

# do-while Loop

zyBook Chap 5.8

# do-while Loops

- **Do**/execute the `<controlled stmt(s)>` **once, then check** the `<condition>`, **while** the `<condition>` is **true**, execute the `<controlled stmt(s)>`
- Hence, the `<controlled stmt(s)>` in a do-while loop can be executed **AT LEAST ONCE**.

```
do {  
    <controlled stmt(s)>;  
} while (<condition>);  
  
<statement>;
```

```

public class MultiplesOfThree {
    public static void main (String[] args) {

        int val = 3;

        /*
        * 1) Execute the controlled stmts
        *     - print out the value
        *     - increment val by 3
        * 2) Check if the condition (val <= 20) is true
        *     If yes, execute the controlled stmts
        *     If no, skip the while loop
        */
        do {
            System.out.println(val);
            val += 3;
        } while (val <= 20);
        System.out.println("Done.");
    }
}

```

val = 3

**print out 3**  
**val += 3 // 6**

**val <= 20 ?**  
 True  
 print out 6  
 val += 3 // 9

**val <= 20 ?**  
 True  
 print out 9  
 val += 3 // 12

**val <= 20 ?**  
 True  
 print out 12  
 val += 3 // 15

**val <= 20 ?**  
 True  
 print out 15  
 val += 3 // 18

**val <= 20 ?**  
 True  
 print out 18  
 val += 3 // 21

**val <= 20 ?**  
 False  
 print out Done.

Q: What's the exact output?

```
public class DoWhileExample {  
    public static void main(String[] args) {  
  
        int a = 57;  
        do {  
            System.out.print(a % 5);  
            a = a / 5;  
        } while(a > 0);  
    }  
}
```

Output:  
**212**

a = 57

print out 2 // 57 % 5

a = 57 / 5 // 11

a > 0 ?

True

print out 1 // 11 % 5

a = 11 / 5 // 2

a > 0 ?

True

print out 2 // 2 % 5

a = 2 / 5 // 0

a > 0 ?

False

Q: What's the exact output?

```
public class DoWhileExample {  
    public static void main(String[] args) {  
  
        int a = 1;  
        do {  
            a++;  
            System.out.print(a);  
            ++a;  
        } while (a <= 10);  
    }  
}
```

Output:  
**246810**

a = 1

a += 1 // a = 2  
print out 2  
a += 1 // a = 3

a <= 10 ?  
True  
a += 1 // a = 4  
print out 4  
a += 1 // a = 5

a <= 10 ?  
True  
a += 1 // a = 6  
print out 6  
a += 1 // a = 7

a <= 10 ?  
True  
a += 1 // a = 8  
print out 8  
a += 1 // a = 9  
  
a <= 10 ?  
True  
a += 1 // a = 10  
print out 10  
a += 1 // a = 11  
  
a <= 10 ?  
False

# while Loops vs. do-while Loops

Q: Assuming  $x$  is a random integer from the user

- Rewrite the following while loop with a do-while loop
- Rewrite the following do-while loop with a while loop

```
while (x <= 10) {  
    System.out.print(x);  
    ++x;  
}  
System.out.print("Done.");
```

```
do {  
    if (x <= 10) {  
        System.out.print(x);  
        ++x;  
    }  
} while (x <= 10);  
System.out.print("Done.");
```

```
do {  
    System.out.print(x);  
    ++x;  
} while (x <= 10);  
System.out.print("Done.");
```

```
System.out.print(x);  
++x;  
while (x <= 10) {  
    System.out.print(x);  
    ++x;  
}  
System.out.print("Done.");
```

# while Loops vs. do-while Loops

- In a **while** loop,
  - the condition is **tested** at the **beginning** of the loop
  - executes the controlled statements **zero or many** times
- In a **do-while** loop,
  - the condition is **tested** at the **end** of the loop
  - executes the controlled statements **at least once**

# Coding Practice – Part 1

Write a program called **WhileLoops** that

- prompts the user for **two integers** (first value and second value), and
- uses a **while loop** to print out **all integers** between these two integers, one per line.

```
$ java WhileLoops  
First value (int): 6  
Second value (int): 10  
6  
7  
8  
9  
10
```

```
$ java WhileLoops  
First value (int): -3  
Second value (int): -7  
-3  
-4  
-5  
-6  
-7
```



# Sample Solution

```
$ java WhileLoops
First value (int): 6
Second value (int): 10
6
7
8
9
10
```

```
$ java WhileLoops
First value (int): -3
Second value (int): -7
-3
-4
-5
-6
-7
```

```
import java.util.Scanner;

public class WhileLoops {
    public static void main (String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.print("First value (int): ");
        int firstVal = input.nextInt();
        System.out.print("Second value (int): ");
        int secondVal = input.nextInt();

        int val = firstVal;

        if (firstVal < secondVal) {
            while(val <= secondVal) {
                System.out.println(val);
                ++val;
            }
        } else {
            while(val >= secondVal) {
                System.out.println(val);
                --val;
            }
        }
    }
}
```

# Coding Practice – Part 2

Write a program called **DoWhileLoops** that

- prompts the user for **an integer**, and
- uses a **do-while loop** to print out all **even integers** between 0 and the given integer, one per line.

```
$ java DoWhileLoops
Enter an integer: 12
0
2
4
6
8
10
12
```

```
$ java DoWhileLoops
Enter an integer: -9
-8
-6
-4
-2
0
```

# Sample Solution

```
$ java DoWhileLoops
```

```
Enter an integer: 12
```

```
0
```

```
2
```

```
4
```

```
6
```

```
8
```

```
10
```

```
12
```

```
$ java DoWhileLoops
```

```
Enter an integer: -9
```

```
-8
```

```
-6
```

```
-4
```

```
-2
```

```
0
```

```
import java.util.Scanner;

public class DoWhileLoops {
    public static void main (String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter an integer: ");
        int maxVal = input.nextInt();

        if (maxVal >= 0) {
            int val = 0;
            do {
                System.out.println(val);
                val +=2;
            } while (val <= maxVal);
        } else {
            int val = maxVal - maxVal % 2;
            do {
                System.out.println(val);
                val +=2;
            } while (val <=0);
        }
    }
}
```