More with Boolean

Sep 20

if statements, scope

Combining booleans

and and or and not

Boolean "Truth Table"

	and		or		not
	TRUE	FALSE	TRUE	FALSE	
TRUE	t	f	t	t	f
FALSE	f	f	t	f	t

The good integer problem

An integer is "good" if it is evenly divisible by 3 or evenly divisible by 5. However it is not good if it is evenly divisible by both 3 and 5. But, the integer is always good if it is evenly divisible by 7. Just print "true" or "false"

Algorithm:
x <= integer to be tested for goodness

Conditionals

doing different things on different inputs

- Consider abbreviated AnalyzeNumber for last class

- It kind of sucks

- Better:

  - "5 is positive" when greater than 0

  - "-5 is negative" when less than 0

```java
public class AnalyzeNumber5 {
    public static void main(String[] args) {
        int num = Integer.parseInt(args[0]);
        boolean isPositive = num > 0;
        System.out.println(num + " is positive " +
isPositive);
    }
}
```

if

- if (boolean) { do something }

- else { do something else }

```java
public class AnalyzeNumber5b {
    public static void main(String[] args) {
        int num = Integer.parseInt(args[0]);
        boolean isPositive = num > 0;
        if (isPositive) {
            System.out.println(num + " is positive");
        } else {
            System.out.println(num + " is negative");
        }
    }
}
```

Max of 3 numbers

- Given 3 numbers (from the command line) print the largest

Chalkboards

- Redo the Max of 3 program but make it handle case when numbers may be equal

{} and "Scope"

- In Java, can declare a new variable at any time

  - its lifetime -- scope -- is from declaration until the next matching }

- Prior to "if" all variables ended at end of program

  - Names can sometimes be re-used inside {} (usually not)

    - BUT this is confusing to people (not computers)

      - so do not

Scope

```java
public class Scoper {
    public static void main(String[] args) {

1       int a = 4;
2       int b = 1;
3       if (b > 0) {
4           int c = 8;
5           a = c;
        }
6        System.out.println(a);
7       int x = 5;
8       if (x > 0) {
9           int y = 7;
10          System.out.println(x + y);
        }
11     System.out.println(y);

12      int m = -2;
13      int n = 4;
14      if (n > 0) {
15          int m = 2;
16          m=4;
        }
17      System.out.println(m + n);
    }
}
```

	a	b	c	x	y	m	n
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

if

Variations

- Lots of legal ways to write if statements

  - VSC does not like some

- Others are a bad idea

- Still others are incorrect

```java
public class if3 {
    public static void main(String[] args) {
        int val = Integer.parseInt(args[0]);
        boolean isPositive = val > 0;
        if (val > 0) {
            System.out.println(val + " is positive");
        }
        if (val > 0) { System.out.println(val + " is positive"); }
        if (val>0)
            System.out.println(val + " is positive");
        if isPositive {
            System.out.println(val + " is positive");
        }
    }
}
```