

Ex. No. 2	ARRAYS AND ARRAY OF OBJECTS
Date of Exercise	20-07-2023

1.Aim:

To write a java program to implement the following procedure to generate prime numbers from 1 to 100 into a program. This procedure is called sieve of Eratosthenes.

Procedure:

Step1:start the program

Step2: Create a boolean array "prime[100]" and initialize all entries as true.

Step3: Mark all the multiples of each prime number as false

Step4: Copy Numbers to Two Arrays (Ascending and Descending)

Step5:stop the program

Program:

```
public class SieveOfEratosthenes {
    public static void main(String[] args) {
        int limit = 100;
        boolean[] primes = new boolean[limit + 1];
        for (int i = 0; i <= limit; i++) {
            primes[i] = true;
            System.out.println(primes[i]);
        }
        for (int num = 2; num * num <= limit; num++) {
            if (primes[num]) {
                for (int multiple = num * num; multiple <= limit; multiple += num) {
                    primes[multiple] = false;
                }
            }
        }
        System.out.println("Prime numbers from 1 to " + limit + ":");
        for (int i = 2; i <= limit; i++) {
            if (primes[i]) {
                System.out.print(i + " ");
            }
        }
    }
}
```

Output:

```
Prime numbers from 1 to 100:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89
97

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

Result:

The above program has been successfully executed and verified.

2.Aim:

To write a java program to copy the given N numbers of one array into another 2 arrays in such a way that one array must contain the numbers in ascending order and the other must contain in the descending order.

Procedure:

Step1:start the program

Step2: Initialize the source array with N numbers.

Step3: Create two new arrays with the same size

Step4: Iterate through the sorted array and fill the descending array in reverse order.

Step5:stop the program

Program:

```
import java.util.Arrays;
import java.util.Scanner;
public class hi {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int[] orgarr = {5, 7, 4};
        int[] ascendingArray = new int[3];
        int[] decendingArray = new int[3];
        System.out.println("Enter the elements of the source array:");
        for (int i = 0; i < 3; i++) {
            ascendingArray[i] = orgarr[i];
        }
        for (int i = 0; i < 3; i++) {
            decendingArray[i] = orgarr[i];
        }
        Arrays.sort(ascendingArray);
        Arrays.sort(decendingArray);

        System.out.println("Sorted array in ascending order:");
        for (int i = 0; i < 3; i++) {
            System.out.print "[" + ascendingArray[i] + ""];
        }
        System.out.println();
        System.out.println("Sorted array in descending order:");
        for (int i = 2; i >= 0; i--) {
            System.out.print "[" + decendingArray[i] + ""];
```

```
    }  
    System.out.println();  
}  
}
```

Output:

```
Enter the elements of the source array:  
Sorted array in ascending order:  
[4][5][7]  
Sorted array in descending order:  
[7][5][4]  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Result:

The above program has been successfully executed and verified.

3.Aim:

To write a java program to obtain transpose of a 3 x 3 matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.

Procedure:

Step1:start the program

Step2: Create a 3x3 matrix and initialize it with values.

Step3: Create a new 3x3 matrix to store the transpose.

Step4: The transpose matrix now contains the transpose of the original matrix.

Step5:stop the program

Program:

```
import java.util.Scanner;
public class hi {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int[][] matrix = new int[3][3];
        System.out.println("Enter the 3x3 matrix (9 integers in total):");
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                matrix[i][j] = scanner.nextInt();
            }
        }
        int[][] transpose = findTranspose(matrix);
        System.out.println("Original Matrix:");
        displayMatrix(matrix);
        System.out.println("Transpose Matrix:");
        displayMatrix(transpose);
    }
    public static int[][] findTranspose(int[][] matrix) {
        int[][] transpose = new int[3][3];
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                transpose[i][j] = matrix[j][i];
            }
        }
        return transpose;
    }
    public static void displayMatrix(int[][] matrix) {
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                System.out.print(matrix[i][j] + " ");
            }
        }
    }
}
```

```
        System.out.println();  
    }  
}  
}
```

Output:

```
Enter the 3x3 matrix (9 integers in total):
```

```
1  
2  
3  
4  
5  
6  
7  
8  
9
```

```
Original Matrix:
```

```
1 2 3  
4 5 6  
7 8 9
```

```
Transpose Matrix:
```

```
1 4 7  
2 5 8  
3 6 9
```

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

Result:

The above program has been successfully executed and verified.

4.Aim:

To write a Java program to find the common elements between two arrays.

Procedure:

Step1:start the program

Step2: Create two arrays of N elements each.

Step3: Sort both arrays using Arrays.sort() or any sorting algorithm.

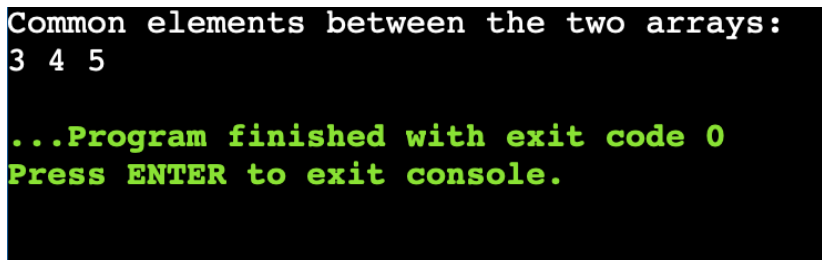
Step4: Compare the elements at the current positions of both pointers.

Step5:stop the program

Program:

```
public class CommonElementsArrays {
    public static void main(String[] args) {
        int[] array1 = {1, 2, 3, 4, 5};
        int[] array2 = {3, 4, 5, 6, 7};

        System.out.println("Common elements between the two arrays:");
        findCommonElements(array1, array2);
    }
    public static void findCommonElements(int[] array1, int[] array2) {
        for (int i = 0; i < array1.length; i++) {
            for (int j = 0; j < array2.length; j++) {
                if (array1[i] == array2[j]) {
                    System.out.print(array1[i] + " ");
                    break;
                }
            }
        }
    }
}
```

Output:

```
Common elements between the two arrays:
3 4 5

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

Result:

The above program has been successfully executed and verified.

5.Aim:

To write a program in Java to count the occurrence of a given character in an array

Procedure:

Step1:start the program

Step2: Create an array of characters with N elements and initialize it.

Step3: Input the character to be counted.

Step4: Use a loop to iterate through the array elements.

Step5:stop the program

Program:

```
import java.util.Scanner;
public class hi {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the array of characters (without spaces): ");
        String input = scanner.nextLine();
        char[] charArray = input.toCharArray();
        System.out.print("Enter the character to count: ");
        char targetCharacter = scanner.next().charAt(0);
        int count = countOccurrences(charArray, targetCharacter);
        System.out.println("The character '" + targetCharacter + "' occurs " + count + " time(s) in the
array.");
    }
    public static int countOccurrences(char[] array, char target) {
        int count = 0;
        for (char c : array) {
            if (c == target) {
                count++;
            }
        }
        return count;
    }
}
```

Output:

```
Enter the array of characters (without spaces): targetcharacter
Enter the character to count: a
The character 'a' occurs 3 time(s) in the array.

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

Result:

The above program has been successfully executed and verified.