⇧ SCROLL TO TOP

Java Arrays

Normally, an array is a collection of similar type of elements which has contiguous memory location.

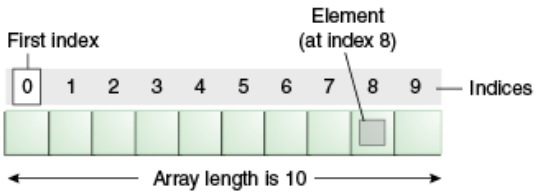
Java array is an object which contains elements of a similar data type. Additionally, The elements of an array are stored in a contiguous memory location. It is a data structure where we store similar elements. We can store only a fixed set of elements in a Java array.

Array in Java is index-based, the first element of the array is stored at the 0th index, 2nd element is stored on 1st index and so on.

Unlike C/C++, we can get the length of the array using the length member. In C/C++, we need to use the sizeof operator.

In Java, array is an object of a dynamically generated class. Java array inherits the Object class, and implements the Serializable as well as Cloneable interfaces. We can store primitive values or objects in an array in Java. Like C/C++, we can also create single dimentional or multidimentional arrays in Java.

Moreover, Java provides the feature of anonymous arrays which is not available in C/C++.



Advantages

- **Code Optimization:** It makes the code optimized, we can retrieve or sort the data efficiently.
- **Random access:** We can get any data located at an index position.

Disadvantages

- **Size Limit:** We can store only the fixed size of elements in the array. It doesn't grow its size at runtime. To solve this problem, collection framework is used in Java which grows automatically.

Types of Array in java

There are two types of array.

- Single Dimensional Array
- Multidimensional Array

Single Dimensional Array in Java

Syntax to Declare an Array in Java

```
dataType[] arr; (or)
dataType []arr; (or)
dataType arr[];
```

Instantiation of an Array in Java

```
arrayRefVar=new datatype[size];
```

Example of Java Array

Let's see the simple example of java array, where we are going to declare, instantiate, initialize and traverse an array.

```
//Java Program to illustrate how to declare, instantiate, initialize
//and traverse the Java array.
class Testarray{
public static void main(String args[]){
int a[]=new int[5];//declaration and instantiation
a[0]=10;//initialization
a[1]=20;
a[2]=70;
a[3]=40;
a[4]=50;
```

⇧ SCROLL TO TOP

```
for(int i=0;i<a.length;i++)//length is the property of array
System.out.println(a[i]);
}}
```

Test it Now

Output:

```
10
20
70
40
50
```

Declaration, Instantiation and Initialization of Java Array

We can declare, instantiate and initialize the java array together by:

```
int a[]={33,3,4,5};//declaration, instantiation and initialization
```

Let's see the simple example to print this array.

```
//Java Program to illustrate the use of declaration, instantiation
//and initialization of Java array in a single line
class Testarray1{
public static void main(String args[]){
int a[]={33,3,4,5};//declaration, instantiation and initialization
//printing array
for(int i=0;i<a.length;i++)//length is the property of array
System.out.println(a[i]);
}}
```

Test it Now

Output:

⇧ SCROLL TO TOP

```
33
3
4
5
```

For-each Loop for Java Array

We can also print the Java array using **for-each loop**. The Java for-each loop prints the array elements one by one. It holds an array element in a variable, then executes the body of the loop.

The syntax of the for-each loop is given below:

```
for(data_type variable:array){
//body of the loop
}
```

Let us see the example of print the elements of Java array using the for-each loop.

```
//Java Program to print the array elements using for-each loop
class Testarray1{
public static void main(String args[]){
int arr[]={33,3,4,5};
//printing array using for-each loop
for(int i:arr)
System.out.println(i);
}}
```

Output:

```
33
3
4
5
```

⇧ SCROLL TO TOP

Passing Array to a Method in Java

We can pass the java array to method so that we can reuse the same logic on any array.

Let's see the simple example to get the minimum number of an array using a method.

```
//Java Program to demonstrate the way of passing an array
//to method.
class Testarray2{
//creating a method which receives an array as a parameter
static void min(int arr[]){
int min=arr[0];
for(int i=1;i<arr.length;i++)
 if(min>arr[i])
  min=arr[i];

System.out.println(min);
}

public static void main(String args[]){
int a[]={33,3,4,5};//declaring and initializing an array
min(a);//passing array to method
}}
```

Test it Now

Output:

```
3
```

Anonymous Array in Java

Java supports the feature of an anonymous array, so you don't need to declare the array while passing an array to the method.

```
//Java Program to demonstrate the way of passing an anonymous array
//to method.
public class TestAnonymousArray{
//creating a method which receives an array as a parameter
static void printArray(int arr[]){
for(int i=0;i<arr.length;i++)
System.out.println(arr[i]);
```

```
}

public static void main(String args[]){
printArray(new int[]{10,22,44,66});//passing anonymous array to method
}}
```

Test it Now

Output:

```
10
22
44
66
```

Returning Array from the Method

We can also return an array from the method in Java.

```
//Java Program to return an array from the method
class TestReturnArray{
//creating method which returns an array
static int[] get(){
return new int[]{10,30,50,90,60};
}

public static void main(String args[]){
//calling method which returns an array
int arr[]=get();
//printing the values of an array
for(int i=0;i<arr.length;i++)
System.out.println(arr[i]);
}}
```

Test it Now

Output:

```
10
30
50
90
60
```

ıtOfBoundsException

⇧ SCROLL TO TOP

The Java Virtual Machine (JVM) throws an ArrayIndexOutOfBoundsException if length of the array in negative, equal to the array size or greater than the array size while traversing the array.

```
//Java Program to demonstrate the case of
//ArrayIndexOutOfBoundsException in a Java Array.
public class TestArrayException{
public static void main(String args[]){
int arr[]={50,60,70,80};
for(int i=0;i<=arr.length;i++){
System.out.println(arr[i]);
}
}}
```

Test it Now

Output:

```
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: 4
        at TestArrayException.main(TestArrayException.java:5)
50
60
70
80
```

Multidimensional Array in Java

In such case, data is stored in row and column based index (also known as matrix form).

Syntax to Declare Multidimensional Array in Java

```
dataType[][] arrayRefVar; (or)
dataType [][]arrayRefVar; (or)
dataType arrayRefVar[][]; (or)
dataType []arrayRefVar[];
```

⇧ SCROLL TO TOP

Example to instantiate Multidimensional Array in Java

```
int[][] arr=new int[3][3];//3 row and 3 column
```

Example to initialize Multidimensional Array in Java

```
arr[0][0]=1;
arr[0][1]=2;
arr[0][2]=3;
arr[1][0]=4;
arr[1][1]=5;
arr[1][2]=6;
arr[2][0]=7;
arr[2][1]=8;
arr[2][2]=9;
```

Example of Multidimensional Java Array

Let's see the simple example to declare, instantiate, initialize and print the 2Dimensional array.

```
//Java Program to illustrate the use of multidimensional array
class Testarray3{
public static void main(String args[]){
//declaring and initializing 2D array
int arr[][]={{1,2,3},{2,4,5},{4,4,5}};
//printing 2D array
for(int i=0;i<3;i++){
 for(int j=0;j<3;j++){
   System.out.print(arr[i][j]+" ");
 }
 System.out.println();
}
}}
```

Test it Now

Output:

```
1 2 3
2 4 5
4 4 5
```

Jagged Array in Java

⇧ SCROLL TO TOP ! number of columns in a 2D array, it is known as a jagged array. In other words, it is an array of arrays with different number of columns.

```
//Java Program to illustrate the jagged array
class TestJaggedArray{
   public static void main(String[] args){
      //declaring a 2D array with odd columns
      int arr[][] = new int[3][];
      arr[0] = new int[3];
      arr[1] = new int[4];
      arr[2] = new int[2];
      //initializing a jagged array
      int count = 0;
      for (int i=0; i<arr.length; i++)
         for(int j=0; j<arr[i].length; j++)
            arr[i][j] = count++;

      //printing the data of a jagged array
      for (int i=0; i<arr.length; i++){
         for (int j=0; j<arr[i].length; j++){
            System.out.print(arr[i][j]+" ");
         }
         System.out.println();//new line
      }
   }
}
```

Test it Now

Output:

```
0 1 2
3 4 5 6
7 8
```

What is the class name of Java array?

In Java, an array is an object. For array object, a proxy class is created whose name can be obtained by getClass().getName() method on the object.

```
//Java Program to get the class name of array in Java
class Testarray4{
public static void main(String args[]){
//declaration and initialization of array
int arr[]={4,4,5};
//getting the class name of Java array
();
```

```
String name=c.getName();
//printing the class name of Java array
System.out.println(name);


}}
```

Test it Now

Output:

```
I
```

Copying a Java Array

We can copy an array to another by the arraycopy() method of System class.

Syntax of arraycopy method

```
public static void arraycopy(
Object src, int srcPos,Object dest, int destPos, int length
)
```

Example of Copying an Array in Java

```
//Java Program to copy a source array into a destination array in Java
class TestArrayCopyDemo {
   public static void main(String[] args) {
      //declaring a source array
      char[] copyFrom = { 'd', 'e', 'c', 'a', 'f', 'f', 'e',
            'i', 'n', 'a', 't', 'e', 'd' };
      //declaring a destination array
      char[] copyTo = new char[7];
      //copying array using System.arraycopy() method
      System.arraycopy(copyFrom, 2, copyTo, 0, 7);
      //printing the destination array
      System.out.println(String.valueOf(copyTo));
   }
}
```

Test it Now

Output:

```
caffein
```

⇧ SCROLL TO TOP

Cloning an Array in Java

Since, Java array implements the Cloneable interface, we can create the clone of the Java array. If we create the clone of a single-dimensional array, it creates the deep copy of the Java array. It means, it will copy the actual value. But, if we create the clone of a multidimensional array, it creates the shallow copy of the Java array which means it copies the references.

```
//Java Program to clone the array
class Testarray1{
public static void main(String args[]){
int arr[]={33,3,4,5};
System.out.println("Printing original array:");
for(int i:arr)
System.out.println(i);

System.out.println("Printing clone of the array:");
int carr[]=arr.clone();
for(int i:carr)
System.out.println(i);

System.out.println("Are both equal?");
System.out.println(arr==carr);

}}
```

Output:

```
Printing original array:
33
3
4
5
Printing clone of the array:
33
3
4
5
Are both equal?
false
```

Addition of 2 Matrices in Java

Let's see a simple example that adds two matrices.

⇧ SCROLL TO TOP

```
//Java Program to demonstrate the addition of two matrices in Java
class Testarray5{
public static void main(String args[]){
//creating two matrices
int a[][]={{1,3,4},{3,4,5}};
int b[][]={{1,3,4},{3,4,5}};

//creating another matrix to store the sum of two matrices
int c[][]=new int[2][3];

//adding and printing addition of 2 matrices
for(int i=0;i<2;i++){
for(int j=0;j<3;j++){
c[i][j]=a[i][j]+b[i][j];
System.out.print(c[i][j]+" ");
}
System.out.println();//new line
}

}}
```

Test it Now

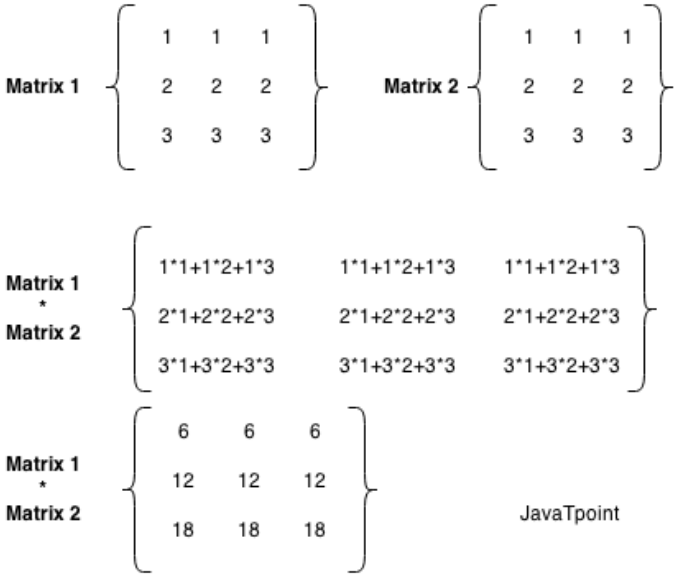
Output:

```
2 6 8
6 8 10
```

Multiplication of 2 Matrices in Java

In the case of matrix multiplication, a one-row element of the first matrix is multiplied by all the columns of the second matrix which can be understood by the image given below.

⇧ SCROLL TO TOP



Let's see a simple example to multiply two matrices of 3 rows and 3 columns.

```
//Java Program to multiply two matrices
public class MatrixMultiplicationExample{
public static void main(String args[]){
//creating two matrices
int a[][]={{1,1,1},{2,2,2},{3,3,3}};
int b[][]={{1,1,1},{2,2,2},{3,3,3}};

//creating another matrix to store the multiplication of two matrices
int c[][]=new int[3][3];  //3 rows and 3 columns

//multiplying and printing multiplication of 2 matrices
for(int i=0;i<3;i++){
for(int j=0;j<3;j++){
c[i][j]=0;
for(int k=0;k<3;k++)
{
c[i][j]+=a[i][k]*b[k][j];
}//end of k loop
System.out.print(c[i][j]+" ");  //printing matrix element
}//end of j loop
System.out.println();//new line
}
}}
```

Test it Now

Output:

⇧ SCROLL TO TOP

```
18 18 18
```

Related Topics

1) Java Program to copy all elements of one array into another array

2) Java Program to find the frequency of each element in the array

3) Java Program to left rotate the elements of an array

4) Java Program to print the duplicate elements of an array

5) Java Program to print the elements of an array

6) Java Program to print the elements of an array in reverse order

7) Java Program to print the elements of an array present on even position

8) Java Program to print the elements of an array present on odd position

9) Java Program to print the largest element in an array

10) Java Program to print the smallest element in an array

11) Java Program to print the number of elements present in an array

12) Java Program to print the sum of all the items of the array

13) Java Program to right rotate the elements of an array

14) Java Program to sort the elements of an array in ascending order

15) Java Program to sort the elements of an array in descending order

16) Find 3rd Largest Number in an Array

17) Find 2nd Largest Number in an Array

18) Find Largest Number in an Array

19) Find 2nd Smallest Number in an Array

20) Find Smallest Number in an Array

21) Remove Duplicate Element in an Array

22) Add Two Matrices

23) Multiply Two Matrices

24) Print Odd and Even Number from an Array

25) Transpose matrix

26) Java Program to subtract the two matrices

27) Java Program to determine whether a given matrix is an identity matrix

28) Java Program to determine whether a given matrix is a sparse matrix

29) Java Program to determine whether two matrices are equal

30) Java Program to display the lower triangular matrix

31) Java Program to display the upper triangular matrix

⇧ SCROLL TO TOP find the frequency of odd & even numbers in the given matrix

33) Java Program to find the product of two matrices

34) Java Program to find the sum of each row and each column of a matrix

35) Java Program to find the transpose of a given matrix

← Prev Next →

Swagger

React tutorial
ReactJS

Regex tutorial
Regex

Reinforcement learning tutorial
Reinforcement Learning

R Programming tutorial
R Programming

RxJS tutorial
RxJS

React Native tutorial
React Native

Python Design Patterns
Python Design Patterns

Python Pillow tutorial
Python Pillow

Python Turtle tutorial
Python Turtle

Keras tutorial
Keras

Preparation

Aptitude
Aptitude

Logical Reasoning
Reasoning

Verbal Ability
Verbal Ability

Interview Questions
Interview Questions

Company Interview Questions
Company Questions

Trending Technologies

Artificial Intelligence Tutorial
Artificial Intelligence

AWS Tutorial
AWS

Selenium tutorial
Selenium

Cloud Computing tutorial
Cloud Computing

Hadoop tutorial
Hadoop

ReactJS Tutorial
ReactJS

Data Science Tutorial
Data Science

Angular 7 Tutorial
Angular 7

Blockchain Tutorial
Blockchain

Git Tutorial
Git

Machine Learning Tutorial
Machine Learning

DevOps Tutorial
DevOps

⇧ SCROLL TO TOP

B.Tech / MCA

DBMS tutorial DBMS	Data Structures tutorial Data Structures	DAA tutorial DAA	Operating System tutorial Operating System	Computer Network tutorial Computer Network
Compiler Design tutorial Compiler Design	Computer Organization and Architecture Computer Organization	Discrete Mathematics Tutorial Discrete Mathematics	Ethical Hacking Tutorial Ethical Hacking	Computer Graphics Tutorial Computer Graphics
Software Engineering Tutorial Software Engineering	html tutorial Web Technology	Cyber Security tutorial Cyber Security	Automata Tutorial Automata	C Language tutorial C Programming
C++ tutorial C++	Java tutorial Java	.Net Framework tutorial .Net	Python tutorial Python	List of Programs Programs
Control Systems tutorial Control System	Data Mining Tutorial Data Mining	Data Warehouse Tutorial Data Warehouse		

⇧ SCROLL TO TOP