TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INFORMATION AND COMMUTICATION TECHNOLOGY

EIT 4108 : FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

(a.) (i.) What does the acronym API stand for? Give.

(ii.) In which Java API are all standard stream objects defined in Java? Give.

(iii.) In which Java API is the JFrame class defined? Give.

(iv.) What is an import statement and why is it important? Explain.

(4 marks)

(b.) In object oriented programming paradigm, an object is said to have the following properties:

(i.) state

(ii.) behaviour

(iii.) identity

Briefly describe each property.

(3 marks)

(c.) With the aid of an example distinguish between the following:

(i.) An overloaded and overridden method.

(ii.) Class method and an instance method.

(4 marks)

(d.) Outline the functions of each of the following components:

(i.) container

(ii.) panel

Give a Java swing class in each case.

(4 marks)

(e.) How do we call the constructor of a parent class when defining the constructor of a child class? Give the operator and hence its general syntax.

(2 marks)

(f.) (i.) Briefly explain the term constructor as used in a class definition. As you explain give the distinguishing features that differentiate it from other member methods.

(ii.) Distinguish between a default constructor and a copy constructor. In each case give the general syntax for defining it.

(iii.) Distinguish between a mutator method and an accessor method. Give the general syntax for defining each type.

(12 marks)

Question TWO

You are required to write a simple Vehicle Hire System to rent and return vehicles. The rental charges are based on the number of days a car is rented.

(a) You are required to write the Vehicle class using the specifications below:

(i.) Instance variables for storing vehicleID, status, dailyRate, nodaysRented, renterName, renterLicenseNumber. The status should be set to either 'O' (on-loan) or 'A' (available). Provide accessor and mutator methods for each of the instance variables vehicleID and status.

(3 marks)

(ii.) Write a constructor that takes as arguments vehicle_ID and daily_Rate and assigns the corresponding instance variables. The instance variable status should be set to 'A' (available) initially.

(3 marks)

(iii.) Provide two methods, one for renting a vehicle and the other for returning a vehicle with the following method specifications.

- The rent() method accepts as argument the name and license number of the person renting the vehicle and also the number of days the vehicle will be on hire. If the vehicle is currently available it should set the status to 'O', store the name, license number and days rented in the corresponding instance variables before returning true. Otherwise this method should simply return false. This method should have the following signature:

public boolean rent(String name, String license, int drented)

- The returnBack() method should return 0 (zero) if an attempt is made to return back a car which is not on loan, otherwise it should compute and return the charges for renting the vehicle (number of days multiplied by daily-rate). This method should have the following signature:

public double returnBack()

(8 marks)

(iv.) Write another method called toString() that returns as a string the details of the vehicle as follows:

- If the vehicle is available then it should return details of vehivle the values of the instance variables vehicleID and dailyRate only.
- Otherwise, if the vehicle is currently on loan it should also return the name and license number of the person holding the car as well as the number of days it was rented out. (this obvious includes the details above.)

(3 marks)

(b.) Write an application class that will create an array of 5 Vehicle references and make them refer to the following 5 Vehicle objects below. Assume all the Vehicles are available initially.

Vehicle ID	Daily-Rate ($)
FJH 123N	12.0
DKY 222N	25.0
GAF 333N	18.0

(3 marks)

Question THREE

(a.) Briefly explain the each of following Java keywords:

(i.) super

(ii.) extends

(iii.) new

(3 marks)

(b.) Define the term binding. Briefly distinguish static binding and dynamic binding. Which method does Java use in binding its methods? Give.

(4 marks)

(c.) A class called Vehicle is required. An object of the class Vehicle will consist of the following data attributes:

- a registration number of type string
- the make of the vehicle of type string
- the year of manufacture of type integer and
- the current value of the vehicle of type float.

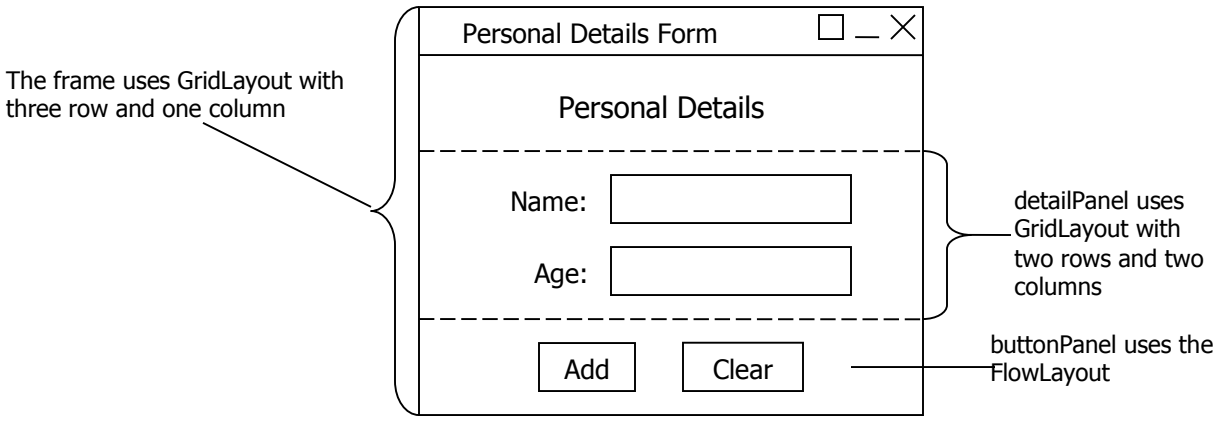
A constructor is required which will accept three arguments (parameters) to assign the first three attributes. Then write two accessor methods that will used to set and get the current value of the vehicle. Then write three get accessor methods for other three data attributes. In addition a method (call it vehAge) is needed which accepts as an argument a year and returns the age of the vehicle.

Write a child class of Vehicle called SecondHandVehicle, this has an additional attribute, numberOwners, which needs to be initialized at the time of creation and read access is also required. An additional method (call it repOwners) is required which returns as a string a message telling us whether the vehicle has had more than one previous owner.

(13 marks)

Question FOUR

Consider the following layout that has three labels, two text fields and two push buttons:



The dotted lines are used to partition the content pane to correspond to the number of rows that we require in it. These lines should be considered virtual so there is no code required to represent them.

The frame above uses GridLayout as its layout manager for a content pane of three rows and one column. The label "Personal Details" is placed in the first row of the content pane. A panel called detailPanel which will be used as a container for the two labels Name: and Age:, and their corresponding text fields is placed in the second row of the content pane. The detailPanel use the GridLayout as its layout manager with two rows and two columns. In the third row of the content pane a panel called buttonPanel is used as a container for the two push buttons with captions Add and Clear.

From the above frame description and layout, write a GUI application class (call it PersonalDetails) that will create the frame, with appropriate event listeners such that when we click on the push button with a caption:

(i.) Add, the program calls a member method called addPerson of the class PersonalDetails, which creates a Person object from the values entered in text fields. The addPerson method should check for empty strings before it passes the values to the constructor of the Person class. Assume Person constructor to be used here has the signature:

public Person(String na, int ag)

(ii.) Clear, the program calls a member method called clearForm of the class PersonalDetails, which sets the contents of each of the two text fields to an empty string.

Assume that the class Person is already written for you and is placed in the package Personal.Details.

(20 marks)

Question FIVE

(a.) Define the term layout manager and briefly explain the how each of the following layout managers arrange GUI components:

(i.) FlowLayout

(ii.) BorderLayout

(iii.) BoxLayout

(4 marks)

(b.) Define the term exception and give the general syntax of the try- catch construct.

(3 marks)

(c.) Define each of the following terms as used in the object oriented paradigm:

(i.) inheritance

(ii.) encapsulation

(iii.) polymorphism

(3 marks)

(d.) (i.) Define the term stream.

(ii.) Give the standard streams that Java can handle.

(4 marks)

(e.) (i.) What do you understand by term compiler? Explain.

(ii.) What is the target language for the Java compiler? Give.

(iii.) What do we mean by the term bytecode? Explain. What is the file extension of a bytecode file? Outline.

(iv.) On compilation of Java source code, if we get errors, do we still get the bytecode? Discuss.

(6 marks)