Java - Introduction to Programming
Lecture 6

Arrays In Java

Arrays in Java are like a list of elements of the same type i.e. a list of integers, a list of booleans etc.

a. Creating an Array (method 1) - with new keyword

type[]array name = new type[size];

```
        int[] marks = new int[3];
        marks[0] = 96;
        marks[1] = 97;
        marks[2] = 99;
```

```

public class arraytype {

        public static void main(String args[]) {
        int[] marks = new int[3]; //array declaration
        marks[0] = 96;
        marks[1] = 97;
        marks[2] = 99; //array initialization
        System.out.println(marks[0]);
        System.out.println(marks[1]);
        System.out.println(marks[2]);

        }
    }
```

b. Creating an Array (method 2)
`int[] marks = {98, 97, 95};`

```
public  class arraytype {
        public static void main(String args[]) {
            int[] marks = {98, 97, 95};
        System.out.println(marks[0]);
        System.out.println(marks[1]);
        System.out.println(marks[2]);

        }
    }
```

c. Taking an array as an input and printing its elements.

```java
import java.util.*;

public class arraytype {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        int size = sc.nextInt();
        int numbers[] = new int[size];

        for(int i=0; i<size; i++) {
            numbers[i] = sc.nextInt();
        }

        //print the numbers in array
        for(int i=0; i<numbers.length; i++) {
            System.out.print(numbers[i]+" ");
        }
    }
}
```

2D Arrays In Java

It is similar to 2D matrices that we studied in 11th and 12th class.

a. Creating a 2D Array - with new keyword
   Type[][] array name = new type[row size][column size]

```java
int[][] marks = new int[3][3];
```

b. Taking a matrix as an input and printing its elements.

```java
import java.util.*;

public class arraytype {
public static void main(String[] args) {

    Scanner sc = new Scanner(System.in);
    int rows = sc.nextInt();
    int cols = sc.nextInt();

    int[][] numbers = new int[rows][cols];

    //input
    //rows
    for(int i=0; i<rows; i++) {
        //columns
        for(int j=0; j<cols; j++) {
            numbers[i][j] = sc.nextInt();
    }
  }
  for(int i=0; i<rows; i++) {
    for(int j=0; j<cols; j++) {
        System.out.print(numbers[i][j]+" ");
      }
      System.out.println();
    }
}}
```

c. Searching for an element x in a matrix.

```
import java.util.*;

public class arraytype {

  public static void main(String args[]) {
    Scanner sc = new Scanner(System.in);
    int rows = sc.nextInt();
    int cols = sc.nextInt();

    int[][] numbers = new int[rows][cols];

    //input
    //rows
    for(int i=0; i<rows; i++) {
      //columns
      for(int j=0; j<cols; j++) {
        numbers[i][j] = sc.nextInt();
      }
    }

    int x = sc.nextInt();

    for(int i=0; i<rows; i++) {
      for(int j=0; j<cols; j++) {
        //compare with x
        if(numbers[i][j] == x) {
          System.out.println("x found at location (" + i + ", " + j
+ ")");
        }
      }}}}
```

Homework Problems

1. Take an array of names as input from the user and print them on the screen.

2. Find the maximum & minimum number in an array of integers.

3. Take an array of numbers as input and check if it is an array sorted in ascending order.

   Eg : { 1, 2, 4, 7 } is sorted in ascending order.

   {3, 4, 6, 2} is not sorted in ascending order.

4. Print the spiral order matrix as output for a given matrix of numbers.

   Spiral order is given by:

   1, 5, 7, 9, 11, 21, 41, 70, 105, 95, 81, 79, 70, 40, 15, 9, 6, 10, 12, 13, 20, 32, 68, 63, 59, 55, 25, 29, 30, 29

5. For a given matrix of N x M, print its transpose.