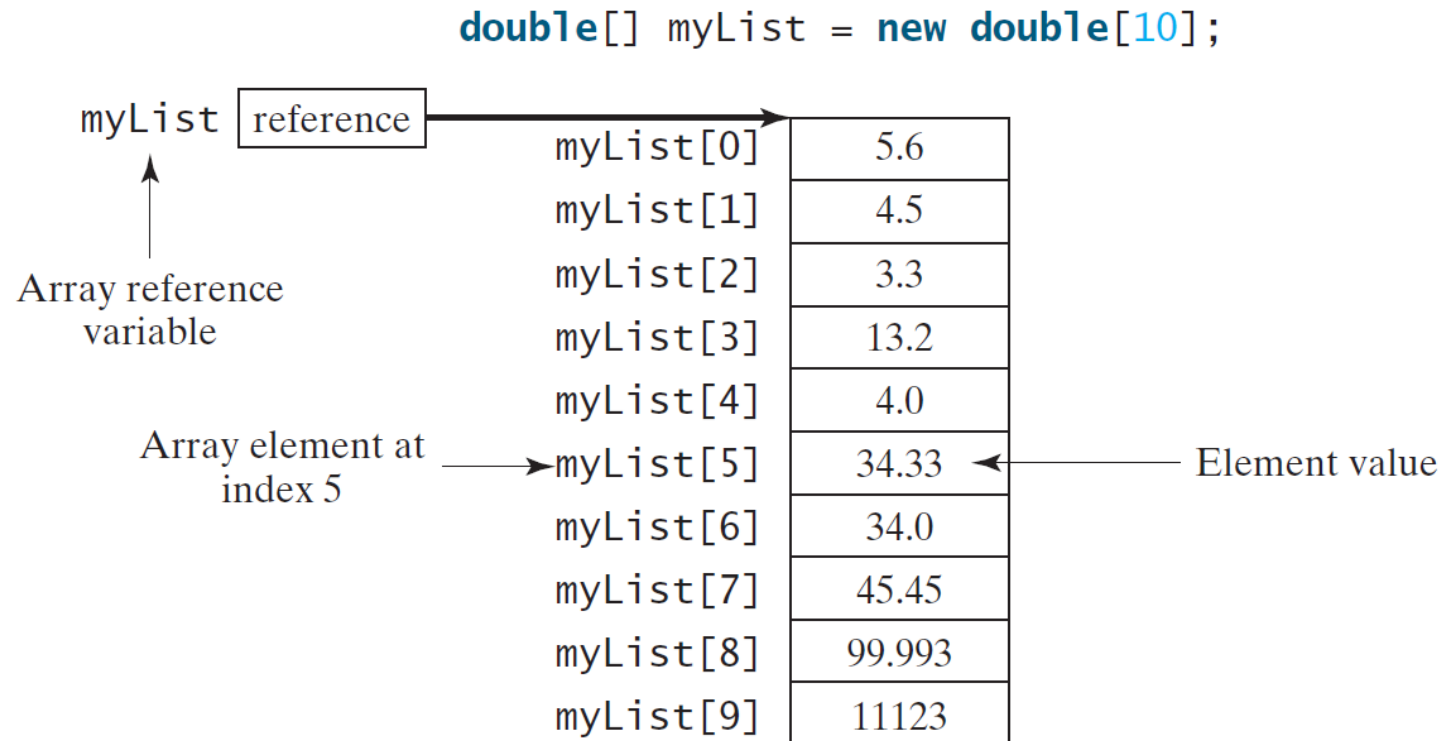# Arrays

Introducing Arrays

- Array is a data structure that represents a collection of the same types of data.

```
double[] myList = new double[10];
```

One-Dimensional Arrays

- A one-dimensional array is an array with a single index.
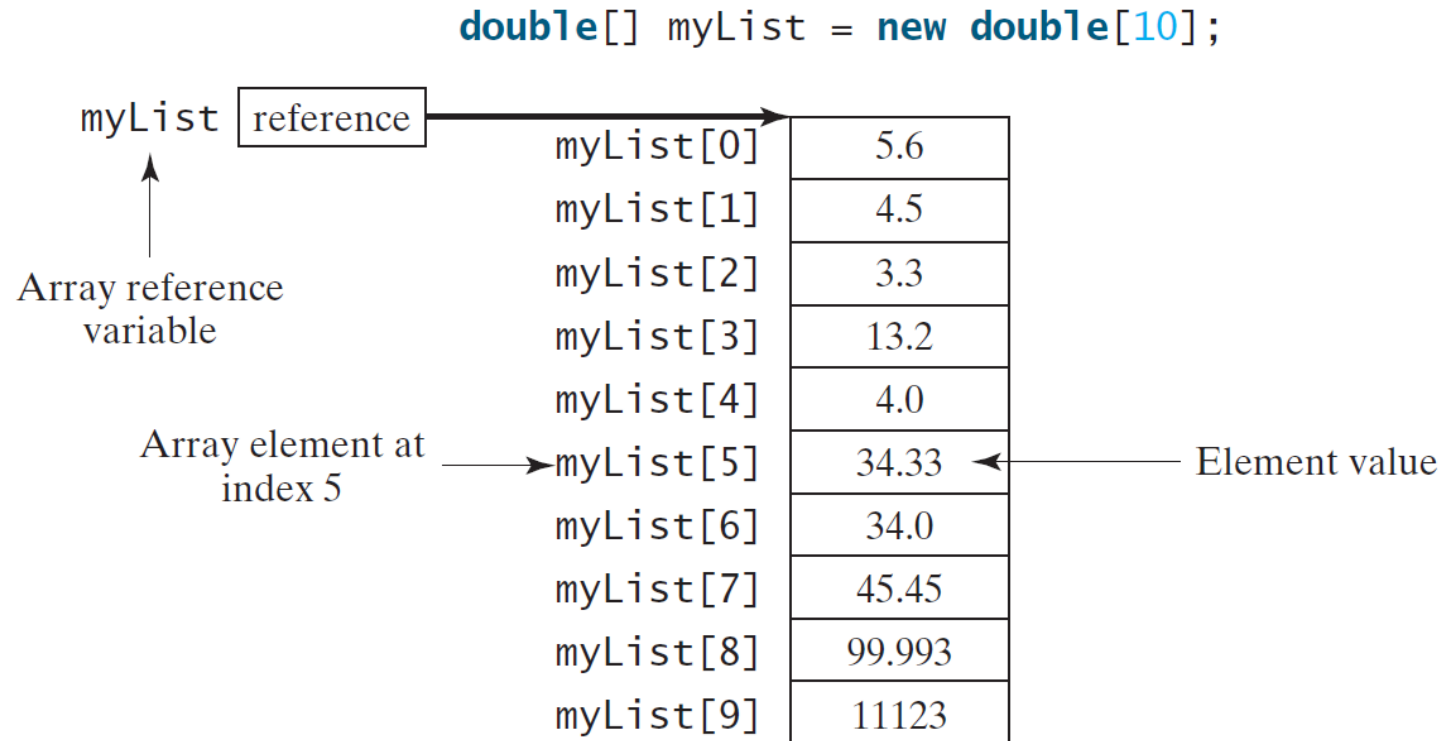
Declaring Variables of One-Dimensional Arrays

- datatype[] arrayVar;

- Example:

    double[] myList;

Creating One-Dimensional Arrays

- arrayVar = new datatype[arraySize];

- Example:

    myList = new double[10];

Declaring and Creating in One Step

- datatype[] arrayVar = new datatype[arraySize];

- Example:
  - double[] myList = new double[10];

The Length of One-Dimensional Arrays

- Once an array is created, its size is fixed. It cannot be changed. We can find its size using
  - arrayVar.length;

- Example:
  - myList.length;

Default Values

- When an array is created, its elements are assigned the default value of

  <u>0</u> for the numeric primitive data types,

  <u>'\u0000'</u> for <u>char</u> types, and

  <u>false</u> for <u>boolean</u> types.

Indexed Variables

- The array elements are accessed through the index. The array indices are *0-based*, i.e., it starts from 0 to arrayVar.length-1.

- Each element in the array is represented using the following syntax, known as an *indexed variable*:
  - arrayVar[index];

- Example:
  - myList[5];

Declaring, Creating, and Initializing a One-Dimensional Array

- Declaring, creating, initializing in one step:

  - double[] myList = {1.9, 2.9, 3.4, 3.5};

- We must declare, create, and initialize the array all in one statement.

Multidimensional Arrays

- A multidimensional array is an array with multiple indexes.

- The simplest form of the multidimensional array is the two-dimensional array, also known as a matrix.

Two-Dimensional Arrays

- A two-dimensional array is an array with two indexes.


```
matrix = new int[5][5];
```

```
matrix[2][1] = 7;
```

Declaring Variables of Two-dimensional Arrays

- dataType[][] arrayVar;

- Example:
  - int[][] matrix;

Creating Two-dimensional Arrays

- arrayVar = new dataType[10][10];

- Example:
    - matrix = new int[10][10];

Declaring and Creating in One Step

- dataType[][] arrayVar = new dataType[10][10];

- Example
  - int[][] matrix = new int[10][10];

Declaring, Creating, and Initializing a Two-Dimensional Array

- We can also use an array initializer to declare, create and initialize a two-dimensional array. For example,
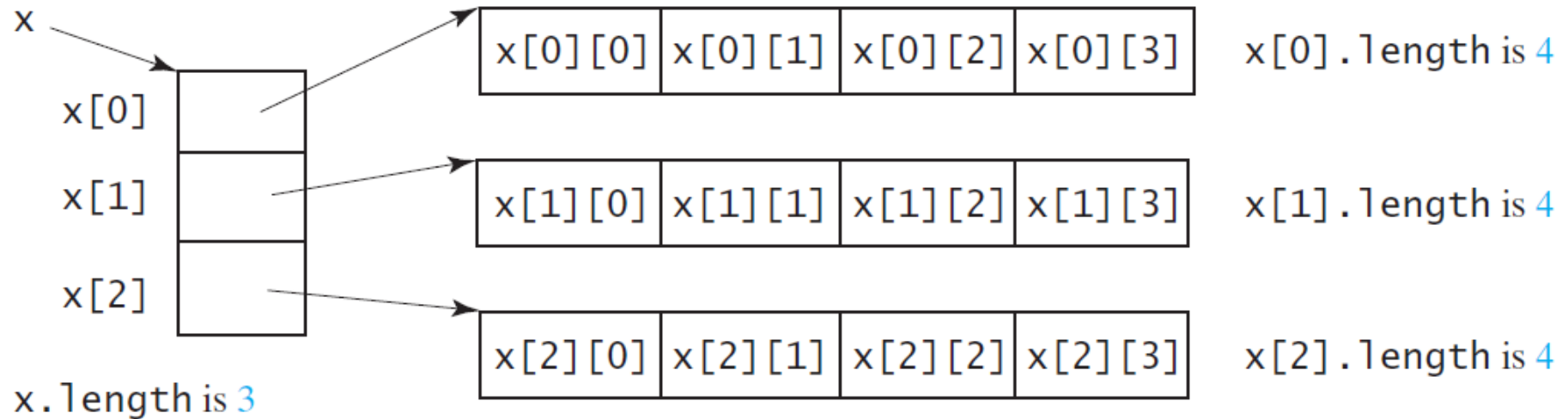
```
int[][] array = {
    {1, 2, 3},
    {4, 5, 6},
    {7, 8, 9},
    {10, 11, 12}
};
```

```
       [0][1][2]

[0]    | 1 | 2 | 3 |

[1]    | 4 | 5 | 6 |

[2]    | 7 | 8 | 9 |

[3]    |10 |11 |12 |
```

Lengths of Two-dimensional Arrays

int[][] x = new int[3][4];

Thank You