

# Array

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# Learning Object

- Array
- Array Declare and Initialize
- Accessing Array Variables
- Arrays length Member

# What if

- Need many variables such as:
  - ❑ Students in the class (34 students)
    - ❖ Name (String), grade (char), ID (int), etc.
    - ❖ name1, name2, name3, ...
  - ❑ How it is inefficient in computer program
- Is there any good way to assign the same type of variables?
  - ❑ Array Object

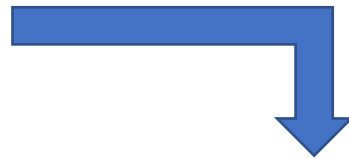
# Array

➤ An **array** is a collection of variables of the same type referred to by a common name.

➤ **Object type**

➤ Each of the variables is specified by an **index**

❑ Fixed length of array



➤ Ways to declare an array:

❑ `type[ ] arrayname = new type[size];`

❑ `type arrayname[] = new type[size];`

➤ Example:

❑ `double[] heights = new double[50];`

❑ `int grades[] = new int[30];`

# Array declare and Initialize

- To **create and initialize an array at the same time**, you can use this form:

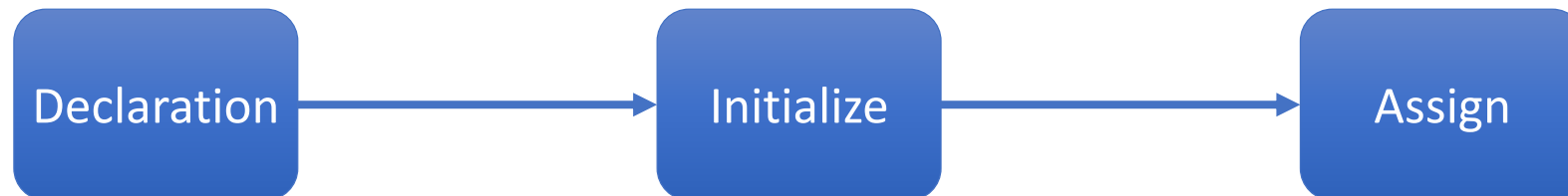
```
type[ ] arrayname = { val1, val2, ..., valN };
```

- Example:

```
int[] fourVals = {3, 1, 4, 1};
```

```
int[] i = new int[4] // index 0~3 //declare, but not initialized
```

- This example creates an array of length 4 storing the four values 3, 1, 4, and 1.



# Array Initializers with Object

- Class type can be stored in an array
  - ❑ `String[] s;`
  - ❑ `s = new String[3];`
  - ❑ `String[] artists = new String[3];`
- After initialization, array is assigned “null”
- Assignment statement
  - ❑ `artists[0] = new String(“Post Malone”);`
  - ❑ `artists[1] = new String(“Maroon 5”);`
  - ❑ `artists[2] = “Beatles”;`
  - ❑ `String[] artists = { “Post Malone”, “Maroon 5” “Beatles”}`

# Example of Array

➤ int data type X 12

- ❑ We cannot remember all the value in an array
- ❑ Array use index to get the value in the array

## One Dimensional array

Initialization `int a[] = new int [12];`

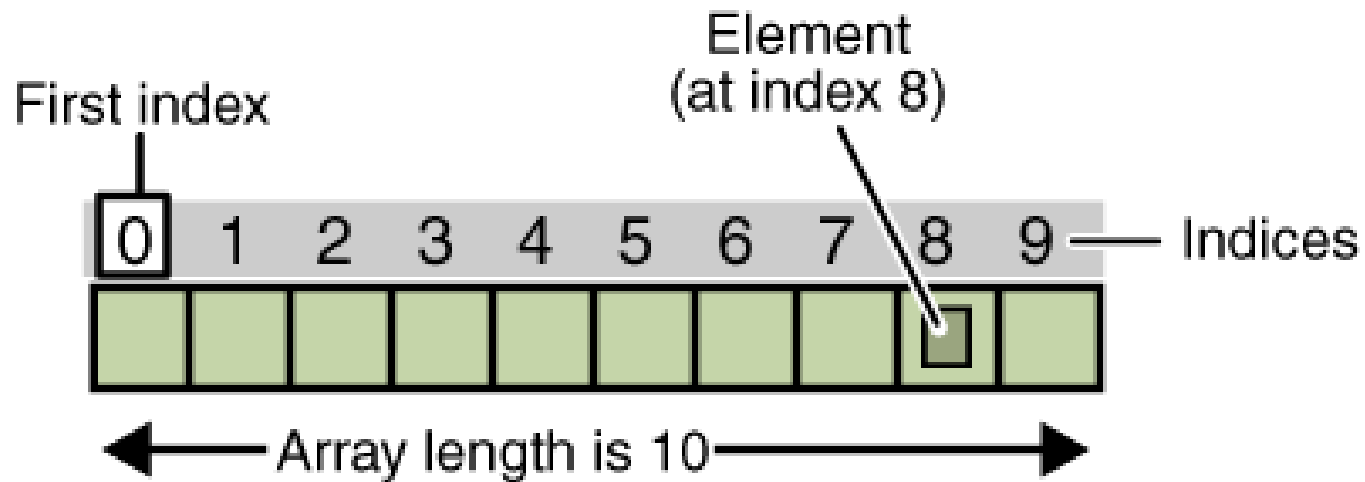
Value	1	2	3	4	5	6	7	8	9	10	11	12
Index	a[0]	a[1]	a[2]	a[3]	a[4]	a[5]	a[6]	a[7]	a[8]	a[9]	a[10]	a[11]

`System.out.print(a[5]);`

Output: 6

# Accessing Array Variables

- You must specify an index to access a variable.
- Array is start from 0 (index)
  - ❑ If the array has size  $n$ , the indices are 0 to  $n-1$ .





# Arrays length Member

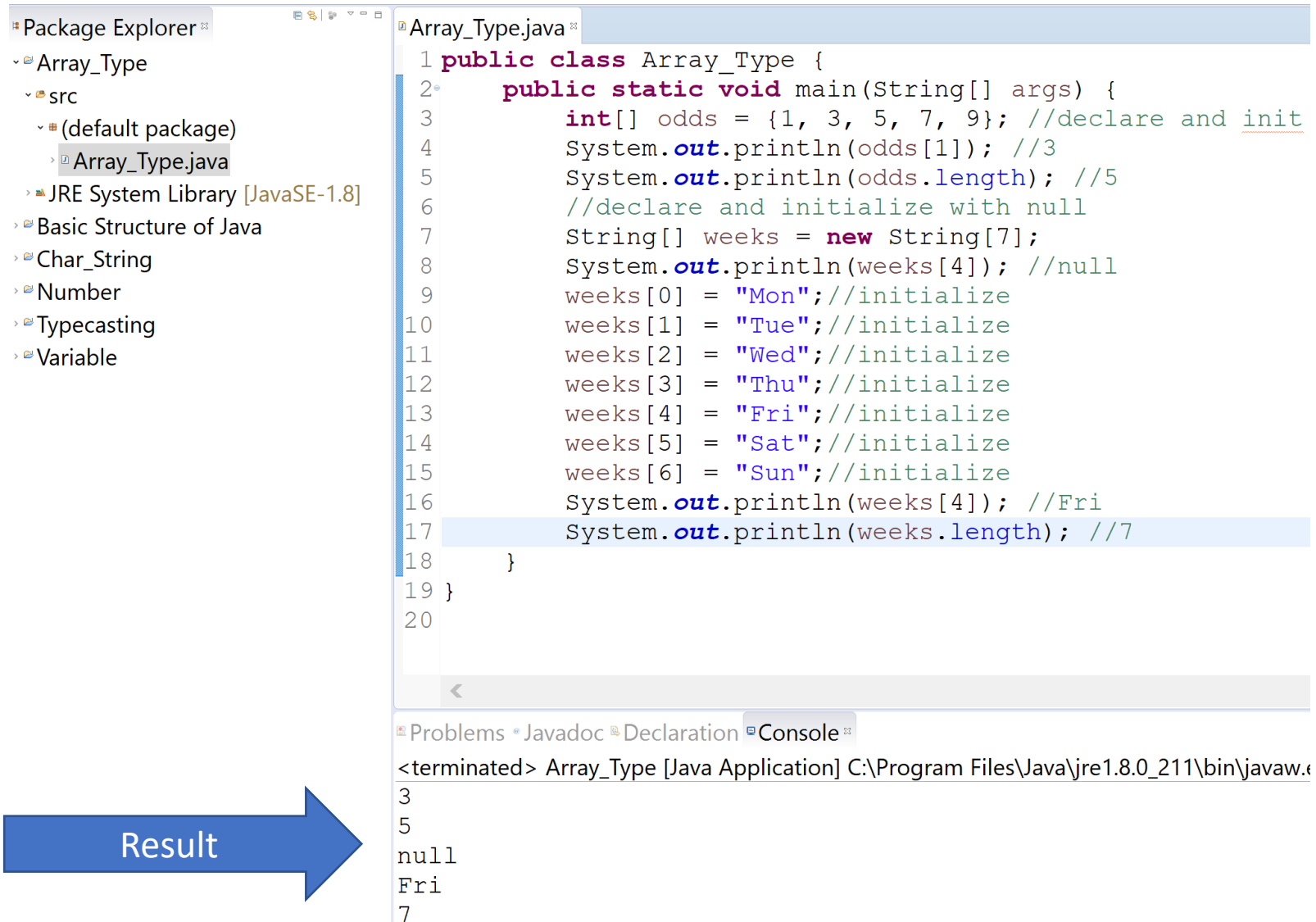
- There are pre-defined methods in Array object
- All arrays have a read-only attribute called length.
  - ❑ Indicate the number of elements in this array
- Method: (arr : variable name)  
arr.length
- Example:
  - ❑ *System.out.println(arr.length);*

# Practice

1. Make a new project (Reference: Create Project and Class File)
  - ❑ Project name: Array\_Type
2. Create a new Class File
  - ❑ Class name: Array\_Type
3. Coding:

```
public class Array_Type {  
    public static void main(String[] args) {  
        int[] odds = {1, 3, 5, 7, 9}; //declare and init  
        System.out.println(odds[1]); //3  
        System.out.println(odds.length); //5  
        //declare and initialize with null  
        String[] weeks = new String[7];  
        System.out.println(weeks[4]); //null  
        weeks[0] = "Mon";//initialize  
        weeks[1] = "Tue";//initialize  
        weeks[2] = "Wed";//initialize  
        weeks[3] = "Thu";//initialize  
        weeks[4] = "Fri";//initialize  
        weeks[5] = "Sat";//initialize  
        weeks[6] = "Sun";//initialize  
        System.out.println(weeks[4]); //Fri  
        System.out.println(weeks.length); } }
```

# Practice – Code and Result



The image shows a screenshot of an IDE with two main panels. The left panel is the 'Package Explorer' showing a project structure with a package 'Array\_Type' containing a source file 'Array\_Type.java'. The right panel is the 'Editor' showing the code of 'Array\_Type.java'. The code defines a public class 'Array\_Type' with a public static void main method. Inside the main method, an integer array 'odds' is declared and initialized with values {1, 3, 5, 7, 9}. It prints the element at index 1 (3) and the length of the array (5). Then, a String array 'weeks' is declared and initialized with null. It prints the element at index 4 (null) and the length of the array (7). The bottom panel is the 'Console' showing the output of the program: 3, 5, null, Fri, 7.

```
Package Explorer
└─ Array_Type
   └─ src
      └─ (default package)
         └─ Array_Type.java
      └─ JRE System Library [JavaSE-1.8]
      └─ Basic Structure of Java
      └─ Char_String
      └─ Number
      └─ Typecasting
      └─ Variable

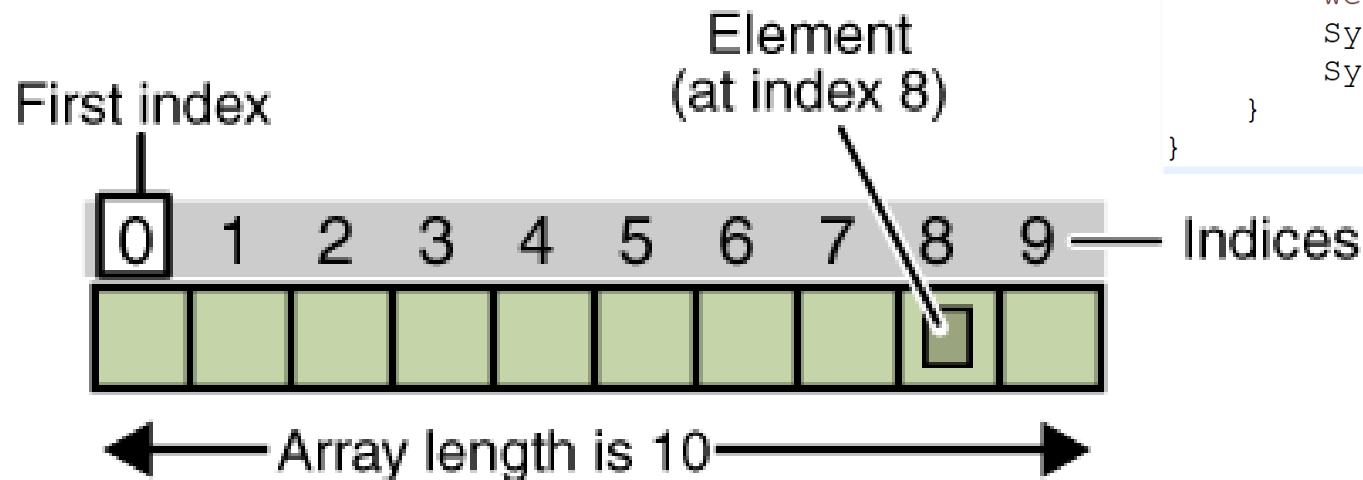
Array_Type.java
1 public class Array_Type {
2     public static void main(String[] args) {
3         int[] odds = {1, 3, 5, 7, 9}; //declare and init
4         System.out.println(odds[1]); //3
5         System.out.println(odds.length); //5
6         //declare and initialize with null
7         String[] weeks = new String[7];
8         System.out.println(weeks[4]); //null
9         weeks[0] = "Mon"; //initialize
10        weeks[1] = "Tue"; //initialize
11        weeks[2] = "Wed"; //initialize
12        weeks[3] = "Thu"; //initialize
13        weeks[4] = "Fri"; //initialize
14        weeks[5] = "Sat"; //initialize
15        weeks[6] = "Sun"; //initialize
16        System.out.println(weeks[4]); //Fri
17        System.out.println(weeks.length); //7
18    }
19 }
20

Problems Javadoc Declaration Console
<terminated> Array_Type [Java Application] C:\Program Files\Java\jre1.8.0_211\bin\javaw.exe
3
5
null
Fri
7
```

Result

# Summary

- Array Declare and Initialize
- Accessing Array Variables
- Arrays length Member



```
public class Array_Type {  
    public static void main(String[] args) {  
        int[] odds = {1, 3, 5, 7, 9}; //declare and init  
        System.out.println(odds[1]); //3  
        System.out.println(odds.length); //5  
        //declare and initialize with null  
        String[] weeks = new String[7];  
        System.out.println(weeks[4]); //null  
        weeks[0] = "Mon";//initialize  
        weeks[1] = "Tue";//initialize  
        weeks[2] = "Wed";//initialize  
        weeks[3] = "Thu";//initialize  
        weeks[4] = "Fri";//initialize  
        weeks[5] = "Sat";//initialize  
        weeks[6] = "Sun";//initialize  
        System.out.println(weeks[4]); //Fri  
        System.out.println(weeks.length); //7  
    }  
}
```