



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 1

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Section/Group: KRG_2B

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Subject Name: PBLJ

Subject Code: 23CSH-304

1. Aim: To design and implement Java programs for analyzing strings, performing matrix operations, and simulating a basic banking system using object-oriented concepts.

A)– Easy Level:

- To analyze a user-input string and count vowels, consonants, digits, and special characters.

B)– Medium Level:

- To implement matrix operations (addition, subtraction, multiplication) with validation of dimensions.

C) – Hard Level:

- To create a basic banking system with account creation, deposit, and withdrawal functionalities ensuring no overdraft.

2. Objective:

- To understand string manipulation and character classification in Java.
- To apply conditional statements for analyzing vowels, consonants, digits, and special characters.
- To implement multidimensional arrays and validate dimensions for performing matrix operations.
- To apply nested loops for addition, subtraction, and multiplication of matrices.
- To design and implement a basic banking system using object-oriented programming concepts.

3. JAVA script and output:



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EASY-LEVEL PROBLEM

```
import java.util.Scanner;

public class StringAnalysis {    public
static void main(String[] args)
{
    Scanner sc = new
Scanner(System.in);
    System.out.print("Enter a string: ");
    String str = sc.nextLine();

    int vowels = 0, consonants = 0, digits = 0, special = 0;
    str = str.toLowerCase();

    for (int i = 0; i < str.length(); i++)
    {
        char ch = str.charAt(i);
        if ("aeiou".indexOf(ch) != -1)
        {
            vowels++;
        } else if (ch >= 'a' && ch <= 'z')
        {
            consonants++;
        } else if (ch >= '0' && ch <= '9') {
            digits++;
        } else if (ch != ' ')
        {
            special++;
        }
    }

    System.out.println("Vowels: " + vowels);
    System.out.println("Consonants: " + consonants);
    System.out.println("Digits: " + digits);
    System.out.println("Special Characters: " + special);
}
}
```

Output:



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```
Enter a string: Hey 123!  
Vowels: 1  
Consonants: 2  
Digits: 3  
Special Characters: 1  
BUILD SUCCESSFUL (total time: 21 seconds)  
|
```

MEDIUM LEVEL PROBLEM:

```
import java.util.Scanner;
```

```
public class MatrixOperations {    public  
static void main(String[] args)  
{    Scanner sc = new  
Scanner(System.in);  
    System.out.print("Enter rows and columns for Matrix A: ");  
int r1 = sc.nextInt(), c1 = sc.nextInt();  
    System.out.print("Enter rows and columns for Matrix B: ");  
int r2 = sc.nextInt(), c2 = sc.nextInt();  
  
int[][] A = new int[r1][c1];  
int[][] B = new int[r2][c2];  
  
    System.out.println("Enter elements of Matrix A:");  
for (int i = 0; i < r1; i++)        for (int j = 0; j < c1; j++)  
    A[i][j] = sc.nextInt();  
  
    System.out.println("Enter elements of Matrix B:");  
for (int i = 0; i < r2; i++)        for (int j = 0; j < c2; j++)  
    B[i][j] = sc.nextInt();  
    if (r1 == r2 && c1 == c2)  
{        System.out.println("Addition:");  
for (int i = 0; i < r1; i++) {  
    for (int j = 0; j < c1; j++)  
        System.out.print((A[i][j] + B[i][j]) + " ");  
    System.out.println();  
}  
}
```



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```
        System.out.println("Subtraction:");
        for (int i = 0; i < r1; i++)
        {
            for (int j = 0; j < c1; j++)
                System.out.print((A[i][j] - B[i][j]) + " ");
            System.out.println();
        }
    } else {
        System.out.println("Addition and Subtraction not possible");
    }
    if (c1 == r2) {
        System.out.println("Multiplication:");
        int[][] result = new int[r1][c2];
        for (int i = 0; i < r1; i++) {
            for (int j = 0; j < c2; j++) {
                for (int k = 0; k < c1; k++)
                    result[i][j] += A[i][k] * B[k][j];
            }
            System.out.print(result[i][j] + " ");
        }
        System.out.println();
    }
    } else {
        System.out.println("Multiplication not possible");
    }
}
```

Output:

```
run:
Enter rows and columns for Matrix A: 2 2
Enter rows and columns for Matrix B: 2 2
Enter elements of Matrix A:
4 0 1 2
Enter elements of Matrix B:
1 25 6 1
Addition:
5 25
7 3
Subtraction:
3 -25
-5 1
Multiplication:
4 100
13 27
BUILD SUCCESSFUL (total time: 13 seconds)
```



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HARD LEVEL PROBLEM

```
import java.util.Scanner;

class BankAccount
{   private String name;
    private String accNumber;
    private double balance;

    public BankAccount(String name, String accNumber, double balance)
    {   this.name = name;    this.accNumber = accNumber;
        this.balance = balance;
    }

    public void deposit(double amount) {
        balance += amount;
        System.out.println("Deposit successful! Current Balance: " + balance);    }

    public void withdraw(double amount) {
        if (amount <= balance)
        {   balance -= amount;
            System.out.println("Withdrawal successful! Current Balance: " + balance);
        } else {
            System.out.println("Error: Insufficient funds. Current Balance: " + balance);
        }
    }
}

public class BankingSystem {   public
static void main(String[] args)
{   Scanner sc = new
Scanner(System.in);

    System.out.println("Create Account:");
    System.out.print("Name: ");
    String name = sc.nextLine();
    System.out.print("Account Number: ");
```



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```
String accNo = sc.nextLine();
System.out.print("Initial Balance: ");
double bal = sc.nextDouble();

BankAccount account = new BankAccount(name, accNo, bal);

System.out.print("Enter amount to Deposit: ");
double dep = sc.nextDouble();    account.deposit(dep);

System.out.print("Enter amount to Withdraw: ");
double wd = sc.nextDouble();
account.withdraw(wd);
}
}
```

Output:

```
Create Account:
Name: Akshara
Account Number: 1234500
Initial Balance: 50000
Enter amount to Deposit: 34000
Deposit successful! Current Balance: 84000.0
Enter amount to Withdraw: 10000
Withdrawal successful! Current Balance: 74000.0
BUILD SUCCESSFUL (total time: 33 seconds)
```