 7 **(4Marks)**

c) A parking garage charges a Kshs 50.00 minimum fee to park for upto 2 hours. The garage charges additional Kshs 20.00 per hour or part thereof in excess of two hours. The maximum charge for any given 24-hour period is Kshs. 200.00. Assume that no car parks for more than 24hours at a time. Write an application that calculates and displays the parking charges for a customer. The program should have a field that stores the car's registration number and another that stores the number of hours a customer has parked. Both fields should have mutator and accessor methods. The program should use the method **calculateCharges**to determine the charge and include constructors if necessary. **(7 Marks)**

QUESTION FOUR

a) What is the value of x after each of the following statements is executed?

i) x = Math.floor(7.5);

ii) x = Math.abs(-6.4);

iii) x = Math.ceil(6.4); **(3 Marks)**

b) i) Highlight two benefits of inheritance? **(2 Marks)**

ii) Define the following terms.

I. Super class

II. Subclass **(2 Marks)**

iii) Assume a class hierarchy is to be created containing the following classes:

- An Employee having a first name, last name and social security number.
- A Salaried Employee having a monthly salary
- A Commission Employee having monthly total sales and commission rate
- An Hourly Employee having an hourly wage and the number of hours worked in a month.

Based on the above information, devise a suitable class hierarchy to model the presented employees. Clearly indicate which data items each object will store and likely methods. No program is required. **(8 Marks)**

QUESTION FIVE

a) Identify any four naming conventions of Java classes. **(4Marks)**

b) Describe two differences between an abstract class and an interface in java **(4 Marks)**

c) Write a simple program in Java that computes the squares of all even numbers between 11 and 29 and displays the numbers and their squares in a suitable format using JOptionPane. **(7 Marks)**