



Tutorial 07

Repetitive Statements: while | do-while | for

Exercise 1:

- A. Analyze the following code. Is `count < 100` always true, always false, or sometimes true or sometimes false at Point A, Point B, and Point C?

```
int count = 0;
while (count < 100) {
    // Point A
    System.out.println("Welcome to Java!");
    count++;
    //Point B
}
// Point C
```

- B. How many times are the following loop bodies repeated? What is the output of each loop?

- ```
int i = 1;
while (i < 10)
 if (i % 2 == 0)
 System.out.println(i);
```
- ```
int i = 1;
while (i < 10)
    if (i % 2 == 0)
        System.out.println(i++);
```
- ```
int i = 1;
while (i < 10)
 if (i++ % 2 == 0)
 System.out.println(i);
```

- C. Suppose the input is 2 3 5 4 0. What is the output of the following code? Explain what it does.

```
import java.util.Scanner;
public class Test {
 public static void main(String[] args){
 Scanner input = new Scanner(System.in);
 int number, max;
 number = input.nextInt();
 max = number;
 while (number != 0) {
 number = input.nextInt();
 if (number > max)
 max = number;
 }
 System.out.println("max is " + max);
 System.out.println("number is " + number);
 }
}
```

**D.** Convert the following while loop into a do-while loop.

```
Scanner input = new Scanner(System.in);
int sum = 0;
System.out.println("Enter an integer (input ends if it is 0)");
int number = input.nextInt();
while (number != 0) {
 sum += number;
 System.out.println("Enter an integer (input ends if it is 0)");
 number = input.nextInt();
}
```

**E.** Suppose the input is 2 3 4 5 0. What is the output of the following code?

```
import java.util.Scanner;
public class Test {
 public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 int number, sum = 0, count;
 for (count = 0; count < 5; count++) {
 number = input.nextInt();
 sum += number;
 }
 System.out.println("sum is " + sum);
 System.out.println("count is " + count);
 }
}
```

**F.** How many times is the println statement executed in the following code?

```
for (int i = 0; i < 10; i++)
 for (int j = 0; j < i; j++)
 System.out.println(i * j);
```

## Exercise 2:

Show the output of the following programs?

**A.**

```
public class Test {
 public static void main(String[] args) {
 for (int i = 1; i < 5; i++) {
 int j = 0;
 while (j < i) {
 System.out.print(j + " ");
 j++;
 }
 }
 }
}
```

**B.**

```
public class Test {
 public static void main(String[] args) {
 int i = 0;
 while (i < 5) {
 for (int j = i; j > 1; j--)
```

```

 System.out.print(j + " ");
 System.out.print("****");
 i++;
 }
}
}
C. public class Test {
 public static void main(String[] args) {
 int i = 5;
 while (i >= 1) {
 int num = 1;
 for (int j = 1; j <= i; j++) {
 System.out.print(num + "xxx");
 num *= 2;
 }
 System.out.println();
 i--;
 }
 }
}
D. public class Test {
 public static void main(String[] args) {
 int i = 1;
 do {
 int num = 1;
 for (int j = 1; j <= i; j++) {
 System.out.print(num + "G");
 num += 2;
 }
 System.out.println();
 i++;
 } while (i <= 5);
 }
}

```

### Exercise 3:

Write a program using for loop that prompts the user to enter two integers x and y. The program prints numbers between x and y (excluding x and y) that are either divisible by x or divide y in reverse (from largest to smallest).

Here are two sample runs:

```

Enter two integers: 10 50 ↵
40 30 25 20

```

```

Enter two integers: 5 1 ↵

```

## Exercise 4



Solve exercise 2 using while loop and without using logical operators `||` and `&&`. (Note: there is no relation between while and `||`, `&&`. This is just to train you on different equivalent ways of writing loops and conditional statements)

## Exercise 5

Write a program that reads a character then displays the following pattern using the input character (assuming input character is 'A' and height is 6):

```
 A
 A A
A A A
A A A A
A A A A A
A A A A A A
```

Height of pattern and character are input by user.

(Hint: assuming name of your Scanner object is `input`, use `input.next().charAt(0)`; to read a character from user.)

## Tutorial 07 Solutions

### Exercise 1:

A. Point A: `count < 100` is always true

Point B: `count < 100` is sometimes true and sometimes false (when is it false?)

Point C: `count < 100` is always false

B. (1) will repeat forever (infinite number of iterations)

(2) will repeat forever (infinite number of iterations)

(3) will repeat 9 times

C.

```
max is 5
number is 0
```

This program finds maximum number among input numbers.

D. `import java.util.Scanner;`

```
public class WhileToDoWhile {
 public static void main(String[] args){
 Scanner input = new Scanner(System.in);
 int number, sum = 0;
 do {
 System.out.print("Enter an integer (input ends if it is
0)");
 number = input.nextInt();
 sum += number;
 } while (number != 0);
 }
}
```

E.

```
sum is 14
count is 5
```

F. 45 times

### Exercise 2:

A.

```
0 0 1 0 1 2 0 1 2 3
```

B.

```


2 ****
3 2 ****
4 3 2 ****
```

C.

```
1xxx2xxx4xxx8xxx16xxx
1xxx2xxx4xxx8xxx
1xxx2xxx4xxx
1xxx2xxx
1xxx
```

D.

```
0 0 1 0 1 2 0 1 2 3
```

### Exercise 3:

```
import java.util.Scanner;
public class Reverse {
 public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 System.out.print("Enter two integers: ");
 int x = input.nextInt();
 int y = input.nextInt();
 for (int i = y - 1; i > x; i--)
 if (i % x == 0 || y % i == 0)
 System.out.println(i + " ");
 }
}
```

### Exercise 4:

```
import java.util.Scanner;
public class Reverse2 {
 public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 System.out.print("Enter two integers: ");
 int x = input.nextInt();
 int y = input.nextInt();
 int i = y - 1;
 while (i > x) {
 if (i % x == 0)
 System.out.println(i + " ");
 else if (y % i == 0)
 System.out.println(i + " ");
 i--;
 }
 }
}
```

### Exercise 5:

```
import java.util.Scanner;
public class Triangle {
 public static void main(String[] args) {
```

```
Scanner input = new Scanner(System.in);
System.out.print("Enter character: ");
char c = input.next().charAt(0);
System.out.print("Enter height: ");
int height = input.nextInt();
for (int i = height; i >= 1; i--) {
 for (int j = height - i + 1; j >= 1; j--)
 System.out.print(" ");
 for (int j = i; j >= 1; j--)
 System.out.print(c + " ");
 System.out.println();
}
}
```