

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

Tutorial #7: For Loops and Nested Loops - SOLUTIONS

Question 1:

What is the output of the following code segments?

A.

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

Answer: 23

B.

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

Answer: 123

C.

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

Answer: 234

D.

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

Answer: 123

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

E.

```
for (int j = 0; j <= 2; j++) //outer loop
{
    System.out.print(j);
    for (char ch = 'A'; ch <= 'M'; ch += (3+j)) //inner loop
        System.out.print((char)(ch + 1));
    System.out.println();
}
```

Output:
0BEHKN
1BFJN
2BGL

F.

```
for (int i = 1; i < 9; i++)
{
    if (i % 2 == 0) System.out.println(i + 1);
    else if (i % 3 == 0) continue;
    else if (i % 5 == 0) break;
    else System.out.println("Not multiple of 2, 3 or 5.");
}
System.out.println ("End");
```

Answer: This program breaks at iterator "i=5"; the loop will end at "i=5" not "i=8".

Output:
Not multiple of 2, 3 or 5.
3
5
End

G.

```
int sum = 0;
for (int k = 0; k < 7; k++)
{
    for (int j = 7; j > 2 * k; j -= 2)
    {
        System.out.print(" " + (j - k) + "+");
        sum += (j - k);
    }
    System.out.println();
}
System.out.println(" = " + sum);
```

Output:
7+ 5+ 3+ 1+
6+ 4+ 2+
5+ 3+
4+

= 40

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

Question 2:

Assume the following program:

```
public class Increment
{
    public static void main(String[] args)
    {
        int prevprev = 2, prev = 2, sum = 0;
        for (int i = 1; i < 4; i++)
        {
            sum = prevprev + prev;
            System.out.println(prevprev + " " + prev + " " + sum);
            prevprev = prev;
            prev = sum;
        }
    }
}
```

A.

What is the output of this program?

Answer:

```
2 2 4
2 4 6
4 6 10
```

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

B.

If we replace the for with the following lines, will the output be the same? If the output will be different, what will it be?

```
for (int i = 1; ++i < 4;)
```

Answer:

```
2 2 4
2 4 6
```

```
for (int i = 1; i < 4; ++i)
```

Answer: (same as A)

```
2 2 4
2 4 6
4 6 10
```

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.Random;
```

Question 3:

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.

Answer:

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

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

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

B.

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

Answer:

```
public static void main(String[] args)
{
    double sum = 0;
    boolean positive = true;
    for (int i=1; i <= 20000; i+=2)
    {
        if (positive)
            sum += 1.0 / i;
        else
            sum -= 1.0 / i;
        positive = !positive;
    }
    System.out.println(4 * sum);
}
```

Question 4:

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.

Answer:

```
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);
    }
}
```

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

Question 5:

Write programs to draw the following shapes:

A.

```
*
**
***
****
*****
```

Answer:

```
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.

```
  *
 ***
*****
*****
*****
*****
*****
```

Answer:

```
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 <= 2 * i; k++)
            System.out.print("*");
        System.out.println();
    }
}
```

```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
```

Question 6:

Write a nested for loop to display the following output:

```
a b c d e
a b c d
a b c
a b
a
```

Answer:

```
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();
    }
}
```



```
import org.json.JSONObject;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.Random;
```

Question 7:

Write a program that will display the following 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

Answer:

```
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();
    }
}
```