



Java 3: Making Decisions

if, else if and else, comparisons, and true-or-false logic

NAME _____

DATE _____

CLASS _____

Conditions and if Statements

A **condition** is a question with a `true` or `false` answer, like `score > 50`. An **if statement** runs its block (the code in its braces) only when its condition is `true`. Add **else if** to check another condition, and **else** to catch everything left over. Java checks conditions **from top to bottom** and runs **only the first** block whose condition is true. The `else` block runs only if no condition was true.

Comparison operators: `==` equal to, `!=` not equal to, `<` less than, `>` greater than, `<=` less than or equal to, `>=` greater than or equal to. Careful: `=` **stores** a value, `==` **compares**. `if (x = 5)` is an error.

Logical operators join conditions. `&&` (and) is true only when **both** sides are true. `||` (or) is true when **at least one** side is true. `!` (not) flips `true` to `false` and `false` to `true`.

String rule: compare Strings with `.equals()`, like `name.equals("Sam")`, never `==` (with Strings it can give the wrong answer). `.equals()` is case-sensitive: `"Sam"` and `"sam"` are not equal.

1 True or False?

Suppose `int x = 7;` and `int y = 10;`. Write `true` or `false` for each condition.

Condition	true or false?
a. <code>x < y</code>	
b. <code>x == 7</code>	
c. <code>x != 7</code>	
d. <code>y >= 10</code>	

Condition	true or false?
e. <code>x > 5 && y < 10</code>	
f. <code>x > 5 y < 10</code>	
g. <code>!(x == y)</code>	
h. <code>x + 3 == y</code>	

2 Which Branch Runs?

```
1  if (temp >= 90) {
2      System.out.println("Hot! Swim.");
3  } else if (temp >= 70) {
4      System.out.println("Nice! Bike ride.");
5  } else if (temp >= 50) {
6      System.out.println("Cool. Jacket.");
7  } else {
8      System.out.println("Cold! Stay in.");
9  }
```

a. Write what prints for each value of `temp`.

temp	Output
95	
70	
69	
20	

b. At 95, both `temp >= 90` and `temp >= 70` are true. Why does only one message print?



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3 Write the Condition

Write a condition that is `true` exactly when the description is true. Use the operators from this sheet.

a. age is from 13 to 19 (including 13 and 19): _____

b. the String day is "Saturday" or "Sunday": _____

4 Debug It!

a. `if (lives = 9) {` will not compile. Write the fixed line.

b. `if (pet == "cat") {` breaks the **String rule**. Write the fixed line.

c. Ben wants 90 or more to print `Honor roll!`, but a score of 95 prints `You passed`. Explain the bug.

```
1  if (score >= 60) {  
2      System.out.println("You passed.");  
3  } else if (score >= 90) {  
4      System.out.println("Honor roll!");  
5  } else {  
6      System.out.println("Try again.");  
7  }
```

d. Rewrite Ben's code so it works.

5 Write Your Own: Letter Grades

The variable `int score` holds a test score from 0 to 100. Write an `if` / `else if` / `else` chain that prints **A** for 90 or more, **B** for 80 to 89, **C** for 70 to 79, and **F** for anything lower.