**OBJECT ORIENTED PROGRAMMING LAB**

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**Batch: B**

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**Extra Questions**

**Aim**

1. Write a java program to perform menu-driven program for matrix multiplication using FOR-loop.
2. Write a java program to perform menu-driven program for matrix multiplication using WHILE loop.
3. Write a java program to perform matrix traversal.

**Procedure**

1. **MatrixMul.java**

import java.util.\*;

public class MatrixMul {

public int[][] MatrixCreation(){

int row=0,col=0;

Scanner sc= new Scanner(System.in);

System.out.print("Enter the number of rows : ");

row= sc.nextInt();

System.out.print("\nEnter the number of columns : ");

col= sc.nextInt();

int[][] matrix= new int[row][col];

System.out.println("Enter the elements for the matrix : ");

for(int i=-0;i<row;i++){

for(int j=0;j<col;j++){

matrix[i][j]= sc.nextInt();

}

}

return matrix;

}

public void matrixDisplay(int[][] matrix){

if(matrix!=null && matrix.length > 0 && matrix[0].length > 0){

int row= matrix.length;

int col= matrix[0].length;

for(int i=0;i<row;i++){

for(int j=0;j<col;j++){

System.out.print(matrix[i][j]+" ");

}

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

}

}

else{

System.out.println("This matrix is empty or not created !! Create a matrix and then try to display !!");

}

}

public void matrixMultiplication(int[][] matA, int[][] matB){

if((matA!=null && matA.length > 0 && matA[0].length > 0) && (matB!=null && matB.length > 0 && matB[0].length > 0)){

int r1= matA.length;

int c1= matA[0].length;

int r2= matB.length;

int c2= matB[0].length;

int[][] finalmatrix= new int[r1][c2];

for(int i=0;i<r1;i++){

for(int j=0;j<c2;j++){

finalmatrix[i][j]=0;

for(int k=0;k<c2;k++){

finalmatrix[i][j]+= matA[i][k]\*matB[k][j];

}

}

}

System.out.println("The final resultant matrix is : ");

new MatrixMul().matrixDisplay(finalmatrix);

}

else{

System.out.println("The given matrices are either empty or not created !! Make sure that both the matrices are created with proper values before multliplication !!");

}

}

public static void main(String[] args){

MatrixMul matrixMul= new MatrixMul();

Scanner sc= new Scanner(System.in);

Boolean iscontinue=true;

int[][] matrix\_01= new int[0][0];

int[][] matrix\_02= new int[0][0];

int choice;

while(true){

System.out.println("\nOperations listed are : \n1. Matrices Creation.\n2. Matrices Display.\n3. Matrix Multiplication.\n4. Exit.");

System.out.print("Enter the choice : ");

choice= sc.nextInt();

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

switch(choice){

case 1:{

matrix\_01= matrixMul.MatrixCreation();

matrix\_02= matrixMul.MatrixCreation();

break;

}

case 2:{

System.out.println("The matrix A is : ");

matrixMul.matrixDisplay(matrix\_01);

System.out.println("\nThe matrix B is : ");

matrixMul.matrixDisplay(matrix\_02);

break;

}

case 3:{

if(matrix\_01[0].length==matrix\_02.length){

matrixMul.matrixMultiplication(matrix\_01, matrix\_02);

}

else{

System.out.println("Matrix Multiplication not possible with these two matrices !! Please make sure the rows and columns are appropiate fro the multliplication.");

}

break;

}

case 4:{

iscontinue= false;

break;

}

default:{

System.out.println("Invalid Choice !! Try Again with correct choice.");

break;

}

}

if(!iscontinue){

break;

}

}

sc.close();

}

}

1. **MatrixMulWhile.java**

import java.util.\*;

public class MatrixMulWhile {

public int[][] MatrixCreation(){

int row=0,col=0;

Scanner sc= new Scanner(System.in);

System.out.print("Enter the number of rows : ");

row= sc.nextInt();

System.out.print("\nEnter the number of columns : ");

col= sc.nextInt();

int[][] matrix= new int[row][col];

System.out.println("Enter the elements for the matrix : ");

for(int i=-0;i<row;i++){

for(int j=0;j<col;j++){

matrix[i][j]= sc.nextInt();

}

}

return matrix;

}

public void matrixDisplay(int[][] matrix){

if(matrix!=null && matrix.length > 0 && matrix[0].length > 0){

int row= matrix.length;

int col= matrix[0].length;

for(int i=0;i<row;i++){

for(int j=0;j<col;j++){

System.out.print(matrix[i][j]+" ");

}

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

}

}

else{

System.out.println("This matrix is empty or not created !! Create a matrix and then try to display !!");

}

}

public void matrixMultiplication(int[][] matA, int[][] matB){

if((matA!=null && matA.length > 0 && matA[0].length > 0) && (matB!=null && matB.length > 0 && matB[0].length > 0)){

int r1= matA.length;

int c1= matA[0].length;

int r2= matB.length;

int c2= matB[0].length;

int[][] finalmatrix= new int[r1][c2];

int tr1=tc1=tr2=tc2=tk=0;

while(tr1 < r1){

while(tc2 < c2){

finalmatrix[tr1][tc2]=0;

while(tk < c2){

finalmatrix[tr1][tc2]+= matA[tr1][tk]\*matB[tk][tc2];

tk+=1;

}

tc2+=1;

}

tr1+=1;

}

System.out.println("The final resultant matrix is : ");

new MatrixMul().matrixDisplay(finalmatrix);

}

else{

System.out.println("The given matrices are either empty or not created !! Make sure that both the matrices are created with proper values before multliplication !!");

}

}

public static void main(String[] args){

MatrixMul matrixMul= new MatrixMul();

Scanner sc= new Scanner(System.in);

Boolean iscontinue=true;

int[][] matrix\_01= new int[0][0];

int[][] matrix\_02= new int[0][0];

int choice;

while(true){

System.out.println("\nOperations listed are : \n1. Matrices Creation.\n2. Matrices Display.\n3. Matrix Multiplication.\n4. Exit.");

System.out.print("Enter the choice : ");

choice= sc.nextInt();

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

switch(choice){

case 1:{

matrix\_01= matrixMul.MatrixCreation();

matrix\_02= matrixMul.MatrixCreation();

break;

}

case 2:{

System.out.println("The matrix A is : ");

matrixMul.matrixDisplay(matrix\_01);

System.out.println("\nThe matrix B is : ");

matrixMul.matrixDisplay(matrix\_02);

break;

}

case 3:{

if(matrix\_01[0].length==matrix\_02.length){

matrixMul.matrixMultiplication(matrix\_01, matrix\_02);

}

else{

System.out.println("Matrix Multiplication not possible with these two matrices !! Please make sure the rows and columns are appropiate fro the multliplication.");

}

break;

}

case 4:{

iscontinue= false;

break;

}

default:{

System.out.println("Invalid Choice !! Try Again with correct choice.");

break;

}

}

if(!iscontinue){

break;

}

}

sc.close();

}

}

1. **TraverseMatrix.java**

import java.util.\*;

class TraverseMatrix{

public static void main(String[] args){

//System.out.println("Hello Traverse Matrix Class");

int row, col;

Scanner sc= new Scanner(System.in);

System.out.print("Enter the number of rows wanted : ");

row= sc.nextInt();

System.out.print("\nEnter the number of columns wanted : ");

col= sc.nextInt();

int[][] matrix= new int[row][col];

System.out.println("Enter the elements for the matrix : ");

for(int i=0;i<row;i++){

for(int j=0;j<col;j++){

matrix[i][j]= sc.nextInt();

}

}

System.out.println("\nThe entered matrix is : ");

for(int i=0;i<row;i++){

for(int j=0;j<col;j++){

System.out.print(matrix[i][j]+" ");

}

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

}

sc.close();

}

}