**Array**

**1. 40 subjects marks. op:total and percentage.**

**package** Demo;

**import** java.util.\*;

**public** **class** SubjectMarks {

**public** **static** **void** main(String[] args) {

**int** n, i, sum = 0;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter the number of elements:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++)

{

a[i] = sc.nextInt();

sum = sum + a[i];

}

System.***out***.print("\nElements are: ");

**for** (i = 0; i < n; i++)

{

System.***out***.print(" " + a[i]);

}

**double** per = (**double**) sum / n;

System.***out***.println("\nSum = " + sum + " Percentage = " + per);

}

}

**output:**

Enter the number of elements:

5

Enter 5 elements:

80

78

87

83

90

Elements are: 80 78 87 83 90

Sum = 418 Percentage = 83.6

**2.Minimum and Maximum.**

**package** Demo;

**import** java.util.\*;

**public** **class** MinAndMax {

**public** **static** **void** main(String[] args) {

**int** n, i, sum = 0, min, max;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter the number of elements:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++) {

a[i] = sc.nextInt();

sum = sum + a[i];

}

System.***out***.print("\nElements are: ");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

max = min = a[0];

**for** (i = 1; i < n; i++) {

**if** (a[i] > max) {

max = a[i];

}

**if** (a[i] < min) {

min = a[i];

}

}

System.***out***.println("\nMax = " + max);

System.***out***.println("Min = " + min);

}

}

**output:**

Enter the number of elements:

5

Enter 5 elements:

34

11

57

34

12

Elements are: 34 11 57 34 12

Max = 57

Min = 11

**3. Prime number**

**package** Demo;

**import** java.util.\*;

**public** **class** PrimeNum2 {

**public** **static** **void** main(String[] args) {

**int** i,n,j,range,div=0;

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter size of array:");

range=sc.nextInt();

**int** a[]=**new** **int** [range];

System.***out***.println("Enter " + range + " elements:");

**for**(i=0;i<range;i++)

{

a[i]=sc.nextInt();

}

System.***out***.print("Elements are:");

**for**(i=0;i<range;i++)

{

System.***out***.print(a[i] +" ");

}

System.***out***.print( "\nPrime elements from an array are: ");

**for**(j=0;j<range;j++)

{

n=a[j];

div=0;

**for**(i=2;i<=(n/2);i++)

{

**if**(n%i==0)

{

div=1;

**break**;

}

}

**if**(div==0)

System.***out***.print( " " + a[j]);

}

}

}

**output:**

Enter size of array:

5

Enter 5 elements:

12

45

97

5

23

Elements are:12 45 97 5 23

Prime elements from an array are: 97 5 23

**4.Perfect number**

**package** Demo;

**import** java.util.\*;

**public** **class** PerfectNum2 {

**public** **static** **void** main(String[] args) {

**int** range, n, i, j, sum;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.println("\nPerfect numbers from the array are:");

**for** (j = 0; j < range; j++)

{

n = a[j];

sum = 0;

**for** (i = 1; i <= n / 2; i++)

{

**if** (n % i == 0)

{

sum = sum + i;

}

}

**if** (sum == n)

{

System.***out***.print(a[j] + " ");

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

6

28

12

496

8

Elements are: 6 28 12 496 8

Perfect numbers from the array are:

6 28 496

**5.Pronic number**

**package** Demo;

**import** java.util.\*;

**public** **class** PronicNum3 {

**public** **static** **void** main(String[] args) {

**int** range, n, i, j, flag;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nPronic numbers from the array are:");

**for** (j = 0; j < range; j++) {

n = a[j];

flag = 0;

**for** (i = 0; i <= n/2; i++)

{

**if** (n == i \* (i + 1))

{

flag = 1;

**break**;

}

}

**if** (flag == 1)

{

System.***out***.print(a[j] + " ");

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

33

56

72

98

20

Elements are: 33 56 72 98 20

Pronic numbers from the array are:56 72 20

**6.Palindrom number**

**package** Demo;

**import** java.util.\*;

**public** **class** PalindromNum3 {

**public** **static** **void** main(String[] args) {

**int** range, n, n1, i, j, sum, f1;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nPalindrom numbers from the array are:");

**for**(j=0;j<range;j++)

{

sum=0;

n = a[j];

**int** temp=n;

**while**(n>0)

{

n1=n%10;

n=n/10;

sum=sum\*10+n1;

}

**if**(temp==sum)

System.***out***.print(a[j]+" ");

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

12

44

151

321

939

Elements are: 12 44 151 321 939

Palindrom numbers from the array are:44 151 939

**7.Armstrong number**

**package** Demo;

**import** java.util.\*;

**public** **class** ArmstrongNum3 {

**public** **static** **void** main(String[] args) {

**int** i,j,range, sum, n, n1;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** ( i = 0; i < range; i++) {

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** ( i = 0; i < range; i++) {

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nArmstrong numbers from the array are:");

**for** ( j = 0; j < range; j++) {

sum = 0;

n = a[j];

**int** A = n;

**while** (n > 0) {

n1 = n % 10;

n = n / 10;

sum = sum + (n1 \* n1 \* n1);

}

**if** (A == sum) {

System.***out***.print(" " + A);

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

1

153

45

876

112

Elements are: 1 153 45 876 112

Armstrong numbers from the array are: 1 153

**8.Strong number**

**package** Demo;

**import** java.util.\*;

**public** **class** StrongNum3 {

**public** **static** **void** main(String[] args) {

**int** range, n, n1, i, j, sum, f1;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nStrong numbers from the array are:");

**for** (j = 0; j < range; j++)

{

sum = 0;

n = a[j];

**int** temp = n;

**while** (n > 0)

{

n1 = n % 10;

n = n / 10;

f1 = 1;

**for** (i = n1; i > 1; i--)

{

f1 = f1 \* i;

}

sum = sum + f1;

}

**if** (sum == temp)

{

System.***out***.print(" " + a[j]);

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

1

2

98

456

145

Elements are: 1 2 98 456 145

Strong numbers from the array are: 1 2 145

**9.Dissarium number**

**package** Demo;

**import** java.util.\*;

**public** **class** DissariumNum3 {

**public** **static** **void** main(String[] args) {

**int** range, n, n1, i, j, sum, f1, temp, digits;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nDissarium numbers from the array are: ");

**for** (j = 0; j < range; j++)

{

n = a[j];

temp = n;

sum = 0;

digits = 0;

**while** (n > 0)

{

digits++;

n = n / 10;

}

n = temp;

**while** (n > 0)

{

n1 = n % 10;

n = n / 10;

f1 = 1;

**for** (i = 1; i <= digits; i++)

{

f1 = f1 \* n1;

}

digits--;

sum = sum + f1;

}

**if** (sum == temp)

System.***out***.print(temp + " ");

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

1

135

32

65

332

Elements are: 1 135 32 65 332

Dissarium numbers from the array are: 1 135

**10.Magic number**

**package** Demo;

**import** java.util.\*;

**public** **class** MagicNum3 {

**public** **static** **void** main(String[] args) {

**int** range, sum, n, n1;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (**int** i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (**int** i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nMagic numbers from the array are:");

**for** (**int** j = 0; j < range; j++)

{

n = a[j];

**while** (n > 9) {

sum = 0;

**while** (n > 0)

{

n1 = n % 10;

n = n / 10;

sum = sum + n1;

}

n = sum;

}

**if** (n == 1)

{

System.***out***.print(a[j] + " ");

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

11

91

34

64

9

Elements are: 11 91 34 64 9

Magic numbers from the array are:91 64

**11.Xylem number**

**package** Demo;

**import** java.util.\*;

**public** **class** XylemAndPhloem {

**public** **static** **void** main(String[] args) {

**int** range, n, n1, sume, summ, num;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (**int** i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (**int** i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nXylem numbers from the array are:");

**for** (**int** j = 0; j < range; j++)

{

n = a[j];

num = n;

sume = 0;

summ = 0;

**while** (n > 0)

{

n1 = n % 10;

**if** (n == num || n < 10)

{

sume = sume + n1;

} **else**

{

summ = summ + n1;

}

n = n / 10;

}

**if** (sume == summ)

{

System.***out***.print(a[j] + " ");

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

234

123

242

500

102

Elements are: 234 123 242 500 102

Xylem numbers from the array are:242

**12.Even & Odd number.**

**package** Demo;

**import** java.util.Scanner;

**public** **class** EvenOddNum {

**public** **static** **void** main(String[] args) {

**int** range, i;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nEven Numbers:");

**for** (i = 0; i < range; i++)

{

**if** (a[i] % 2 == 0)

{

System.***out***.print(" " + a[i]);

}

}

System.***out***.print("\nOdd Numbers:");

**for** (i = 0; i < range; i++)

{

**if** (a[i] % 2 != 0)

{

System.***out***.print(" " + a[i]);

}

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

22

36

9

67

80

Elements are: 22 36 9 67 80

Even Numbers: 22 36 80

Odd Numbers: 9 67

**13.Accept array from user & print alteranate element**

**i/p 10 20 30 40 50**

**package** Demo;

**import** java.util.\*;

**public** **class** AlternateElements {

**public** **static** **void** main(String[] args) {

**int** range, i, j;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter size of the array:");

range = sc.nextInt();

**int**[] a = **new** **int**[range];

System.***out***.println("Enter " + range + " elements:");

**for** (i = 0; i < range; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("Elements are: ");

**for** (i = 0; i < range; i++)

{

System.***out***.print(a[i] + " ");

}

System.***out***.print("\nAlternate array elements are:");

**for** (j = 0; j < range; j = j + 2 )

{

System.***out***.print(a[j] + " ");

}

}

}

**output:**

Enter size of the array:

5

Enter 5 elements:

10 20 30 40 50

Elements are: 10 20 30 40 50

Alternate array elements are:10 30 50

**14.array size even(4)**

**ip:10 20 30 40**

**op:20 10 40 30**

**package** Demo;

**import** java.util.Scanner;

**public** **class** ArrayExample2 {

**public** **static** **void** main(String[] args) {

**int** n, i, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**if** (n % 2 == 0) {

**int**[] a = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++) {

a[i] = sc.nextInt();

}

**for** (i = 0; i < n; i += 2) {

temp = a[i];

a[i] = a[i + 1];

a[i + 1] = temp;

}

System.***out***.println("Swapped array:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

} **else** {

System.***out***.println("\nArray size invalid");

}

}

}

**output:**

Enter array size:

4

Enter 4 elements:

10 20 30 40

Swapped array:

20 10 40 30

**15.Linear search**

**package** Demo;

**import** java.util.\*;

**public** **class** LinearSearch {

**public** **static** **void** main(String[] args){

**int** i,n,num,flag=0;

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter size of array:");

n=sc.nextInt();

**int** a[]=**new** **int**[n];

System.***out***.println("Enter "+n+" elements:");

**for**(i=0; i<n; i++){

a[i]=sc.nextInt();

}

System.***out***.print("The elements are:");

**for**(i=0;i<n; i++){

System.***out***.print(" "+a[i]);

}

System.***out***.println("\nEnter an element which u want to search:");

num=sc.nextInt();

**for**(i=0; i<n; i++)

{

**if**(a[i]==num)

{

flag=1;

System.***out***.println("Element found at position: "+(i+1));

**break**;

}

}

**if**(flag==0)

{

System.***out***.println("Element not found");

}

}

}

**output:**

Enter size of array:

5

Enter 5 elements:

10

20

30

40

50

The elements are: 10 20 30 40 50

Enter an element which u want to search:

30

Element found at position: 3

**16.Binary search**

**package** demo;

**import** java.util.\*;

**public** **class** Binary\_search{

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter the number of elements in the array:");

**int** n = sc.nextInt();

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

System.***out***.print("Enter " + n + " sorted elements: ");

**for** (**int** i = 0; i < n; i++) {

arr[i] = sc.nextInt();

}

System.***out***.print("Enter the element to search: ");

**int** key = sc.nextInt();

**int** result = *binarySearch*(arr, 0, n - 1, key);

**if** (result == -1) {

System.***out***.println("Element not found in the array.");

} **else** {

System.***out***.println("Element found at index: " + result);

}

}

**public** **static** **int** binarySearch(**int**[] arr, **int** low, **int** high, **int** key) {

**while** (low <= high) {

**int** mid = low + (high - low) / 2;

**if** (arr[mid] == key) {

**return** mid;

}

**if** (arr[mid] > key) {

high = mid - 1;

}

**else** {

low = mid + 1;

}

}

**return** -1;

}

}

**output:**

Enter the number of elements in the array:

5

Enter 5 sorted elements: 2 3 4 5 6

Enter the element to search: 5

Element found at index: 3

**17.Print an array in Reverse order.**

**package** Demo;

**import** java.util.\*;

**public** **class** ReverseOrder {

**public** **static** **void** main(String[] args)

{

**int** n,i;

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter array size");

n=sc.nextInt();

**int** a[]=**new** **int**[n];

System.***out***.println("Enter "+ n +" Elements");

**for**(i=0;i<n;i++)

{

a[i]=sc.nextInt();

}

System.***out***.print("\nArray elements are");

**for**(i=0;i<n;i++)

{

System.***out***.print(" "+a[i]);

}

System.***out***.print("\nArray reverse elements are");

**for**(i=n-1;i>=0;i--)

{

System.***out***.print(" "+a[i]);

}

}

}

**output:**

Enter array size

4

Enter 4 Elements

10

20

30

40

Array elements are 10 20 30 40

Array reverse elements are 40 30 20 10

**18.Array sort(Ascending order)**

**package** Demo;

**import** java.util.\*;

**public** **class** ArraySort {

**public** **static** **void** main(String[] args) {

**int** n, i, j, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++) {

a[i] = sc.nextInt();

}

**for** (i = 0; i < n - 1; i++) {

**for** (j = i + 1; j < n; j++) {

**if** (a[i] > a[j]) {

temp = a[i];

a[i] = a[j];

a[j] = temp;

}

}

}

System.***out***.println("Sorted array elements are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

}

}

**output:**

Enter array size:

4

Enter 4 elements:

12

34

67

9

Sorted array elements are:

9 12 34 67

**19.Java Program to sort the elements of an array in descending order**

**package** Demo;

**import** java.util.Scanner;

**public** **class** DescendingOrder {

**public** **static** **void** main(String[] args) {

**int** n, i, j, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.print("Enter " + n + " elements:");

**for** (i = 0; i < n; i++) {

a[i] = sc.nextInt();

}

**for** (i = 0; i < n - 1; i++) {

**for** (j = i + 1; j < n; j++) {

**if** (a[i] < a[j]) {

temp = a[i];

a[i] = a[j];

a[j] = temp;

}

}

}

System.***out***.print("\nSorted array elements in descending order are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

}

}

**output:**

Enter array size:

5

Enter 5 elements:

12

23

10

32

18

Sorted array elements in descending order are:32 23 18 12 10

**20.Java Program to Find 3rd Largest Number in an arraySOP("Third highest"+a[n-3])**

**package** Demo;

**import** java.util.Scanner;

**public** **class** ThirdHighest{

**public** **static** **void** main(String[] args) {

**int** n, i, j, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int** a[] = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("\nArray elements are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

**for** (i = 0; i < n - 1; i++)

{

**for** (j = i + 1; j < n; j++)

{

**if** (a[i] > a[j])

{

temp = a[i];

a[i] = a[j];

a[j] = temp;

}

}

}

System.***out***.print("\nSorted Array elements are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

System.***out***.print("\n3rd highest element: " + a[n - 3]);

}

}

**output:**

Enter array size:

4

Enter 4 elements:

12

13

16

65

Array elements are:12 13 16 65

Sorted Array elements are:12 13 16 65

3rd highest element: 13

**21.Java Program to Find 2nd Largest Number in an array n-2 System.out.println("2 nd highest "+a[n-2])**

**package** Demo;

**import** java.util.Scanner;

**public** **class** SecondHighest {

**public** **static** **void** main(String[] args) {

**int** n, i, j, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int** a[] = **new** **int**[n];

System.***out***.println("Enter " + n + " elements:");

**for** (i = 0; i < n; i++)

{

a[i] = sc.nextInt();

}

System.***out***.print("\nArray elements are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

**for** (i = 0; i < n - 1; i++)

{

**for** (j = i + 1; j < n; j++)

{

**if** (a[i] > a[j])

{

temp = a[i];

a[i] = a[j];

a[j] = temp;

}

}

}

System.***out***.print("\nSorted Array elements are:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

System.***out***.print("\n2nd highest element: " + a[n - 2]);

}

}

**output:**

Enter array size:

4

Enter 4 elements:

10

20

30

40

Array elements are:10 20 30 40

Sorted Array elements are:10 20 30 40

2nd highest element: 30

**22.Java Program to Find Largest Number in an array n-1**

**package** Demo;

**import** java.util.\*;

**public** **class** LargestNum {

**public** **static** **void** main(String[] args) {

**int** n, i, largest;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int**[] a = **new** **int**[n-1];

System.***out***.println("Enter " + (n-1) + " elements:");

**for** (i = 0; i < n-1; i++)

{

a[i] = sc.nextInt();

}

largest = a[0];

**for** (i = 1; i < n-1; i++)

{

**if** (a[i] > largest)

{

largest = a[i];

}

}

System.***out***.println("The largest element in the array is: " + largest);

}

}

**output:**

Enter array size:

4

Enter 3 elements:

10

20

30

The largest element in the array is: 30

**23.bubble sort**

**package** Demo;

**import** java.util.\*;

**public** **class** BubbleSort {

**public** **static** **void** main(String[] args) {

**int** n, i, j, temp;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.print("Enter " + n + " elements:");

**for** (i = 0; i < n; i++)

{

a[i] = sc.nextInt();

}

**for** (i = 0; i < n - 1; i++)

{

**for** (j = 0; j < n - 1 - i; j++)

{

**if** (a[j] > a[j + 1])

{

temp = a[j];

a[j] = a[j + 1];

a[j + 1] = temp;

}

}

}

System.***out***.print("\nSorted array elements in ascending order:");

**for** (i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

}

}

**output:**

Enter array size:

5

Enter 5 elements:

10

20

30

40

50

Sorted array elements in ascending order:10 20 30 40 50

**24.Insertion sort**

**package** Demo;

**import** java.util.\*;

**public** **class** InsertionSort {

**public** **static** **void** main(String[] args) {

**int** n, i, j, key;

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.print("Enter " + n + " elements:");

**for** (i = 0; i < n; i++) {

a[i] = sc.nextInt();

}

**for** (i = 1; i < n; i++)

{

key = a[i];

j = i - 1;

**while** (j >= 0 && a[j] > key)

{

a[j + 1] = a[j];

j--;

}

a[j + 1] = key;

}

System.***out***.print("\nSorted array elements in ascending order:");

**for** (i = 0; i < n; i++)

{

System.***out***.print(a[i] + " ");

}

}

}

**output:**

Enter array size:

5

Enter 5 elements:

12

45

23

10

34

Sorted array elements in ascending order:10 12 23 34 45

**25.Quick Sort**

**package** demo;

**import** java.util.\*;

**public** **class** Quick\_sort {

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter array size:");

**int** n = sc.nextInt();

**int**[] a = **new** **int**[n];

System.***out***.print("Enter " + n + " elements: ");

**for** (**int** i = 0; i < n; i++) {

a[i] = sc.nextInt();

}

*quickSort*(a, 0, n - 1);

System.***out***.print("\nSorted array elements in ascending order: ");

**for** (**int** i = 0; i < n; i++) {

System.***out***.print(a[i] + " ");

}

}

**public** **static** **void** quickSort(**int**[] arr, **int** low, **int** high) {

**if** (low < high) {

**int** pi = *partition*(arr, low, high);

*quickSort*(arr, low, pi - 1);

*quickSort*(arr, pi + 1, high);

}

}

**public** **static** **int** partition(**int**[] arr, **int** low, **int** high) {

**int** pivot = arr[high];

**int** i = (low - 1);

**for** (**int** j = low; j < high; j++) {

**if** (arr[j] < pivot) {

i++;

**int** temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

**int** temp = arr[i + 1];

arr[i + 1] = arr[high];

arr[high] = temp;

**return** i + 1;

}

}

**output:**

Enter array size:

5

Enter 5 elements: 23 13 4 21 11

Sorted array elements in ascending order: 4 11 13 21 23