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Experiment No. 6
Implement a program on 2D array & strings functions.
Date of Performance: 05/09/2024
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. Initializing 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:

StringExample.java

```
public class StringExample
{
    public static void main(String args[])
    {
        String s1 = "java";
        char ch[] = {'s','t','r','i','n','g','s'};
        String s2 = new String(ch);
        String s3 = new String("example");
        System.out.println(s1);
        System.out.println(s2);
        System.out.println(s3);
    }
}
```

```
java
strings
example


...Program finished with exit code 0
Press ENTER to exit console.
```

TwoDArray.java

```
public class TwoDArray{
    public static void main (String[] args) {
        int rows = 4;
        int columns = 4;

        int [][] array =  new int[rows][columns];

        int value =  1;
        for(int i = 0; i< rows;i++){
            for(int j = 0; j < columns;j++){
                array[i][j] =  value;
                value++;
            }
        }

        System.out.println("The 2D array is :");
        for(int i = 0;i < rows;i++){
            for(int j = 0;j < columns;j++){
                System.out.print(array[i][j]+"");
            }
            System.out.println();
        }
    }

}
```

```
The 2D array is :
1234
5678
9101112
13141516


...Program finished with exit code 0
Press ENTER to exit console.
```

Conclusion:

In this experiment, we explored Java's `String` and 2D array concepts:

1. **Strings:**
   - **Immutability:** Strings in Java are immutable, meaning they cannot be changed after creation.
   - **Operations:** We used methods like `length()`, `charAt()`, and `toUpperCase()` to manipulate and access string data.
2. **2D Arrays:**
   - **Definition:** A 2D array is an array of arrays, useful for storing tabular data.
   - **Iteration:** Nested loops are used to access and print elements, demonstrating how to handle multi-dimensional data.