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 ith 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]
d) arr[4]
e) arr[arr.length - 1]
```
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**

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

9)

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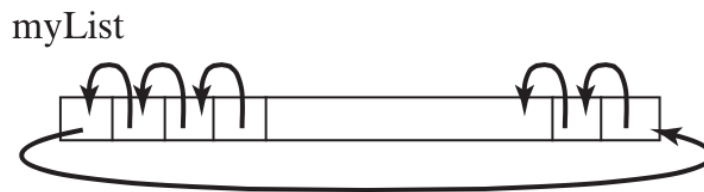
myList

Figure 1: Shift left operation

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

Done...