

# HW: Loops 2 Chapter 4: Review

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1. Multiple Choice and true/false ODD #1-13, ~~15-20~~, 21-28
2. Find the errors ODD #1-4
3. Algorithmic Workbench #1, #7, #9, #11, #13
4. Short answer ODD #1-15

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1. Multiple Choice and true/false ODD #1-13, 21-28

What will println statement in the following program segment display? ✓

```
int x = 5;  
System.out.println(x++);
```

5

- a. 5
- b. 6
- c. 0
- d. None of these

3. In the expression number++, the ++ operator is in what mode?

- a. prefix
- b. pretest
- c. postfix
- d. posttest

postfix

5. This is a variable that controls the number of iterations performed by a loop.

- a. loop control variable
- b. accumulator
- c. iteration register variable
- d. repetition meter

loop control variable

7. The do-while loop is this type of loop.

- a. pretest
- b. post-test
- c. prefix
- d. post-fix

post - test

9. This type of loop has no way of ending and repeats until the program is interrupted.
- indeterminate
  - interminable
  - c. infinite
  - timeless
- infinite
11. This expression is executed by the for loop only once, regardless of the number of iterations.
- a. initialization expression
  - test expression
  - update expression
  - pre-increment expression
- initialization expression
13. This is a special value that signals when there are no more items from a list of items to be processed. This value cannot be mistaken as an item from the list.
- a. sentinel
  - flag
  - signal
  - accumulator
- sentinel

## TRUE AND FALSE QUESTIONS

21. True or False: The while loop is a pretest loop. True
22. True or False: The do-while loop is a pretest loop. False
23. True or False: The for loop is a posttest loop. False
24. True or False: It is not necessary to initialize accumulator variables. False
25. True or False: One limitation of the for loop is that only one variable may be initialized in the initialization expression. False
26. True or False: A variable may be defined in the initialization expression of the for loop. True
27. True or False: In a nested loop, the inner loop goes through all of its iterations for every iteration of the outer loop. True

28 True or False: To calculate the total number of iterations of a nested loop, add the number of iterations of all the loops. **False**

To calculate the total number of iterations of a nested loop, you multiply the outer iterations by the inner iterations

## FIND THE ERROR #1 - 4

Find the errors in the following code:

1.

```
// code contains error
// adds two numbers entered by user

int num1, num2;
String Input;
char again;
Scanner keyboard = new Scanner (System. in);
while (again = 'y' || again = 'Y') {
    System.out.print ("Enter a number ");
    num1 = keyboard.nextInt ();
    System.out.print ("Enter another number: ");
    num2 = keyboard.nextInt ();
    System.out.println ("Their sum is " + (num1 + num2));
    System.out.println ("Do you want to do this again . ");
    keyboard.nextLine (); // consume remaining newline
    input = keyboard.nextLine ();
    again = input.charAt(0); ←
```

}

1. Missing braces { }

2. again variable should be initialized 'y' or "y"

3.

// This code contains ERRORS!

int choice, num1, num2;

Scanner keyboard = new Scanner (System.in);

do

{

System.out.print ("Enter a number: ");

num1 = Keyboard.nextInt();

System.out.print ("Enter another number: ");

num2 = Keyboard.nextInt();

System.out.println ("Their sum is " + (num1 + num2));

System.out.println ("Do you want to do this again? ");

System.out.print ("1 = yes, 0 = no");

choice = Keyboard.nextInt();

} while (choice &gt;= 1);

1. choice should be testing ==

= is an assignment operator

2. Also needs a semi-colon

- ① Write a while loop that lets the user enter a number. The number should be multiplied by 10, and the result stored in the variable product. The loop should iterate as long as product contains a value less than 100.

```
import java.util.Scanner;
int product = 0, num;
Scanner keyboard = new Scanner(System.in);
while (product < 100) {
    num = keyboard.nextInt();
    product = num * 10;
}
```

- ⑦ Convert the while loop in the following code to a do-while loop:

```
Scanner keyboard = new Scanner(System.in);
```

```
int x = 1;
while (x > 0)
{
    System.out.print("Enter a number:");
    x = keyboard.nextInt();
}
```

```
Scanner keyboard = new Scanner
int x = 1
(System.in);
```

```
do
{
    System.out.print("Enter a number:");
    x = keyboard.nextInt();
} while (x > 0);
```

- ⑨ Convert the following while loop to a for loop:

```
int count = 0;
while (count < 50)
{
    System.out.println("count is " + count);
    count++;
}
```

```
for (count = 0, count < 50, count++) {
    System.out.println("count is " + count);
}
```

11.

Write an input validation loop that asks the user to enter a number in the range of 1 through 4

```

int number;
Scanner keyboard = new Scanner (System.in);
System.out.print ("Enter number 1-4");
number = keyboard.nextInt();
while (number < 1 || number > 4) {
    System.out.print ("Not valid: 1-4");
}

```

13. Write nested loops to draw this pattern.

```

1   **** *****
2   *** ***
3   ** **
4   *
5
6
7

```

```

for (int r = 7; r > 0; r--) {
    for (int c = 0; c < r; c++) {
        System.out.print ("*");
    }
    System.out.println ();
}

```

- ① Briefly describe the difference between the prefix and postfix modes used by the increment and decrement operators.

prefix mode is when the operator is placed before the variable operand. Postfix mode the operator is placed after the operand. Postfix mode causes the increment or decrement to occur after the value of the variable is used. Prefix mode causes the increment or decrement to happen first

- ③ Describe the difference between pretests loop and posttests loops.

A pretest loop tests the expression before each iteration. A posttest loop tests its expression after each iteration.

- ⑤ Describe the difference between the while loop and do while loop.

The while loop is a pretest loop and the do-while loop is a posttest loop.

7 Which loop should you use in situations where you want the loop to repeat until the boolean expression is false, but the loop should iterate at least once?

The do-while loop.

9 Why is it critical that accumulator variables are properly initialized?

An accumulator is used to keep a running total of numbers. In a loop, a value is usually added to the current value of the accumulator. If it is not done right, it will not have the correct total.

11 Describe a programming problem that would require the use of an accumulator calculating the sum of a list of numbers.

13 What is the advantage of using a sentinel?

Sometimes the user has a list of input values, but doesn't know how many. A sentinel when entered, signals the end of the list, user doesn't have to count.

15 Describe a programming problem requiring the use of nested loops.

A use is printing rows and columns. Outer loop iterates through the rows (numbers 1 through n).