**FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERIG**

**Department of Computer Engineering**

**Experiment 2- Class and Object**

1. **Course Details:**

| **Academic Year** | **2023 - 24** | **Estimated Time** | **Experiment No. 2 – 02 Hours** |
| --- | --- | --- | --- |
| **Course & Semester** | **S.E. (COMP) – Sem. III** | **Subject Name** | **Skill based lab Course-OOP with Java** |
| **Module No.** | **02** | **Chapter Title** | **Class, Object, Packages, and Input/Output** |
| **Experiment Type** | **Software Performance** | **Subject Code** | **CSL304** |
|  |  |  |  |

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| --- | --- | --- | --- |
| **Date of**  **Performance:** | 2/8/23 | **Date of Submission:** | 9/8/23 |
| **CO Mapping** | **CSL304.2: Illustrate the concept of packages, classes, and objects** | | |

| **Timeline**  **(2)** | **Preparedness**  **(2)** | **Effort**  **(2)** | **Result**  **(2)** | **Total (10)** |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

**Problem Statements:**

1. Write a program to create a class Student with data ‘name, city and age’ along with method printData to display the data. Create the two objects s1, s2 to declare and access the values.

**CODE:**

class Student {

private int id;

private String name;

private String city;

private int age;

*// constructor to set the student data*

Student(int *id*, String *name*, int *age*, String *city*) {

this.id = id;*// assigns the local values to the class variables*

this.name = name;

this.age = age;

this.city = city;

}

*// prints the student data*

void printData() {

System.out.println("Student" + id + ":\n\tName: " + name + "\n\tAge: " + age + "\n\tCity: " + city + "\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

}

}*// end of class Student*

class StudentDetails {

public static void main(String[] *args*) {

*// instantiating the objects of class Student and passing the values to the constructors*

Student s1 = new Student(1, "Pratyay", 18, "Mumbai");

Student s2 = new Student(2, "Shwen", 18, "Vasai");

*// print the data passed through the constructor*

System.out.println("\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

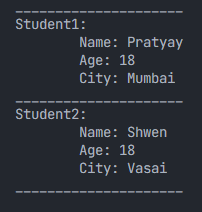
s1.printData();

s2.printData();

}

}

**OUTPUT:**

****

1. Write a program to create a class Student2 along with two method getData(), printData() to get the value through argument and display the data in printData. Create the two objects s1, s2 to declare and access the values from class STtest.

**CODE:**

class Student2 {

private String name;

private String city;

private int age;

public void getData(String *name*, String *city*, int *age*) {

this.name = *name*;

this.city = *city*;

this.age = *age*;

}

public void printData() {

System.out.println("Name: " + name);

System.out.println("City: " + city);

System.out.println("Age: " + age);

}

}

public class STtest {

public static void main(String[] *args*) {

*// Create object s1*

Student2 s1 = new Student2();

s1.getData("John", "New York", 20);

*// Access s1's values*

s1.printData();

*// Create object s2*

Student2 s2 = new Student2();

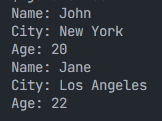
s2.getData("Jane", "Los Angeles", 22);

*// Access s2's values*

s2.printData();

}

}



**OUTPUT:**

1. WAP using parameterized constructor with two parameters id and name. While creating the objects obj1 and obj2 passed two arguments so that this constructor gets invoked after creation of obj1 and obj2.

**CODE:**

class Object{

private int id;

private String name;

Object(int *id*, String *name*){

this.id = *id*;

this.name = *name*;

}

void printData(){

System.out.println("Object" + id + ":-\tName: " + name + "\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

}

}

class ObjectCreation{

public static void main(String[] *args*) {

Object obj1 = new Object(1, "first object");

Object obj2 = new Object(2, "second object");

System.out.println("\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

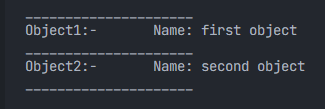
obj1.printData();

obj2.printData();

}

}

**OUTPUT:**

****

1. WAP to demonstrate the working of a banking-system, where we deposit and withdraw amount from our account. Creating an Account class which has deposit() and withdraw() methods.

import java.util.Scanner;

class Account {

*// object states*

private long accountNumber;

private String accountHolderName;

private String password;

private double balance;

boolean flagRightAccount = true;

Scanner sc = new **Scanner**(System.in);

*// constructor to define the object data*

**Account**(long *accNo*, String *name*, double *amount*, String *password*) {

this.accountNumber = *accNo*;

this.accountHolderName = *name*;

this.balance = *amount*;

this.password = *password*;

}

*// verifies the account number*

boolean **verifyAccountNumber**(String *input*) {

try {

if (Long.**parseLong**(*input*) == this.accountNumber) {

return true;

} else {

return false;

}

} catch (Exception *e*) {

return false;

}

}

*// verifies the account name*

boolean **verifyAccountHolderName**(String *input*) {

if (*input*.**equals**(this.accountHolderName)) {

return true;

}

return false;

}

*// verifies the password*

boolean **verifyPassword**(String *input*) {

if (*input*.**equals**(this.password)) {

return true;

}

return false;

}

*// checks whether the account is right*

void **checkAccount**() {

while (this.flagRightAccount) {

*// prints account details*

System.out.**println**("\n Please verify the account details to proceed\n\tAccount Holder Name: "

+ this.**getAccountHolderName**() + "\n\tAccount Number: " + this.**getAccountNumber**() + "\n\tBalance: "

+ this.**getBalance**());

System.out.**println**("------------------------------------------------------------------------");

System.out.**print**("\nWould you like to proceed?(yes / no(default)) ");

String proceed = sc.**nextLine**();*// right account?*

System.out.**println**("------------------------------------------------------------------------");

if (proceed.**equalsIgnoreCase**("yes")) {

*// account is correct*

this.flagRightAccount = false;

**operation**();*// goes to make an operation on the account*

return;

} else {

System.out.**print**("Would you like to re-enter your details? (yes / no(default)):\t");*// enter details again?*

String retry = sc.**nextLine**();

System.out.**println**("------------------------------------------------------------------------");

*// reenter your details.*

if (retry.**equalsIgnoreCase**("yes")) {

Bank.needflagDetails = true;

Bank.accountExists = false;

Bank.passwordMatches = false;*// reenter account details*

Bank.**verifyAccount**();

} else {

System.out.**println**("--x--x--End of program--x--x--");

System.**exit**(0);

*// return; //i have no idea why return doesn't work*

}

}

}

}

*// tried recursion here*

*// operation on the account*

void **operation**() {

System.out.**println**(

"Enter the mode of operation:\n\t1.Withdraw(with)\n\t2.Deposit(dep)\n\t3.Balance(bal)\n\t4.Change Password(pass)\n\t5.Go Back(back) \n\t6.Cancel Operation(c)");

String input = sc.**nextLine**();*// operation input*

System.out.**println**("------------------------------------------------------------------------");

switch (input) {

case "with":

**withdraw**();

System.out.**println**("The account currently has Rs." + **getBalance**() + "\\-");

break;

case "dep":

**deposit**();

System.out.**println**("The account currently has Rs." + **getBalance**() + "\\-");

break;

case "bal":

System.out.**println**("The account currently has Rs." + **getBalance**() + "\\-");

break;

case "pass":

**setPassword**();

break;

case "back":

*// goes to account*

this.flagRightAccount = true;

**checkAccount**();

return;

case "c":

*// exit*

return;

default:

System.out.**println**("Error: Invalid input");

}

System.out.**println**("------------------------------------------------------------------------");

*// make another operation*

System.out.**print**("Would you like to make another operation?(yes / no(default)):\t");

String again = sc.**nextLine**();

System.out.**println**("------------------------------------------------------------------------");

if (again.**equalsIgnoreCase**("yes")) {

**operation**();*// recalls the operation again*

} else {

this.flagRightAccount = true;

**checkAccount**();*// goes one step back*

}

}

*// changes the password if the requirements are met*

public void **setPassword**() {

System.out.**print**("Enter the previous password:\t");

String previousPassword = sc.**nextLine**();

System.out.**print**("Enter the new password:\t");

String newPassword1 = sc.**nextLine**();

System.out.**print**("Re-enter the new password:\t");

String newPassword2 = sc.**nextLine**();

*// used .equals cause '==' doesn't work on strings*

if (previousPassword.**equals**(this.password)) {

if (newPassword1.**equals**(newPassword2)) {

this.password = newPassword1;

System.out.**println**("The new password is: " + this.password);

} else {

System.out.**println**("The new passwords dont match");

}

} else {

System.out.**println**("The previous password is incorrect");

}

}

*// withdraw money from bank*

void **withdraw**() {

System.out.**print**("Enter the amount to withdraw:\t");

*// makes sure that the input has double datatype*

while (!sc.**hasNextDouble**()) {

System.out.**print**("Error: Invalid input. Please enter a valid amount:\t");

sc.**nextDouble**(); *// Clear the invalid input*

}

double withdrawnAmount = sc.**nextDouble**();

sc.**nextLine**();*// consumes the leftover newline*

*// checks whether the amount already exists in the account or not*

if (withdrawnAmount > 0 && withdrawnAmount > balance) {

System.out

.**println**("Error: Your withdrawing amount is more than your current balance amount. Operation cannot proceed");

return;

} else {

balance -= withdrawnAmount;

System.out.**println**("You have withdrawn Rs." + withdrawnAmount + "\\- from your bank account");

return;

}

}

*// deposit money in bank*

void **deposit**() {

System.out.**print**("Enter the amount to deposit:\t");

*// makes sure that the input has double datatype*

while (!sc.**hasNextDouble**()) {

System.out.**println**("Error: Invalid input. Please enter a valid amount:");

sc.**nextDouble**(); *// Clear the invalid input*

}

double depositedAmount = sc.**nextDouble**();

sc.**nextLine**();

if (depositedAmount < 1) {

System.out.**println**("Error: Minimum Amount Allowed:\tRs.1");

return;

} else {

balance += depositedAmount;

System.out.**println**("You have deposited Rs." + depositedAmount + "\\- in your bank account");

return;

}

}

*// getter balance*

public double **getBalance**() {

return balance;

}

*// getter account name*

public String **getAccountHolderName**() {

return accountHolderName;

}

*// getter account number*

public long **getAccountNumber**() {

return accountNumber;

}

}*// end of class Account*

class Bank {

static boolean needflagDetails = true;*// for repetative crendentials input*

*// for account verfication*

static boolean accountExists = false;

static boolean passwordMatches = false;

static Account[] ac = new Account[3];*// initialised outside so that both functions can access it*

static int i = 0;*// current account*

*// verifies whether the account exist and the user can be logged in*

static void **verifyAccount**() {

Scanner sc = new **Scanner**(System.in);

*// repetative checking of the credentials*

while (needflagDetails) {

*// input account details*

System.out.**print**("Enter the account holder's name/ account number:\t");

String name = sc.**nextLine**();

System.out.**print**("Enter the account holder's password:\t");

String pass = sc.**nextLine**();

System.out.**println**("------------------------------------------------------------------------");

*// checks each account to find a match*

for (i = 0; i < ac.length; i++) {

if (ac[i].**verifyAccountHolderName**(name) || ac[i].**verifyAccountNumber**(name)) {

if (ac[i].**verifyPassword**(pass)) {

accountExists = true;

passwordMatches = true;

break;

} else {

accountExists = true;*// only account exists*

}

}

}

*// output based on the entered credentials*

if (accountExists && passwordMatches) {

needflagDetails = false;

System.out.**println**("User Logged in!");

ac[i].**checkAccount**();*// logs the user into its account*

return;

} else if (accountExists && !passwordMatches) {

accountExists = false;

System.out.**println**("Incorrect password");

} else {

System.out.**println**("Invalid username.");

}

System.out.**println**("------------------------------------------------------------------------");

*// whether to ask for the detials again or not*

if (needflagDetails) {

System.out.**print**("Would you like to retry?(yes / no(default)):\t");

String retryInput = sc.**nextLine**();

if (retryInput.**equalsIgnoreCase**("yes")) {

needflagDetails = true;

} else {

needflagDetails = false;

}

}

System.out.**println**("------------------------------------------------------------------------");

}

}

public static void **main**(String[] *args*) {

*// initialising the accounts*

ac[0] = new **Account**(1l, "Shaun Mendes", 100000, "pass1");

ac[1] = new **Account**(2l, "Mark Lopes", 100000, "pass2");

ac[2] = new **Account**(3l, "Jonathan Gomes", 100000, "pass3");

*// this method is used to call all the operations. The methods of the objects*

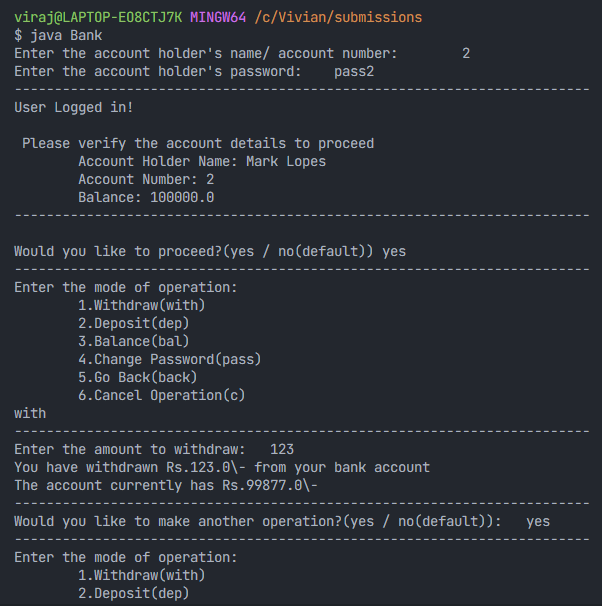
*// call other method until the user doesn't want to continue with the operation*

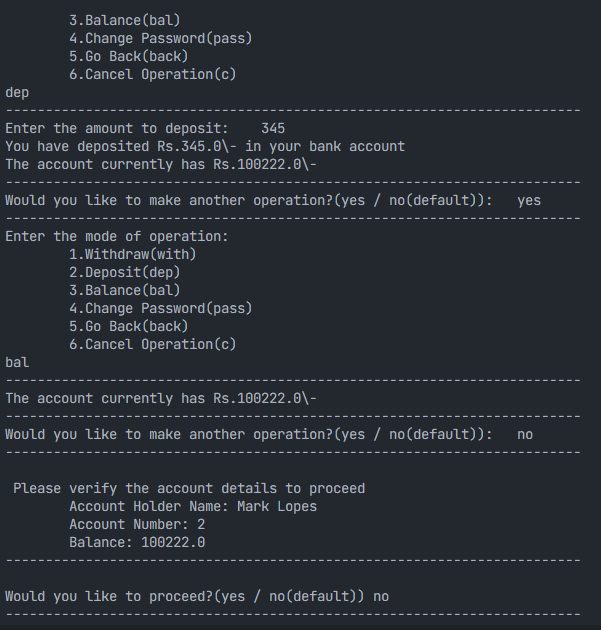
**verifyAccount**();

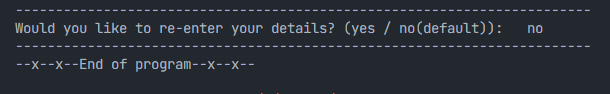
}

}*// it works*

**OUTPUT :**

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1. Write a program to print the area of a rectangle by creating a class named 'Area' taking the values of its length and breadth as parameters of its constructor and having a method named 'returnArea' which returns the area of the rectangle. Length and breadth of rectangle are entered through keyboard.

**CODE:**

import java.util.Scanner;*//importing the Scanner class*

class Area {

private double length;

private double breadth;

*// constructor to input the dimensions of the rectangle*

**Area**(double *len*, double *bre*) {

this.length = *len*;

this.breadth = *bre*;

}

*// returns the area of rectangle*

double **returnArea**() {

return this.length \* this.breadth;

}

}

class Rectangle {

public static void **main**(String[] *args*) {

double length;

double breadth;

double area;

Scanner sc = new **Scanner**(System.in);*// creating an object ot use scanner class*

System.out.**print**("Enter the length of the rectangle:\t");

length = sc.**nextDouble**();

sc.**nextLine**();*// consuming the newLine character*

System.out.**print**("Enter the breadth of the rectangle:\t");

breadth = sc.**nextDouble**();

sc.**nextLine**();*// consuming the newLine character*

Area rect1 = new **Area**(length, breadth);*// creating an object of class area*

area = rect1.**returnArea**();*// stores the area of the object rect1*

System.out.**println**("The area of the rectangle is " + area);

}

}

**OUTPUT:**