

CS 122 – Review questions for test 1

1. What is the output of each of the following code segments?

```
for (i = 1; i <= 9; ++i)
{
    for (j = 1; j <= 9; ++j)
    {
        if (j >= 4 && j <= 7)
            continue;
        System.out.printf("%d ", 10*i + j);
    }
    System.out.printf("\n");
}
```

```
for (i = 1; i <= 7; ++i)
{
    for (j = 1; j <= 7; ++j)
    {
        if (j >= i)
            System.out.printf("%d ", 45 - 5*i);
        else
            System.out.printf(" ");
    }
    System.out.printf("\n");
}
```

```
for (i = 40; i >= 10; i -= 5)
{
    for (j = i; j <= 40; j += 5)
    {
        System.out.printf("%d ", j);
    }
    System.out.printf("\n");
}
```

```
for (topNumber = 20; topNumber <= 40; topNumber += 5)
{
    for (i = topNumber; i >= 10; i -= 5)
    {
        for (j = i; j <= topNumber; j += 5)
        {
            System.out.printf("%d ", j);
        }
        System.out.printf("\n");
    }
    System.out.printf("\n");
}
```

2. Suppose `s1` and `s2` are declared to be `String`. What does the following code accomplish?

```
String portion = s1.substring(s1.length() - 5);
if (s2.indexOf(portion) > 0)
    System.out.printf("yes\n");
else
    System.out.printf("no\n");
```

3. Suppose `temp` is an array of `double` that holds the average temperatures for the 12 months of the year, January through December. Show how we can use Java to calculate the average temperature of just the 3 summer months, which are June, July and August.

4. Which data type would be most appropriate for:

- The human population of the world
- Mass of an electron
- The name of Canada's prime minister
- The number of Furman alumni

5. Write a Java statement that accomplishes the following. Assume that variables `x` and `y` have already been declared.

If x is a real number between 0 and 1, then let y equal the value of x ; otherwise let y equal zero.

6. Identify the two errors in the following statement. What kind of errors are they: syntax, run-time, or logical?

```
if (num = 0);
    System.out.printf("Sorry, please enter a positive value.\n");
```

7. Suppose we want to print the values from 1 to 10. What is wrong with this loop?

```
int i = 1;
while (i <= 10)
    System.out.printf("%d\n", i);
```


12. Suppose that `s` is a string that contains a positive integer value, with one of its digits replaced by a question mark. For example, `s` could be `"3?87"`. Write a loop in Java that will print out all possible integer values this string could represent if the `'?'` is replaced by the digits 0 through 9.
13. Suppose you are implementing a board game that has 100 rows and 100 columns, and one player has his army occupying the rectangular area from `board[30][20]` to `board[50][30]` inclusive. Write Java code that will move these values 5 positions to the right.
14. Fill in the blanks to the right of the code with the appropriate values of the variables after each statement executes.

Table of values of the variables

	a	b	x	y
<code>int a = 3, b = 2;</code>	_____	_____	_____	_____
<code>int x = a-- * ++b;</code>	_____	_____	_____	_____
<code>int y = b += 2;</code>	_____	_____	_____	_____
<code>x *= a + b;</code>	_____	_____	_____	_____

15. Suppose `list` is an `ArrayList` of `Strings`. Explain in English an algorithm to determine how many of these strings begin with a digit (0-9).
16. Suppose you have an array of `int` that has already been initialized. Describe in English how you can tell if all the values in the array are distinct. In other words, we want to know if no two elements have the same value.
17. Explain in English how you would find the smallest positive number in an array of `double`.

18. Explain the difference between the following expressions:

`x = 5`

`x += 5`

`x = +5`

`x+5`

`x++ 5`

19. How many bits are allocated for an int? What approximate range of values does this provide?

20. Why does Java have a precedence and associativity for its operators?

21. Write Java statements that print, in ascending order, all 2 digit numbers that are factors of 24000 or multiples of 7. At the end, give the sum of all these numbers that have been printed.

22. Suppose a, b and c are integers. Write Java code that will compute the following: divide the product of the 2 largest numbers by the smallest number.

23. Write Java code that, given an integer called "n", will find the sum of all integers between 1 and n, inclusive, that divide evenly into n.

24. Suppose s is a String object. How would you use String methods to determine the position of the 2nd occurrence of the lowercase letter 'e'?

25. Suppose s is a String object. What would it mean if `s.lastIndexOf(s.charAt(0))` returns the value 1?

26. Suppose s is a String object. Write a while loop that finds the total number of times the letter e, either capital or lowercase, appears before the first '!' mark appears.

27. How would you find the sum of the numbers in the outer edge of a 2-dimensional array? To illustrate, assume the array has 10 rows and 20 columns.

28. Let's say you have a square 2-D array. How would you test to see if the sum of the elements of one main diagonal is equal to the sum of the elements along the other main diagonal?

29. Discuss the similarities and differences between the Java language and the English language.

30. Suppose `s` and `t` are `String` objects, and we know the following about them:

`s.substring(0,5).equals(t.substring(0,5))` returns `true`

`s.compareTo(t)` returns `4`

`s.charAt(5)` returns `'p'`

What would be the value returned by `t.charAt(5)` ?

31. Write Java code that does the following `String` operations.

Initialize `s1` to be the string `"triumphant"`.

Let `s2` be that part of `s1` that begins with the letter `'p'`.

Let `s3` be that part of `s2` that begins with any letter from `"shell"`.

Let `s4` be that part of `s3` that just omits the first character.

Print `s4`.