

COMP 248 - Tutorial #7 - Solution

More complex for statements and very simple 1D arrays

Question 1

Write a program to compute PI:

$$\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} + \dots \right)$$

a) Use a for loop (10000 iteration) and % symbol to find odd numbers.

```
public static void main(String[] args) {
    double sum = 0;
    boolean positive = true;

    for(int i=0; i < 10000; i++) {
        if(i % 2 == 1) {
            if(positive)
                sum += 1.0 / i;
            else
                sum -= 1.0 / i;
            positive = !positive;
        }
    }
    double PI = 4 * sum;
    System.out.println(PI);
}
```

b) Use a for loop (10000 iteration) but don't use % symbol to find odd numbers.

```
public static void main(String[] args) {
    double sum = 0;
    boolean positive = true;
    for(int i=1; i < 10000; i+=2) {
        if(positive)
            sum += 1.0 / i;
        else
            sum -= 1.0 / i;
        positive = !positive;
    }
    double PI = 4 * sum;
    System.out.println(PI);
}
```

Question 2

Given a sorted array, write a program to find the kth largest element in an array:

[1,2,3,4,5,6,7,8,9]

```
System.out.println(a[a.length - 3]);
```

Question 3

Write a program that prints the numbers from 1 to 100. But for multiples of three print “Fizz” instead of the number and for the multiples of five print “Buzz”. For numbers which are multiples of both three and five print “FizzBuzz”.

Use a for loop to solve this problem.

```
public static void main(String[] args) {
    for(int i=1; i < 100; i++) {
        if(i % 3 == 0 && i % 5 == 0)
            System.out.println("FizzBuzz");
        else if(i % 3 == 0)
            System.out.println("Fizz");
        else if(i % 5 == 0)
            System.out.println("Buzz");
        else
            System.out.println(i);
    }
}
```

Question 4

What's the output of the following program:

```
int[] a = {9, 8, 7, 6, 5, 4, 3, 2, 1};
for(int i=0; i<a.length; i++){
    for(int j=0; j<a.length - i - 1; j++) {
        if(a[j] > a[j + 1]) { // swap if a[j] > a[j + 1]
            int tmp = a[j];
            a[j]= a[j + 1];
            a[j + 1] = tmp;
        }
    }
}
```

```

}
System.out.println(Arrays.toString(a));

[1, 2, 3, 4, 5, 6, 7, 8, 9]

```

Question 5

Write a program to draw the following shapes:

a)

```

*
**
***
****
*****

public static void main(String[] args) {
    for(int i = 0; i < 5; i++){
        for(int j=0; j <= i; j++)
            System.out.print("*");
        System.out.println();
    }
}

```

b)

```

      *
     **
    ***
   ****
  *****
 *****
*****
*****

public static void main(String[] args) {
    for (int i = 0; i <= 5; i++) {
        for (int k = 0; k < 5 - i; k++)
            System.out.print(" ");
        for (int k = 0; k <= i; k++)
            System.out.print("*");
        for (int k = 0; k < i; k++)
            System.out.print("*");
        System.out.println();
    }
}

```

Question 6

Write a nested for loop to display the following output:

a b c d e

b c d e

c d e

d e

e

```
public static void main(String[] args) {  
    for(int i=0; i < 5; i++) {  
        for(int j=0; j < 5 - i; j++)  
            System.out.print((char) ('a' + j) + " ");  
        System.out.println();  
    }  
}
```

Question 7

What is the output of the following:

a)

```
for (int i = 1; ++i < 4; )  
    System.out.print(i);
```

23

b)

```
for (int i = 1; i < 4; i++)  
    System.out.print(i);
```

123

c)

```
for (int i = 1; i++ < 4; )  
    System.out.print(i);
```

234

d)

```
for (int i = 1; i < 4; ++i)
    System.out.print(i);
```

123

Question 8:

Write a program that show the multiplication table

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

```
public static void main(String[] args) {
    for (int i = 1; i < 10; ++i){
        for(int j = 1; j < 10; j++) {
            System.out.print(i * j + "\t");
        }
        System.out.println();
    }
}
```

Question 9

Encrypt the following sentence using a for loop, by adding 1 to the ascii of each of its characters:

"Hello world"

```
public static void main(String[] args) {
    String s = "Hello world";
    for(int i=0; i < s.length(); i++) {
        String before = s.substring(0, i);
        String after = s.substring(i+1, s.length());
        s = before + (char)(s.charAt(i) + 1) + after;
    }
    System.out.println(s);
}

// Output: Ifmmp!xpsme
```

Question 10

Display the content of the following arrays:

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

```
boolean[] b = new boolean[5];
```

```
char[] c = new char[5];
```

```
String[] s = new String[5];
```

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

```
System.out.println(Arrays.toString(i));
```

```
System.out.println(Arrays.toString(b));
```

```
System.out.println(Arrays.toString(c));
```

```
System.out.println(Arrays.toString(s));
```

```
System.out.println(Arrays.toString(d));
```

```
[0, 0, 0, 0, 0]
```

```
[false, false, false, false, false]
```

```
Array of character that have ascii: 0
```

```
[null, null, null, null, null]
```

```
[0.0, 0.0, 0.0, 0.0, 0.0]
```

Question 11

Are the below declarations correct:

a) `Int[] a = new int[5]`

b) `Int a[] = new int[5]`

c) `Int[] a = {1, 2, 3}`

d) `Int a[] = {1, 2, 3}`

e) `Int a[] = {'a', 'b', 'c'}`

f) `char a[] = {'a', 'b', 'c'}`

g) `char a[] = {1, 2, 3}`

All above are correct