

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?

1.

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

```
int i = 1;
while (i<10)
    if (i % 2 == 0)
        System.out.println(i++);
```
3.

```
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.)