EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

THIRD YEAR SECOND SEMESTER (Dec.,2017. / Jan., 2018) - 2014/2015

OC 352 – PRACTICAL WORK ON FUNDAMENTAL OF JAVA PROGRAMMING

Answer all questions   **Time allowed: 2 Hours**

Note: Create a new folder on your desktop and name it with your Index No, save your answer in that created folder.

Q1. Design a class named **MyInteger** in Java. The class contains:

- An **int** data field named **value** that stores the integer value represented by this object.

- A parameterized constructor that creates an object in the class **MyInteger** for the specified integer value.

- The methods **isEven(), isOdd(), isPrime(), and isAmstrong()** that return **true** if the value in this object is even, odd, prime, or armstrong respectively.

- The method **display()** that displays the appropriate information about the value.

- Create an object with the value of 371, and check whether the value is even, odd, prime, or amstrong.

(Hint: **Armstrong number** is a number that is equal to the sum of cubes of its digits. For example, $153 = (1*1*1) + (5*5*5) + (3*3*3)$)

[40%]

Q2. A Lanka Finance Insurance Co-operation needs a software application to maintain their customer details. You are required to write Java program for the following requirements.

I. Create a super class named **LankaInsurance** which contains:

a. Data members **name** as *String*, **age** as *int*, **policyNumber** as *int* and **insuranceAmount** as *double* to store the customer details.

b. A constant data member **MAX_AGE** as *int* with default value (set **MAX_AGE** value as 65).

c. A data member **duration** as *int* used to store the duration between the constant value **MAX_AGE** and **age** of the customer.

d. A constructor is used to initialize the data member values **name**, **policyNumber**, **age** and **insuranceAmount**.

e. A constructor is used to initialize the data member values **policyNumber** and **insuranceAmount**.

f. Consider the following instructions to implement the methods:

   o A method **findDuration()** as *int* that finds the duration of the insurance,

   o Abstract methods **monthlyDue()** as *double* and **annualDue()** as *double*,

   o A method **medicalDue()** as *double* that finds the monthly medical due amount from 40% of **insuranceAmount**

   o A method **printDetail()** as *void* that displays the details of the customer **name, age, policyNumber** and **insuranceAmount**.

g. A data member named **AccountInfo** which type is **ArrayList** that stores the history of the insurance claims. Each claim is an instance of the **Life** or **General** class.

II. Create a sub class **Life** that contains:

   a. Data members **type** as *String* defines type of claim and **claimAmount** as *double* defines amount of value that the customer can claim.

   b. A constructor is used to initialize the data member values **name, policyNumber, age** and **insuranceAmount**.

   c. A constructor that constructs a **Life** claim history with the **type, policyNumber, insurancAmount** and **claimAmount**.

   d. Consider the following instructions to implement the methods:

      o A method **accidentalDeathClaim()** as *double* that calculates the **claimAmount** by three times of **insuranceAmount**,

      o A method **naturalDeathClaim()** as *double* that calculates the **claimAmount** by equal value to **insuranceAmount**,

      o A method **medicalClaim()** as *double* that calculates the **claimAmount** by 10% of **insuranceAmount**,

      o An overriding method **monthlyDue()** that returns the monthly due value of **insuranceAmount** plus medical due value,

      o A method **printInfo()** as *void* that displays the details of the customer **name, age, policyNumber, insuranceAmount** and value of **monthlydue.**

III. Create a sub class **General** that contains:

   a. Data members **type** as *String*, **period** as *int*, **vehicleAmount** as *double* and **totalDamage** as *double* to store the vehicle details of the customer.

   b. A constructor is used to initialize the data member values **name, policyNumber, age, insuranceAmount** and **period** of the vehicle purchased.

c. A constructor that constructs a **General** claim history with the **type, policyNumber, insurancAmount** and **totalDamage**.

(Hint: **vehicleAmount = insurancAmount**)

d. An overriding method **annualDue()** that returns the annual due amount for vehicle as per the following criteria:

   o If period =1, then 10% of vehicleAmount,

   o If period =2 or period =3, then 5% discount of 10% of vehicleAmount,

   o If period =4 or period =5, then 7% discount of 10% of vehicleAmount,

   o If period >5, then 10% discount of 10% of vehicleAmount.

e. Consider the following instructions to implement the methods:

   o A method **damageClaim (double totalDamage)** as *double*, if the **totalDamage** value greater than **vehicleAmount** it returns **vehicleAmount** otherwise returns **totalDamage** value,

   o A method **printInfo()** as *void* that displays the details of the customer **name, age, policyNumber, insuranceAmount, period** and value of **annualDue**.

IV. Implement a test class **TestInsurance** as follows:

a. Create an object in **Life** class with name of Sana, **policyNumber** of 134, **age** of 34 and **insuranceAmount** of 100000.00. Use the method **medicalClaim()** and the method **accidentalDeathClaim()** for the object and print the details.

b. Create an object in **General** class with **name** of Gayan, **policyNumber** of 454, **age** of 56, **insuranceAmount** of 50000.00 and **period** of 6. Use the method **damageClaim()** for the object and print the details.

[60%]