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WIX1002 Fundamentals of Programming
Tutorial 5 Arrays

1. Write statements for each of the following
    a. Declare an array that used to store 12 floating point numbers.

```
float[] number = new float[12];
```

    b. Initialize an array that used to store the value of A to E.

```
char[] alphabet = {'A','B','C','D','E'};
```

    c. Declare an array that used to store 100 students name.

```
String[] student_name = new String[100];
```

    d. Declare an array for a table with 6 rows 2 columns that used to store integer value.

```
int[][] table = new int[6][2];
```

    e. Initialize an array with the following value:

$$\begin{pmatrix} 6 & 9 \\ 2 & 5 \\ 4 & 6 \end{pmatrix}$$

```
int[][] matrix = {{6,9}, {2,5}, {4,6}};
```

    f. After initialize the array, modify the value of the above array to

$$\begin{pmatrix} 6 & 9 \\ 2 & 4 \\ 3 & 7 \end{pmatrix}$$

```
matrix[1][1] = 4;
matrix[2][0] = 3;
matrix[2][1] = 7;
```

    g. Display all the values of an array name contact in separate lines.

```
for (int i = 0; i < contact.length; i++) {
        System.out.println(contact[i]);
    }
```

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2. Correct the error for the following statements.

a.

```
String[] code = {'AAA', 'AAB', 'AAC', 'AAD'};
```

```
String[] code = {"AAA","AAB","AAC","AAD"};
```

b.

```
int[] num = new num[10];
for(int k=0; k<=num.length(); k++)
  sum+=num;
```

```
int [] num = new int[10];
for (int k = 0; k<num.length; k++)
  sum += num[k];
```

c.

```
int [][]t = new int[3][];
t[1][2] = 5;
```

```
int[][] t = new int[3][3];
t[1][2] = 5;
```

d.

```
int i=4;
int []score = new int[5];
score [1] = 78;
score[++i] = 100;
```

```
int i = 4;
int[] score = new int[5];
score[1] = 78;
score[i] = 100;
```

3. Determine the values of each element of array marks. Assume the array was declared as:

```
int[] marks = new int[5];
int i = 0, j = 1;
marks[i] = 12;
marks[j] = marks[i] + 19;
marks[j-1] = marks[j] * marks [j];
marks[j*3] = marks[i+1];
marks[++j] = marks[i]%5;
marks[2*j] = marks[j-1];
```

Line 1:	-	-
Line 2:	-	i = 0, j = 1
Line 3:	marks[0] = 12	i = 0, j = 1
Line 4:	marks[1] = marks[0] + 19 = 12 + 19 = 31	i = 0, j = 1
Line 5:	marks[1-1] = marks[1] * marks[1] marks[0] = 31 * 31 = 961	i = 0, j = 1
Line 6:	marks[1*3] = marks[0+1] marks[3] = marks[1] = 31	i = 0, j = 1
Line 7:	marks[++1] = marks[0] % 5 marks[2] = 961 % 5 = 1	i = 0, j = 2 *** Pre-increment by 1 using the statement ++j**
Line 8:	marks[2*2] = marks[2-1] marks[4] = marks[1] = 31	i = 0, j = 2

Thus,

marks[0] = 961

marks[1] = 31

marks[2] = 1

marks[3] = 31

marks[4] = 31

4. Write the statements that display the number of occurrence of the word "the" (case sensitive) in a string array name sentence.

```
import java.util.Scanner;
public class T5Q4 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int counter = 0;

        System.out.print("Enter a sentence: ");
        String sentence = sc.nextLine();

        // Split the sentences by 1 whitespace each
        String[] words = sentence.split(" ");

        for(String word:words){
            if (word.equals("the")){
                counter++;
            }
        }

        System.out.println("The number of occurrence of the word \"the\" is "+ counter);

        sc.close();
    }
}
```

5. Write the statements that display the string array name sentence in reverse order. Each string element must be displayed in reverse order as well.

```
import java.util.Scanner;
public class T5Q5 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a sentence: ");
        String sentence = sc.nextLine();

        // Split the sentences by 1 whitespace each
        String[] words = sentence.split(" ");

        // outer loop collect each word and inner loop reverse the characters
        for (int i = words.length - 1; i >= 0; i--){ // array starts from 0
            String word = words[i];
            String reversed_word = "";

            for (int j = word.length() - 1; j >= 0; j--) {
                reversed_word += word.charAt(j);
            }

            System.out.print(reversed_word + " ");
        }
        System.out.println("");

        sc.close();
    }
}
```

6. Write the statements that generate 1 random integer within 0 – 255. Convert the number to binary and store the bit into an 8 bit array. Then, display the binary number.

```
import java.util.Random;
public class T5Q6{
   public static void main(String[] args) {
      Random random = new Random();

      int number = random.nextInt(256);
      System.out.println("The random integer is: "+ number); // data validation

      int[] binary = new int[8]; // 8 bit array

      // Reverse order since least significant bit(LSB) to most significant bit(MSB)
      for (int i = binary.length - 1; i >= 0; i--) {
         binary[i] = number % 2;
         number /= 2;
      }

      System.out.print("The binary number is: ");

      for (int i = 0; i < binary.length; i++) {
         System.out.print(binary[i]);
      }
      System.out.println("");
   }
}
```