Aror University of Art, Architecture, Design & Heritage Sukkur.

Department of Artificial Intelligence and Multimedia Gaming

Object Oriented Programming(Spring-2024)

LAB No. 4

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Objective of Lab No. 4:

After performing lab4, students will be able to:

- Implement classes in Java and Create Objects
- Use Default constructor and new operator
- Use Dot Operator
- Modify default and create Parameterized constructor
- Implement void and return type methods

Lab Exercises:

1. **Create a class circle with attributes radius and color, Now:**
    a. create two objects namely red_circle and green_circle in the main method using default constructor.
    b. Add a method named calculateArea() which calculates the area of calling object and prints it on the console screen, note the method does not return any value and accepts no parameter.
    c. Use dot operator to initialize the instance variables of red_circle and green_circle (Use any radius value)
    d. Now print the radius of both circles (Use Dot Operator with instance variables)

2. **Now Modify the Task 1 in following way:**
    a. Initialize the instance variables using parameterized constructor (Demonstrate bypassing the local variable hiding)
    b. calculateArea() method returns the area of calling object, choose return type wisely.
    c. Print the radius of both circles with the help of getter methods for color and radius.

3. **Create a class called Bank Account with attributes balance and AccountNumber, Now:**
    a. Create two Objects namely acc1, acc2 with parameterized constructor, by bypassing local variable hiding (Initial balance of account 1 is 1000 and account 2 is 500).
    b. Implement methods to deposit, withdraw and check balance of an account.

c. Deposit 500 in account 1 and 1500 in account 2 with the help of method.
d. Check balance of both accounts now.
e. Withdraw 500 from account 1 (Make sure you have that much balance…)
f. Check balance of account 1.
g. Withdraw 3000 from account 2.

4. Write a program that would print the information (name, year of joining, salary, address) of three employees by creating a class named 'Employee'. The output should be as follows:

Name	Year_of_Joining	Address
Robert	1994	WallsStreat
Sam	2000	WallsStreat
John	1999	WallsStreat

5. **Create a class student having attributes id, name and grades (array of 5 double elements)**
   a. Initialize the above given attributes with the help of parameterized constructor by creating 2 objects.
   b. Add a method display_average_grade() which displays the average grade of calling object.
   c. Add a method calc_percentage() which converts each numeric grade into percentage form and returns the array of percentages, remember naximum marks for each grade are 200.
   d. Add a method called concat_id_name, which concatenates the id and name of student and returns the concatenated result.
   e. Demonstrate the use of all the above methods by calling them over the objects.

6. **Create a class matrix, with attributes number of rows and number of columns, and a matrix of size rows and columns named matx:**
   a. Add a constructor which sets the number of rows and number of columns when an object is created.
   b. Add a get_matrix() method which displays the elements of matt of a matrix object
   c. Add a method called set_element() which accepts row number and column number along with the value, and sets the value at that row number and column number.
   d. Create an object matrix1 having 4 rows and 3 columns.
   e. Create an object matrix2 having 3 rows and 3 columns.
   f. Initialize the matt attribute of both matrices.
   g. Update the element of matt of matrix one at row number 1 and column number 2 with 3.
   h. Call get_matrix() on both objects.