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

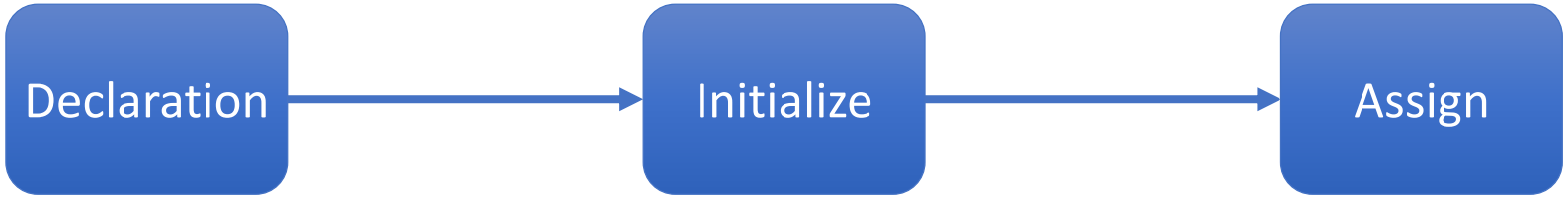
- To create and initialize an array at the same time, you can use this form:

  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.

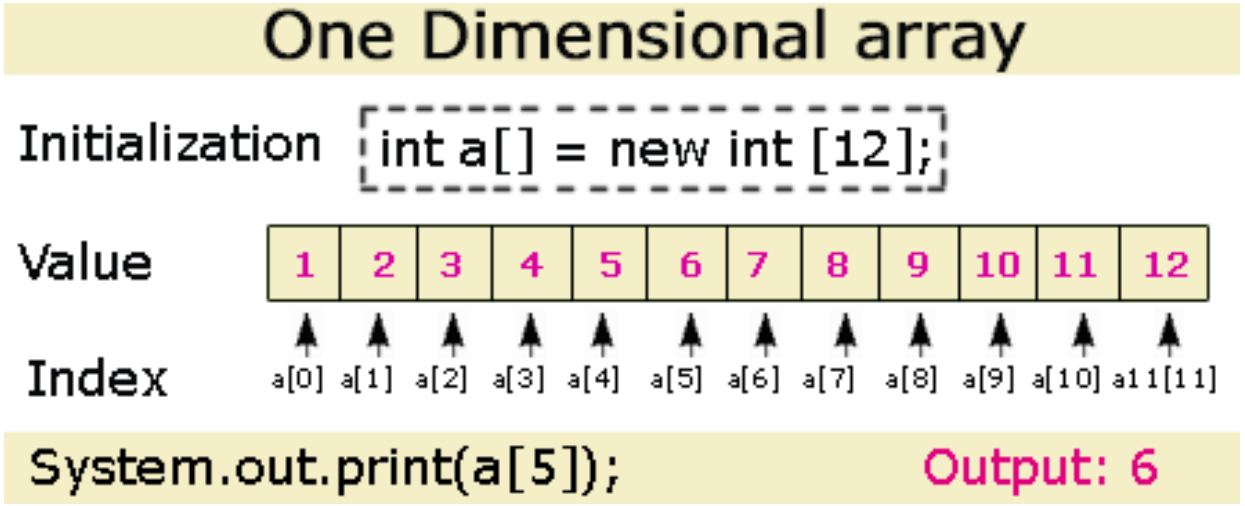


Array Initializers with Object

- 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”}

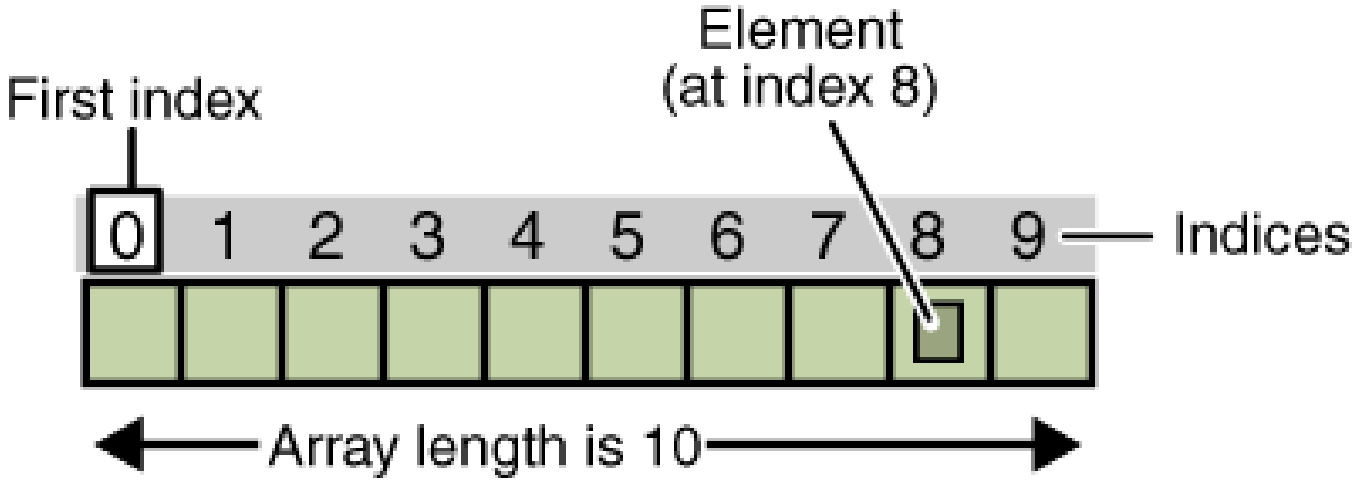
Example of Array

- int data type X 12
  - We cannot remember all the value in an array
  - Array use index to get the value in the array



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)

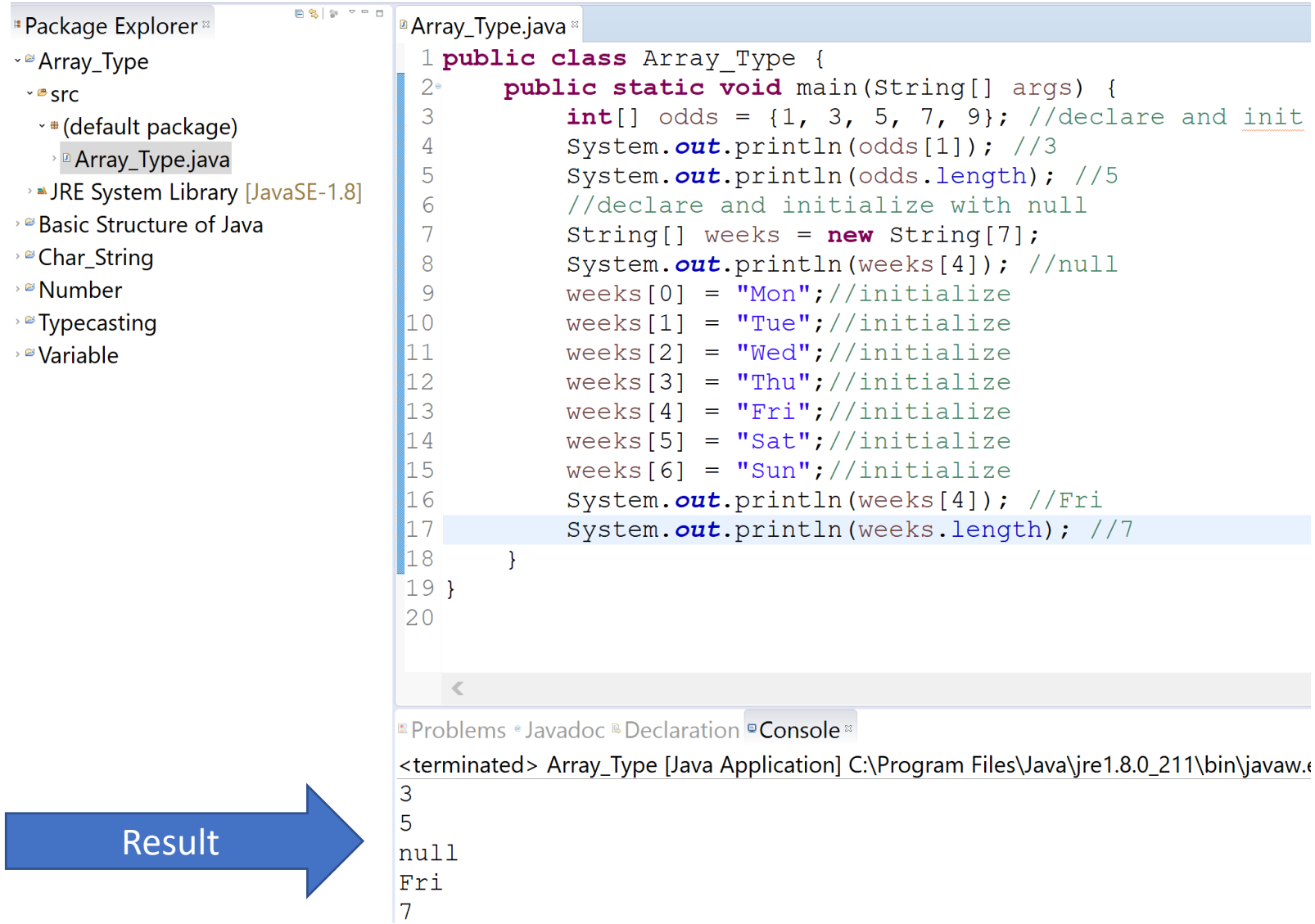
  arr.length
- Example:
  - *System.out.println(arr.length);*

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



Summary

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

```java
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
    }
}
```