National University of Computer and Emerging Sciences

Lab Manual # 11
Object Oriented Programming
(CL2004)

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Objectives

After performing this lab, students shall be able to understand:

- ✓ Inheritance and its types

TASK 1:

Consider a base class named Employee and its derived classes **HourlyEmployee** and **PermanentEmployee** while taking into account the following criteria.

- ***Employee*** class has two data fields i.e. a ***name*** (of type string) and specific ***empID*** (of type integer)
- Both classes (***HourlyEmployee*** and ***PermanentEmployee***) have an attribute named ***hourlyIncome***
- Both classes (***HourlyEmployee*** and ***PermanentEmployee***) have ***three-argument*** constructor to initialize the ***hourlyIncome*** as well as data fields of the base class
- Class ***HourlyEmployee*** has a function named ***calculate_the_hourly_income*** to calculate the income of an employee for the actual number of hours he or she worked. One hour income is Rs. 150
- Similarly, ***PermanentEmployee*** class has function named ***calculate_the_income*** to calculate the income of an employee that gets paid the salary for exact 240 hours, no matter how many actual hours he or she worked. Again, one hour salary is ***Rs. 150.***

Implement all class definitions with their respective ***constructors*** to initialize all data members and functions to compute the total income of an employee. In the **main**() function, create an instance of both classes (i.e. ***HourlyEmployee*** and ***PermanentEmployee***) and test the working of functions that calculate total income of an employee.

Task 2:

Consider a class ***BankAccount*** that has

- Two attributes i.e. ***accountID*** and balance and
- A function named ***balanceInquiry***() to get information about the current amount in the account Derive two classes from the ***BankAccount*** class i.e. ***CurrentAccount*** and the ***SavingsAccount***. Both classes (***CurrentAccount*** and ***SavingsAccount***) inherit all attributes/behaviors from the ***BankAccount*** class. In addition, followings are required to be the part of both classes
- Appropriate ***constructors*** to initialize data fields of base class
- A function named ***amountWithdrawn***(amount) to withdraw certain amount while taken

into account the following conditions
    - While withdrawing from current account, the minimum balance should not decrease ***Rs. 5000***
    - While withdrawing from savings account, the minimum balance should not decrease ***Rs. 10,000***
- ***amountDeposit(amount)*** to deposit amount in the account

In the **main()** function, create instances of derived classes (i.e. ***CurrentAccount*** and ***SavingsAccount***) and invoke their respective functions to test their working.

Task 3:

Consider the following details of all classes for class hierarchy.

- Class ***Person*** holds
    - Two attributes i.e. ***name*** and ***year_of_birth***
    - A ***two-argument constructor*** to initialize its data members with user-defined values

- Class ***Student*** has
    - Two attributes i.e. studentID and enrolledSemester
    - A ***four-argument constructor*** to initialize its data members (including inherited data members)
    - A function named ***display()*** to show the values of all attributes (including inherited attributes)

- Class ***Employee*** contains
    - Five attributes i.e. ***employeeID, joiningYear, jobTitle*** (designation of an employee), ***courseID***, and ***courseTitle.***

- Class ***Administration*** has

- A ***parameterized constructor*** to receive ***five arguments*** to initialize inherited attributes from class ***Employee*** (Concerning ***courseID*** and ***courseTitle***, only null value is allowed to set for an admin officer)
- Two functions i.e. ***setJobTitle***(employee) and ***getJobTitle***(employee) to set and get job title of an employee.

• Class ***Academic*** has

- A ***parameterized constructor*** to receive ***five arguments*** to initialize inherited attributes from class Employee (Concerning ***employeeID, joiningYear, and jobTitle***, only null value is allowed to set)
- Two functions i.e. ***setCourseID()*** and ***setCourseTitle()***

• Only an instance of class ***DeanHOD*** should be able to modify values for ***employeeID, designation of an employee, ID*** and ***name of a particular course.***

Implement all these classes and within the main function, create instances of all classes (except class Employee) and test the described working of all these classes.