OBJECT ORIENTED PROGRAMMING

SECTION – C [WEDNESDAY OCTOBER 20, 2021: 2:30 PM – 5:30 PM]

ASSIGNMENTS – 08 (RP08) CODE: ASSIGN08

NOTES:

i) Create files with the following file naming conventions: If your roll number ends with **abc**, year of admission is 20**19** and assignment code is **Assign08** then, use the file name as follows: Assign082019abc.cpp (use appropriate extension .cpp suitably).
   For example, if the roll number ends with 127; year of admission is 2019 & the assignment code is Assign08, then the file name should be **Assign082019127.cpp**

ii) Strictly follow the file naming convention. Otherwise, it would attract a penalty up to 20%.

PROBLEM: **[Total Marks: 20]**

You may choose C++ (.cpp) or JAVA (.java) to solve these problems using different inheritances
Note: Use Random numbers as necessary. Use only Public Derivation for inheriting the classes.

a) [4 Marks] Define a class: `Account` consisting of the following States and Behaviours:

States:

i. `name`: brand of the car – enum(Tata, Ford, BMW, Rolls-Royce, Benz, Leyland, Isuzu)
ii. `cif`: Customer Information Folio (CIF) – Unique number for each account holder
iii. `year`: the year in which the account has been opened [2010, 2021]
iv. `type`: either Resident or Non-Resident
v. `listacs`: the list of accounts that include (saving = 1, current = 2, deposit = 3, loan = 4 and funds = 5, overdraft = 6 and others = 7). Initially this list would be empty and it may have a maximum size of 7 elements.

Behaviour:

i. `getBalance(int cat)`: This method will return the outstanding balance as on today.
ii. `getInterestRate()`: This is related to the interest rate of a specific account. You may use as many arguments as necessary.
iii. `getNetAmount()`: this method should get the net balance amount by calculating (savings + current + deposit + funds) – (loan + overdraft + others)

b) [6 Marks] Write a method to populate an array of n `Accounts` where n in [5, 20] with the above state variables and behaviours. Use random number generator for the state variables as suggested.

c) [3 Marks] Define a class Hierarchy as follows (apply Hierarchical Inheritance):
`Account` ← `saving`
`Account` ← `current`
`Account` ← `deposit` ← `overdraft`
`Account` ← `loan`
`Account` ← `funds`
`Account` ← `others`

Here overdraft account can be created with the 90% of the value of the fixed deposit accounts. You may assume additional member variables (attribute-value pairs) that are specific to other accounts.

d) [4 Marks] Apply a suitable inheritance to define the following:
`Account` ← `deposit` ← `shortterm`
`Account` ← `deposit` ← `mediumterm`
`Account` ← `deposit` ← `longterm`

Here short term loan duration is 1 day to <= 1 year; mediumterm duration is > 1 year to <=3 years; and longterm duration is > 3 years to <= 10 years. Interest rates for short, medium and long terms are defined as 5%, 6.1% and 7.2% respectively.

e) [4 Marks] Apply Hybrid Intelligence to add the following loan details and get the sum of the loan amount taken by a specific account holder:

House Loan, Car Loan, Education Loan, Personal Loan and Gold Loan

f) [3 Marks] Write a method in the base class to print the details of the user profile information: `void printDetails()`. Apply inheritance of this method in each derived class with the same name.