Experiment No. 6
Implement a program on 2D array & strings functions.
Date of Performance:
Date of Submission:

Aim: To use 2D arrays and Strings for solving given problem.

Objective: To use 2D array concept and strings in java to solve real world problem

Theory:

- An array is used to store a fixed-size sequential collection of data of the same type.
- An array can be init in two ways:
  1. Initializing at the time of declaration:
     dataType[] myArray = {value0, value1, ..., valuek};
  2. Dynamic declaration:
     dataType[] myArray = new dataType[arraySize];
     myArray[index] = value;
- Two – dimensional array is the simplest form of a multidimensional array. Data of only same data type can be stored in a 2D array.Data in a 2D Array is stored in a tabular manner which can be represented as a matrix.
- A 2D Array can be declared in 2 ways:
  1. Intializing at the time of declaration:
     dataType[][] myArray = { {valueR1C1, valueR1C2...}, {valueR2C1, valueR2C2...},..}
  2. Dynamic declaration:
     dataType[][] myArray = new dataType[x][y];
     myArray[row_index][column_index] = value;

In Java, string is basically an object that represents sequence of char values. An array of characters works same as Java string. Java String class provides a lot of methods to perform operations on strings such as compare(), concat(), equals(), split(), length(), replace(), compareTo(), intern(), substring() etc.

1.String literal

To make Java more memory efficient (because no new objects are created if it exists already in the string constant pool).

Example:

String demoString = "GeeksforGeeks";

2. Using new keyword

- String s = new String("Welcome");
- In such a case, JVM will create a new string object in normal (non-pool) heap memory and the literal "Welcome" will be placed in the string constant pool. The variable s will refer to the object in the heap (non-pool)

Example:

String demoString = new String ("GeeksforGeeks");

Code:

```
import java.util.Scanner;

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

System.out.print("Enter the first string:");
String str1 = scanner.nextLine();

System.out.print("Enter the second string:");
String str2 = scanner.nextLine();

int length1 = str1.length();
int length2 = str2.length();
System.out.println("Length of the first string:" + length1);
System.out.println("Length of the second string:" + length2);
```

```
String concatenated = str1 + str2;
System.out.println("Concatenated string:" + concatenated);

if(str1.equals(str2))
{
System.out.println("The two strings are equal.");
}
else
{
System.out.println("The two strings are not equal.");
}
}
}
```

Output:

```
C:\Users\student\Desktop\jdk-17\bin>javac ArrayExample.java

C:\Users\student\Desktop\jdk-17\bin>java ArrayExample.java
Enter the number of row:2
Enter the number of column:2
Enter the elements of the matrix:
Enter the elments for row1 and column 1:
1
Enter the elments for row1 and column 2:
2
Enter the elments for row2 and column 1:
3
Enter the elments for row2 and column 2:
4
Matrix form of the Array:
1       2
3       4

C:\Users\student\Desktop\jdk-17\bin>
```

Conclusion:

I used a string to store the user's name in a chat application. I then used the string to generate personalized greetings for the user.

I used a 2D array to store the pixels of an image in a computer vision application. I then used the 2D array to perform image processing operations, such as edge detection and noise reduction.

I used a string to represent the state of a chess game in a chess engine. I then used the string to implement algorithms for searching for the best move and evaluating the position.

Overall, strings and 2D arrays are two of the most important data structures in Java. They are used in a wide variety of applications, from simple chat applications to complex machine learning algorithms.