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| **Department of Software Engineering**  **Mehran University of Engineering and Technology, Jamshoro** |

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| **Course: SWE121 – Object Oriented Programming** | | | |
| **Instructor** | Mr. Asmatullah | **Practical/Lab No.** | 06 |
| **Date** | 12-08-2022 | **CLOs** | CLO-3 |
| **Signature** |  | **Assessment Score** | 1 Marks |

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| **Topic** | **Implementation of arrays** |
| **Objectives** | * Declaring, Defining and initializing the arrays. * To learn how to traverse arrays using loops. * Declaring and defining multi-dimensional arrays. * Using and manipulating arrays. |

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| **Lab Discussion: Theoretical concepts and Procedural steps** |

**Tools:**  Java Development Kit, Text Pad, Netbeans, Eclipse

**Theory**

Outline

* Explain what are arrays and how to use them to store data.
* Explain what is data structure and various types of data structures such as Linear and non-linear
* To understand arrays elements and access them through index numbers.
* To learn how to iterate through an array and traversing array elements.
* Sorting of an array, and bubble sort.

**Arrays**

In computer programming, an array is a collection of similar types of data. For example, if we want to store the names of 100 people then we can create an array of the string type that can store 100 names.

* String[] array = new String[100];

The number of values in the Java array is fixed. That is, the above array can not store more than 100 elements.

Java provides a data structure, the array, which stores a fixed-size sequential collection of elements of the same type. An array is used to store a collection of data, but it is often more useful to think of an array as a collection of variables of the same type.

Instead of declaring individual variables, such as number0, number1, ..., and number99, you declare one array variable such as numbers and use numbers[0], numbers[1], and ..., numbers[99] to represent individual variables.

This tutorial introduces how to declare array variables, create arrays, and process arrays using indexed variables.

## Declaring Array Variables

To use an array in a program, you must declare a variable to reference the array, and you must specify the type of array the variable can reference. Here is the syntax for declaring an array variable −

### Syntax

dataType[] arrayRefVar; // preferred way.

or

dataType arrayRefVar[]; // works but not preferred way.

Note − The style dataType[] arrayRefVar is preferred. The style dataType arrayRefVar[] comes from the C/C++ language and was adopted in Java to accommodate C/C++ programmers.

### Example

The following code snippets are examples of this syntax −

double[] myList; // preferred way.

or

double myList[]; // works but not preferred way.

Creating Arrays

You can create an array by using the new operator with the following syntax −

Syntax

**arrayRefVar = new dataType[arraySize];**

The above statement does two things −

It creates an array using new dataType[arraySize].

It assigns the reference of the newly created array to the variable arrayRefVar.

Declaring an array variable, creating an array, and assigning the reference of the array to the variable can be combined in one statement, as shown below −

dataType[] arrayRefVar = new dataType[arraySize];

Alternatively you can create arrays as follows −

dataType[] arrayRefVar = {value0, value1, ..., valuek};

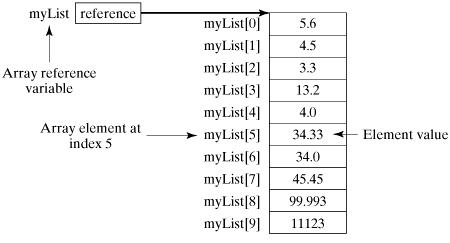
The array elements are accessed through the index. Array indices are 0-based; that is, they start from 0 to arrayRefVar.length-1.

### **Example**

Following statement declares an array variable, myList, creates an array of 10 elements of double type and assigns its reference to myList −

double[] myList = new double[10];

Following picture represents array myList. Here, myList holds ten double values and the indices are from 0 to 9.



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| **Lab Tasks** |

1. Write java code that takes a value at runtime and searches it in the array. If the value appears in the array then it prints the position of the value or else prints a message that value is not found.
2. Write a java program to demonstrate the concept of java runtime arguments. Input your name and roll number and print it on the console.
3. Develop a java program that takes 5 floating numbers as runtime arguments and print their total sum and average.