

King Saud University
College of Computer & Information Science
CSC111 - Tutorial12
Arrays - I -
All Sections

Objectives:

- To know how to define and create an array.
- To know how to access array elements.
- To know how to iterate over arrays using loops
- To know how to manipulate arrays

*(Exercise with * can be left to the student as self review questions)*

Exercise 1

1. Write a code snippet to define the following arrays:
 - a. An int array named **nums** of size 10.
 - b. A double array named **dobs** of size 5.
 - c. A string array named **names** of size 100.
2. Which of the following array definitions is right and which is wrong?

- a) `int i = new int(30);`
- b) `double d[] = new double[30];`
- c) `char[] r = new char(1..30);`
- d) `int i[] = (3, 4, 3, 2);`
- e) `float f[] = {2.3, 4.5, 6.6};`
- f) `char[] c = new char();`

3. Given the following array definition,

```
double[] arr = new double[5];
```

Write code snippets (if possible) to answer the following questions:

- a. Access the 1st element.
- b. Access the element at index 0.
- c. Access the last element.
- d. Access the element at index 4.
- e. Access the element before the last.
- f. Access the element at index 6.
- g. Given an integer variable **i < 5**, access the element at index **i - 1**

- h. Assign the sum of the first two elements to the 4th element.
- i. Given an integer variable **i**, assign the result of dividing the **i**th element by the element before it to last element.
Your code must have full checks to avoid runtime errors.

4. Write a code snippet that uses an **array initializer** to create an array of characters **r** that contains the characters of the word **“Riyadh”**.
5. What is wrong with the following code? Is it a compile-time error or a runtime error?

```
int[] a = new int[-1];
```

6. What is wrong with the following code? Is it a compile-time error or a runtime error?

```
int[] a;  
a[2] = 10;
```

7. Given a non-empty array **a** of integers and a **Scanner** object **s**, what is wrong with the following code? Does it have a compile-time error or runtime error?

```
for (int i = 0; i <= a.length; i++){  
    a[i] = s.nextInt();  
}
```

8. Write a code snippet to create a boolean array **b** of size **N**, where **N** is entered by the user (assume user will enter a positive integer greater than zero). Then fill out the array such that elements with

even index get **true** and elements with odd index get **false**
(Element with index zero gets **true**).

9. Write a code snippet that shifts the elements of an array **myList** of size **N** where **N > 0**, one element to the left.

Solution

1)

- a. `int[] nums = new int[10];`
- b. `double[] dobs = new double[5];`
- c. `String[] names = new String[100];`

2)

- `int i = new int(30);`
- `double d[] = new double[30];`
- `char[] r = new char(1..30);`
- `int i[] = (3, 4, 3, 2);`
- `float f[] = {2.3, 4.5, 6.6};`
- `char[] c = new char();`

Note: the fifth one (e) has a type mismatch error since 2.3 is double while 2.3f is a float. Array elements have to be compatible with the array type.

3)

- a) `arr[0]`
- b) `arr[0]`
- c) `arr[arr.length - 1]`
- d) `arr[4]`
- e) `arr[arr.length - 2]`
- f) Can not access element at index 6.
- g) `arr[i - 1]`
- h) `arr[3] = arr[0] + arr[1]`
- i) `if (i >= 2 && i <= arr.length && arr[i - 2] != 0)`
`arr[arr.length - 1] = arr[i - 1] / arr[i - 2];`

4)

```
char[] r = {'R', 'i', 'y', 'a', 'd', 'h'};
```

- 5) Can not create an array with a negative size. It will give you the following runtime error (exception): [java.lang.NegativeArraySizeException](#)
- 6) Can not use an array without initializing it. This is a compile time error: "local variable may not have been initialized"
- 7) The loop at the last iteration will try to access the element at index `a.length`, which is outside the array. This will cause the following runtime error (exception): [java.lang.ArrayIndexOutOfBoundsException](#)
- 8) Since boolean arrays are initialized by Java to **false**, we just need to fill out elements with even index with value **true**

```
boolean[] b = new boolean[N];
for (int i = 0; i < b.length; i++){
    if (i % 2 == 0)
        b[i] = true;
}
```

- 9)
- ```
int temp = myList[0];
for (int i = 1; i < myList.length; i++) {
 myList[i - 1] = myList[i];
}
myList[myList.length - 1] = temp;
```

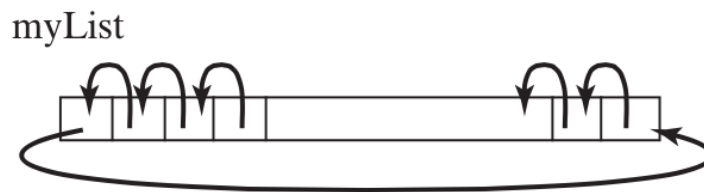


Figure 1: Shift left operation

**Exercise:** rewrite the answer starting loop from 0 (i.e., `int i = 0;`).

**Done...**