

Code : 1

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class A_SpanOfArray {  
    public static void main(String[] args) {  
        Scanner s = new Scanner(System.in);  
        int n = s.nextInt();  
        int[] a = new int[n];  
        for (int i = 0; i < n; i++) {  
            a[i] = s.nextInt();  
        }  
        int rv = findMaxandMin(a);  
        System.out.println(rv);  
    }  
  
    private static int findMaxandMin(int[] a) {  
        int rv = 0;  
        int max = a[0];  
        int min = a[0];  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] > max)  
                max = a[i];  
            if (a[i] < min)  
                min = a[i];  
        }  
        return max - min;  
    }  
}
```

Code : 2

```
package Topic_04_Arrays;
```

```
import java.util.Scanner;
```

```
public class B_FindAnElementInArray {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        int n = s.nextInt();
        int[] a = new int[n];
        for (int i = 0; i < n; i++) {
            a[i] = s.nextInt();
        }
        int key = s.nextInt();
        int rv = findElement(a, key);
        System.out.println(rv);
    }

    private static int findElement(int[] a, int key) {
        int rv = -1;
        for (int i = 0; i < a.length; i++) {
            if (a[i] == key) {
                rv = i;
                break;
            }
        }
        return rv;
    }
}
```

Code : 3

```
package Topic_04_Arrays;
```

```
import java.util.Scanner;
```

```
public class C_BarChartUsingArrays {  
    public static void main(String[] args) {  
        Scanner s = new Scanner(System.in);  
        int n = s.nextInt();  
        int[] a = new int[n];  
        for (int i = 0; i < n; i++) {  
            a[i] = s.nextInt();  
        }  
        printBarChart(a);  
    }  
  
    private static void printBarChart(int[] a) {  
        int max = findMax(a);  
        for (int i = max; i > 0; i--) {  
            for (int j = 0; j < a.length; j++) {  
                if (i <= a[j]) {  
                    System.out.print("*\t");  
                } else {  
                    System.out.print("\t");  
                }  
            }  
            System.out.println();  
        }  
    }  
  
    private static int findMax(int[] a) {  
        int max = a[0];  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] > max)  
                max = a[i];  
        }  
        return max;  
    }  
}
```

Code : 4

```
package Topic_04_Arrays;
```

```
import java.util.Scanner;
```

```
public class C_InvertedBarChartUsingArrays {  
    public static void main(String[] args) {  
        Scanner s = new Scanner(System.in);  
        int n = s.nextInt();  
        int[] a = new int[n];  
        for (int i = 0; i < n; i++) {  
            a[i] = s.nextInt();  
        }  
  
        printBarChart(a);  
    }  
  
    private static void printBarChart(int[] a) {  
        int max = findMax(a);  
        for (int i = 0; i < max; i++) {  
            for (int j = 0; j < a.length; j++) {  
                if (i < a[j]) {  
                    System.out.print("*\t");  
                } else {  
                    System.out.print("\t");  
                }  
            }  
            System.out.println();  
        }  
    }  
  
    private static int findMax(int[] a) {  
        int max = a[0];  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] > max)  
                max = a[i];  
        }  
        return max;  
    }  
}
```

Code : 5

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class D_SumOfTwoArrays {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        int n1 = s.nextInt();
        int[] a = new int[n1];
        for (int i = 0; i < n1; i++) {
            a[i] = s.nextInt();
        }
        int n2 = s.nextInt();
        int[] b = new int[n2];
        for (int i = 0; i < n2; i++) {
            b[i] = s.nextInt();
        }
        var c = sumOfArrays(a, b);
        displayArray(c);
    }

    private static int[] sumOfArrays(int[] a, int[] b) {
        int[] res = new int[(a.length > b.length ? a.length : b.length)];
        int c = 0; // carry
        for (int i = a.length - 1, j = b.length - 1, k = res.length - 1; k >= 0; i--, j--, k--) {
            int d = c;

            if (i >= 0)
                d += a[i];

            if (j >= 0)
                d += b[j];

            if (d > 9) {
                res[k] = d % 10;
                c = d / 10;
            } else {
                c = 0;
                res[k] = d;
            }
        }
        return res;
    }

    private static void displayArray(int[] c) {
        for (int ele : c) {
            System.out.println(ele);
        }
    }
}
```

Code : 6

```
package Topic_04_Arrays;
import java.util.*;
public class E_DifferenceOfTwoArrays {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        int n1 = s.nextInt();
        int[] a = new int[n1];
        for (int i = 0; i < n1; i++) {
            a[i] = s.nextInt();
        }

        int n2 = s.nextInt();
        int[] b = new int[n2];
        for (int i = 0; i < n2; i++) {
            b[i] = s.nextInt();
        }
        var c = diffOfTwoArrays(a, b);
        displayArray(c);
    }

    private static int[] diffOfTwoArrays(int[] a, int[] b) {
        int[] res = new int[(a.length > b.length ? a.length : b.length)];
        int borrow = 0;
        for (int i = a.length - 1, j = b.length - 1, k = res.length - 1; k >= 0; i--, j--, k--) {
            int d = 0;

            d = (b[j]-borrow);
            if(i>=0)
                d=d-a[i];
            if (d < 0) {
                d = d + 10;// - borrow;
                borrow = 1;
            } else {
                borrow = 0;
                d = d;
            }
            res[k] = d;
        }
        return res;
    }

    private static void displayArray(int[] c) {
        int i=0;
        while(c[i]==0) {
            i++;
        }
        while(i<c.length) {
            System.out.println(c[i]);
            i++;
        }
    }
}
```

Code : 7

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class F_ReverseOfArray {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);

        int n1 = s.nextInt();
        int[] a = new int[n1];
        for (int i = 0; i < n1; i++) {
            a[i] = s.nextInt();
        }
        reverse(a);
        displayArray(a);
    }

    private static void reverse(int[] a) {
        int i = 0;
        int j = a.length - 1;
        while (i <= j) {
            int temp = a[i];
            a[i] = a[j];
            a[j] = temp;
            i++;
            j--;
        }
    }

    private static void displayArray(int[] c) {
        int i = 0;
        while (i < c.length) {
            System.out.println(c[i]);
            i++;
        }
    }
}
```

Code : 8

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class G_RotateAnArray {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);

        int n1 = s.nextInt();
        int[] a = new int[n1];
        for (int i = 0; i < n1; i++) {
            a[i] = s.nextInt();
        }
        int k = s.nextInt();
        rotate(a, k);
        displayArray(a);
    }

    private static void rotate(int[] a, int k) {
        k = k % a.length;
        if (k < 0) {
            k = k + a.length;
        }
        reverse(a, 0, a.length - 1);
        reverse(a, 0, k - 1);
        reverse(a, k, a.length - 1);
    }

    private static void reverse(int[] a, int left, int right) {
        while (left <= right) {
            int temp = a[left];
            a[left] = a[right];
            a[right] = temp;
            left++;
            right--;
        }
    }

    private static void displayArray(int[] c) {
        int i = 0;
        while (i < c.length) {
            System.out.println(c[i]);
            i++;
        }
    }
}
```


Code : 9

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class H_InverseOfArray {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);

        int n1 = s.nextInt();
        int[] a = new int[n1];
        for (int i = 0; i < n1; i++) {
            a[i] = s.nextInt();
        }
        a = inverse(a);
        displayArray(a);
    }

    private static int[] inverse(int[] a) {
        int i = 0;
        int res[] = new int[a.length];
        while (i < a.length) {
            res[a[i]] = i;
            i++;
        }
        return res;
    }

    private static void displayArray(int[] c) {
        int i = 0;
        while (i < c.length) {
            System.out.println(c[i]);
            i++;
        }
    }
}
```

Code : 10

```
package Topic_04_Arrays;
```

```
import java.io.*;
```

```
import java.util.*;
```

```
public class I_AllSubarrays {
```

```
    public static void main(String[] args) throws Exception {
```

```
        // write your code here
```

```
        Scanner scn = new Scanner(System.in);
```

```
        int n = scn.nextInt();
```

```
        int[] arr = new int[n];
```

```
        for (int i = 0; i < arr.length; i++) {
```

```
            arr[i] = scn.nextInt();
```

```
        }
```

```
        PrintSubArrays(arr);
```

```
    }
```

```
    private static void PrintSubArrays(int[] arr) {
```

```
        for (int i = 0; i < arr.length; i++) {
```

```
            for (int j = i; j < arr.length; j++) {
```

```
                for (int k = i; k <= j; k++) {
```

```
                    System.out.print(arr[k] + "\t");
```

```
                }
```

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

```
            }
```

```
        }
```

```
    }
```

```
}
```

Code : 11

```
package Topic_04_Arrays;
```

```
import java.util.Scanner;
```

```
public class J_SubSetsOfArray {

    public static void main(String[] args) throws Exception {
        // write your code here
        Scanner scn = new Scanner(System.in);
        int n = scn.nextInt();
        int[] arr = new int[n];
        for (int i = 0; i < arr.length; i++) {
            arr[i] = scn.nextInt();
        }

        SubSetOfArrays(arr);
    }

    private static void SubSetOfArrays(int[] a) {
        int p = (int) Math.pow(2, a.length);
        for (int i = 0; i < p; i++) {
            int temp = i;
            String set = "";
            for (int j = a.length - 1; j >= 0; j--) {
                int rem = temp % 2;
                temp = temp / 2;
                if (rem == 0) {
                    set = "-\t" + set;
                } else {
                    set = a[j] + "\t" + set;
                }
            }
            System.out.println(set);
        }
    }
}
```

Code : 12

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class K_BrokenEconomy_FloorAndCeil{

    public static void main(String[] args) throws Exception {
        // write your code here
        Scanner scn = new Scanner(System.in);
        int n = scn.nextInt();

        int[] arr = new int[n];
        for (int i = 0; i < arr.length; i++) {
            arr[i] = scn.nextInt();
        }

        int data = scn.nextInt();

        int left = 0;
        int right = arr.length - 1;

        int floor = -1; // the greatest among smaller numbers
        int ceil = -1; // the smallest among greater numbers

        while (left <= right) {
            int mid = (left + right) / 2;

            if (data > arr[mid]) {
                left = mid + 1;
                // left to mid are all small and mid is greatest of them
                floor = arr[mid];
            } else if (data < arr[mid]) {
                right = mid - 1;
                // mid to right are all greater and mid is the smallest of them
                ceil = arr[mid];
            } else {
                floor = arr[mid];
                ceil = arr[mid];
                break;
            }
        }

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

Code : 13

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class L_FiAndLi{
    public static void main(String[] args) {
        Scanner scn = new Scanner(System.in);
        int n = scn.nextInt();

        int[] arr = new int[n];
        for (int i = 0; i < arr.length; i++) {
            arr[i] = scn.nextInt();
        }

        int data = scn.nextInt();
        int left = 0;
        int right = arr.length - 1;

        int fi = -1;
        while (left <= right) {
            int mid = (left + right) / 2;
            if (data > arr[mid]) {
                // left side is useless, discard it
                left = mid + 1;
            } else if (data < arr[mid]) {
                // right side is useless, discard it
                right = mid - 1;
            } else {
                fi = mid;
                right = mid - 1;
            }
        }

        System.out.println(fi);

        int li = -1;
        left = 0;
        right = arr.length - 1;
        while (left <= right) {
            int mid = (left + right) / 2;
            if (data > arr[mid]) {
                // left side is useless, discard it
                left = mid + 1;
            } else if (data < arr[mid]) {
                // right side is useless, discard it
                right = mid - 1;
            } else {
                li = mid;
                left = mid + 1;
            }
        }

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

Code : 14

```
package Topic_04_Arrays;
```

```
import java.util.*;
```

```
public class Z_BinarySearch {
    public static void main(String[] args) {
        Scanner scn = new Scanner(System.in);
        int n = scn.nextInt();

        int[] arr = new int[n];
        for (int i = 0; i < arr.length; i++) {
            arr[i] = scn.nextInt();
        }

        int data = scn.nextInt();
        int left = 0;
        int right = arr.length - 1;

        int foundAt = -1;
        while (left <= right) {
            int mid = (left + right) / 2;
            if (data > arr[mid]) {
                // left side is useless, discard it
                left = mid + 1;
            } else if (data < arr[mid]) {
                // right side is useless, discard it
                right = mid - 1;
            } else {
                foundAt = mid;
                break;
            }
        }

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

