Problem 1 (10 points)
Which of the following **ten** are **legal** Java expressions? Cross out the invalid ones!

`5 < 6 && ! (3 > 5)` **valid**	`14 % 3 / 3` **valid**
`'abc'` **invalid**	`201 + " is fun"` **valid**
`"hi" + "there"` **valid**	`((3 + (4 * 5)))` **valid**
`5 +` **invalid**	`+ 5` **valid**
`12.34.56` **invalid**	`4 > 3 > 2` **invalid**

Problem 2 (40 points)
Each of the **twenty** arithmetic expressions written below evaluates to a value whose data type in Java is either `int`, `double`, or `boolean`. State both the value and data type for each.

Expression	*Value*	*Type*
`4 / 3 * 1.0`	**1.0**	**double**
`1 + (int)(3/5)`	**1**	**int**
`1.0/2.0/4.0`	**0.125**	**double**
`0 - 0.0`	**0.0**	**double**
`true && false`	**false**	**boolean**
`1 > 3`	**false**	**boolean**
`30 / 3 * 10`	**100**	**int**
`1 + 2 / 4 + 4`	**5**	**int**
`true || false`	**true**	**boolean**
`4/2`	**2**	**int**
`! (5 >= 5)`	**false**	**boolean**
`(double)5/2`	**2.0**	**double**
`(int)5.0/2.0`	**2.5**	**double**
`(double)(5/2)`	**2.0**	**double**
`3 * 2 - 1`	**5**	**int**
`'a' < 'b'`	**true**	**boolean**
`4 + 0.0 / 5`	**4.0**	**double**
`(4 + 0.0) * 15`	**60.0**	**double**
`8 % 4`	**0**	**int**
`true && false || true`	**true**	**boolean**

Problem 3 (24 points)

Assume that both `x` and `y` have been declared to be `int` variables and that `x` has the value 100 and `y` has the value 200. What is printed when each of the following **six** sequences of code are executed? More than one line may be printed and perhaps no lines will be printed.

```if (x > 50) {` ` System.out.println("A") ;` `} else if (y > 150) {` ` System.out.println("B") ;` `}``` **A**	```if (x > 150 && y > 150) {` ` System.out.println("C") ;` `} else if (y > 250) {` ` System.out.println("D") ;` `}``` *nothing is printed*
```if (x > 150) {` ` System.out.println("E") ;` `} else {` ` System.out.println("F") ;` `}` `if (y > 150) {` ` System.out.println("G") ;` `}``` **F** **G**	```if (x > 50) {` ` System.out.println("H") ;` `}` `if (y > 250) {` ` System.out.println("I") ;` `} else {` ` System.out.println("J") ;` `}``` **H** **J**
```if (x > 50) {` ` if (y > 250) {` ` System.out.println("K") ;` ` } else {` ` System.out.println("L") ;` ` }` `}``` **L**	```if (x > 50) {` ` if (y > 250) {` ` System.out.println("M") ;` ` }` `} else {` ` System.out.println("N") ;` `}``` *nothing is printed*

Problem 4 (26 points)

Assume that `x` and `y` have been declared as `double` variables. Write a statement that tests if `x` is between `y-1` and `y+1` and prints the result of the test. Your output line should contain the values of both `x` and `y`. Here are two appropriate output lines for your program where `x` is 4.5 and `y` is 5.3 in the first case and where `x` is 2.5 and `y` is 7.3 in the second case.

```
4.5 is close to 5.3
2.5 is not close to 7.3
```

```
if (y-1 <= x && x <= y+1) {
    System.out.println(x + " is close to " + y) ;
} else {
    System.out.println(x + " is not close to " + y) ;
}
```