DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

University Examinations 2020/2021

SECOND YEAR **SEMESTER ONE** EXAMINATION FOR THE DEGREE OF **BACHELOR OF SCIENCE IN BUSINESS INFORMATION TECHNOLOGY**

CIT 2206: ADVANCED OBJECT ORIENTED PROGRAMMING

DATE: AUGUST 2020   **TIME: 2 HOURS**

Instructions: Answer Question 1 and Any Other Two.

Question 1: (20 Marks)

a) Explain the term superclass as used in object oriented programming   (2 Marks)
b) Differentiate between the following:
      i.   class and object
      ii.   method overloading and method overriding   (2 marks)
c) Discuss two type of arguments as used in object oriented programming   (2 marks)

d) Using appropriate examples discuss TWO types of exceptions in java   (4 Marks)

e) Explain exception handling process in java using a syntax example   (2 Marks)

f) Write a class named Rectangle with instance variables length (float) and width (float). Provide a constructor that initializes the two instance variables. Provide a set and a get method for each instance variable. Each of the set methods should verify the value supplied is larger than 0.0 and less than 20.0. Provide methods that calculate the rectangle's perimeter and area. Use the formulas:
$Perimeter of a Rectangle = 2(length + width)$,
$Area of a Rectangle = length \times width$ (8 Marks)

Question 2: (20 marks)

a) Write a test class named RectangleTest that tests the functionalities of the class Rectangle reference to **Q1 (f)** by creating two objects.   (4 marks)

b) Write a Java application, with a class named Addition, which uses two input dialogs to obtain integers from the user and a message dialog to display the sum of the integers the user enters.
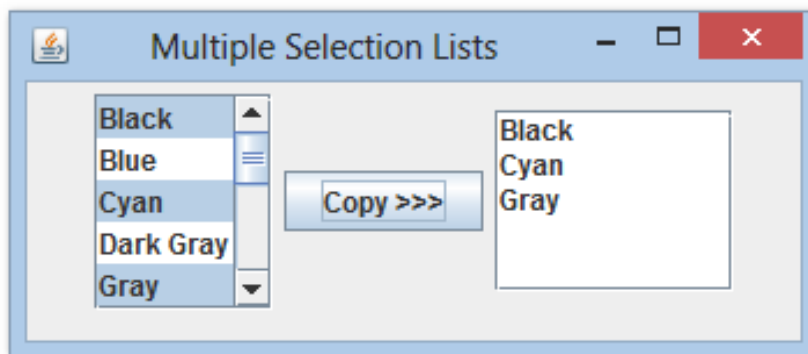   (4 marks)

c) Imagine that we have two classes "Teacher" and "Student" which have common properties i.e. name, age, and gender. Create a class "Person" which has these properties and then extend "Teacher" and "Student" classes from it. Now on the main method create a teacher and student object to print the name of the teacher, age and gender.   (10 Marks)

Question 3: (20 marks)

a) What is the difference between an error and an exception? Give an example of each.
                                                                                                    (4 marks)

b) Write a java program with a class named DivideByZeroExceptionHandling that prompts for and reads two integer numbers, then divides the first integer by the second integer and prints the quotient. The program should also include an exception handling mechanism for an attempt to divide by Zero.   (6 marks)

c) Write a java program, with a class named ArrayDoubleSum, which declares an array of type double and uses an enhanced for statement to sum the double values.   (4 marks)

d) Write a Java class named RectangualrCuboid that inherits from Rectangle class written in **Question 1(e)**. Add an instance variable, named depth, of type float, together with its setter and getter methods. Provide a constructor that initializes the instance variables used in class RectangularCuboid. Provide a method that calculates the volume of the rectangular cuboid. Use the formulas:
$$Volume of a Rectangular Cuboid = length x width x depth$$ (6 marks)

Question 4: (20 marks)

d) Write a Java GUI application of the figure shown below that uses multi-selection lists to copy items from one list to another.   (10 marks)

a) Create a java code for establishing a TCP connection between two computers using java.net.Socket class   (10 Marks)