CSSE 220 Day 8

Decision Statements and Expressions

Check out *Decisions* from SVN

Questions?

Today

- Quick review of `if` statements
- `==` vs. `equals()`
- Selection operator, `? :`
- `switch` and enumerations

If Statements in a Nutshell

```
int letterCount = 0;
int upperCaseCount = 0;
String switchedCase = "";
for (int i = 0; i < message.length(); i++) {
    char nextChar = message.charAt(i);
    if (Character.isLetter(nextChar)) {
        letterCount++;
    }
    if (Character.isUpperCase(nextChar)) {
        upperCaseCount++;
        switchedCase += Character.toLowerCase(nextChar);
    } else if (Character.isLowerCase(nextChar)){
        switchedCase += Character.toUpperCase(nextChar);
    } else {
        switchedCase += nextChar;
    }
}
```

Comparing Objects

- Exercise: EmailValidator
  - Use a Scanner object
  - Prompt for user’s email address
  - Prompt for it again
  - Compare the two entries and report whether or not they match

- Notice anything strange?

Comparing Objects

- In Java:
  - `o1 == o2` compares *values*
  - `o1.equals(o2)` compares *objects*

- Remember: variables of class type store **reference** values

- How should you compare the email addresses in the exercise?

Q1

Statement vs. Expressions

- Statements: used only for their *side effects*
  - Changes they make to stored values or control flow
- Expressions: calculate values

- Many statements contain expressions:

  -
    ```
    if (amount <= balance) {
      balance -= amount;
    } else {
      balance -= OVERDRAFT_FEE;
    }
    ```

Conditional Operator

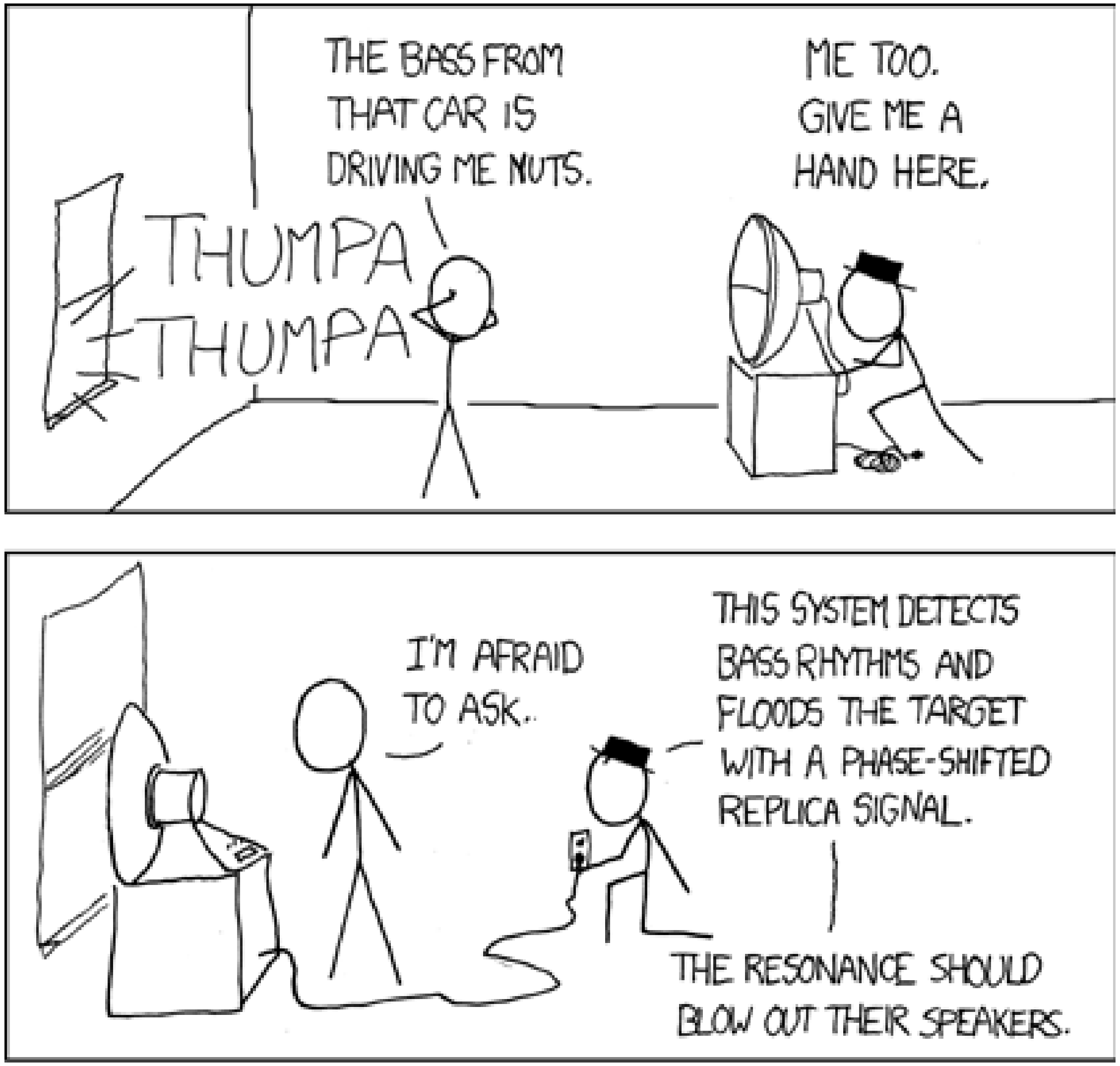
- Let’s us choose between two possible values for an expression
- For example,
  - `balance -= (amount <= balance ? amount : OVERDRAFT_FEE);`
- is equivalent to:

```
if (amount <= balance) {
    balance -= amount;
} else {
    balance -= OVERDRAFT_FEE;
}
```

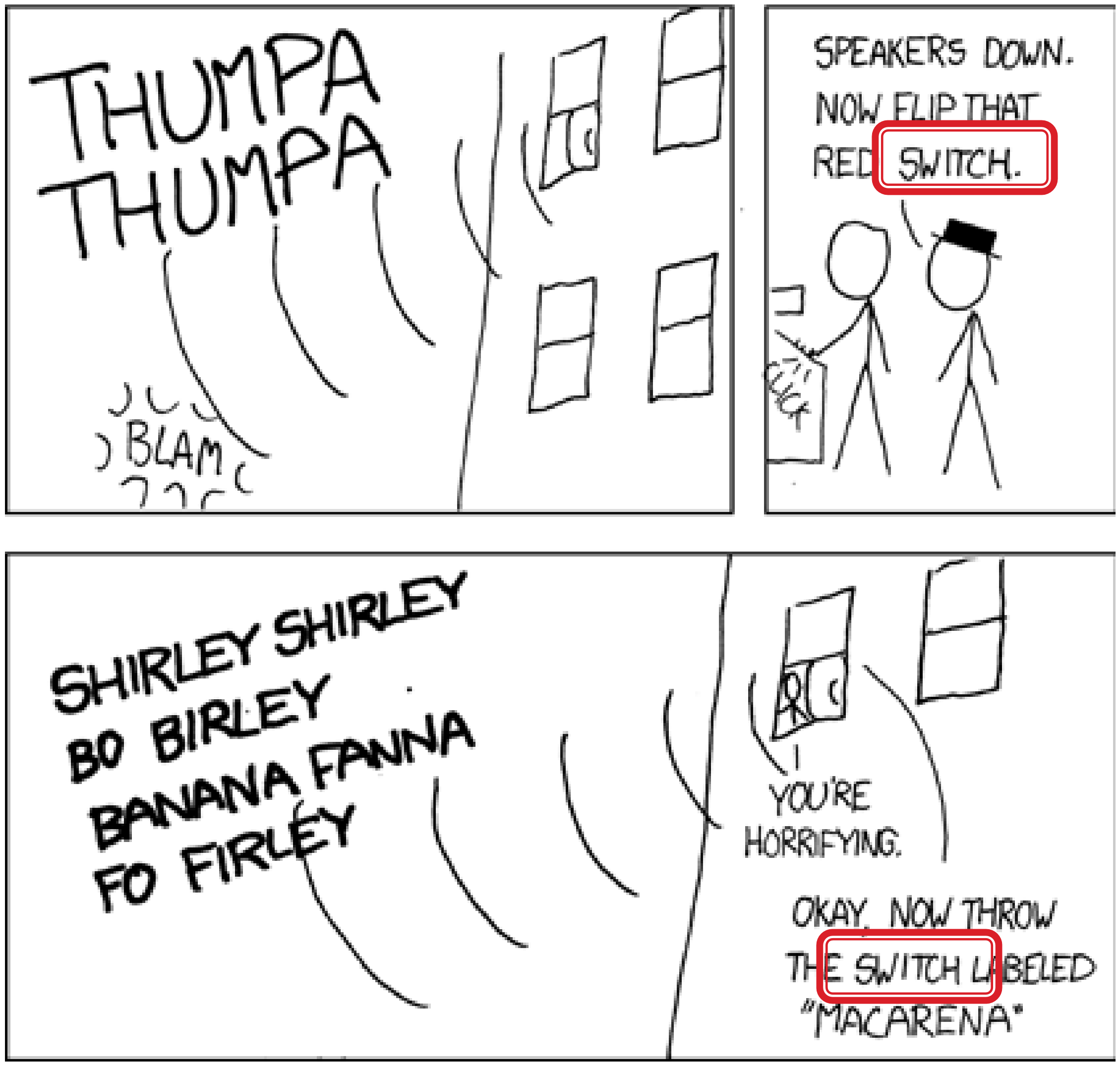
- Also called ternary or selection operator (Why?)

Q2

Bass (1/2)


THUMPA THUMPA
THE BASS FROM THAT CAR IS DRIVING ME NUTS.
ME TOO. GIVE ME A HAND HERE.
I'M AFRAID TO ASK.
THIS SYSTEM DETECTS BASS RHYTHMS AND FLOODS THE TARGET WITH A PHASE-SHIFTED REPLICA SIGNAL.
THE RESONANCE SHOULD BLOW OUT THEIR SPEAKERS.

Bass (2/2)


THUMPA THUMPA
BLAM
SPEAKERS DOWN. NOW FLIP THAT RED SWITCH.
CLICK
SHIRLEY SHIRLEY BO BIRLEY BANANA FANNA FO FIRLEY
YOU'RE HORRIFYING.
OKAY, NOW THROW THE SWITCH LABELED "MACARENA"

Switch Statements: Choosing Between Several Alternatives

```
char grade = …
int points;
switch (grade) {
case ‘A’:
    points = 95;
    break;
case ‘B’:
    points = 85;
    break;
…
default:
    points = 0;
}
```

Can switch on integer, character, or “enumerated constant”

Don’t forget the breaks!

Q3

Enumerated Constants

- Specify named sets:

```
public enum Suit {
    CLUBS, SPADES, DIAMONDS, HEARTS
}
```

- Store values from set:

```
Card c = new Card(2, CLUBS);'
```

- Then switch on them:

```
switch (this.suit) {
    case CLUBS:
    case SPADES:
        return "black";
    default:
        return "red";
}
```

Why no break here?

Why no break here?

Exercise: Bids for the Card Game "500"

```
switch (bidSuit) {
    case CLUBS:
    case SPADES:
        return "black";
    default:
        return "red";
}
```

- Implement a class Bid
  - Constructor should take a "trump" Suit and an integer representing a number of "tricks"
  - Test and implement a method, getValue(), that returns the point value of the bid, or 0 if the bid isn't legal. See table for values of the legal bids.

	Spades	Clubs	Diamonds	Hearts	No Trump
6 tricks	40	60	80	100	120
7 tricks	140	160	180	200	220
8 tricks	240	260	280	300	320
9 tricks	340	360	380	400	420
10 tricks	440	460	480	500	520

Suit enum is provided in the repository!

Boolean Essentials—Like C

- Comparison operators: `<`, `<=`, `>`, `>=`, `!=`, `==`
- Comparing objects: `equals()`, `compareTo()`
- Boolean operators:
  - and: `&&`
  - or: `||`
  - not: `!`

Q4

Predicate Methods

- A common pattern in Java:

```
public boolean isFoo() {
    … // return true or false depending on
      // the Foo-ness of this object
}
```

- Live-coding:
  - Tests and implement `isValid()` method for Bid
    - JUnit has test methods `assertTrue()` and `assertFalse()` that will be handy
  - Change `getValue()`: return 0 if `isValid()` is false

Q5

Test Coverage

- *Black box testing*: testing without regard to internal structure of program
  - For example, user testing
- *White box testing*: writing tests based on knowledge of how code is implemented
  - For example, unit testing
- *Test coverage*: the percentage of the source code executed by all the tests taken together
  - Want high test coverage
  - Low test coverage can happen when we miss branches of switch or if statements

Q6

Exercise

- Study your code for `Bid` and `BidTests`
- Do you have 100% test coverage of the methods?
  - `getValue()`
  - `isValid()`
- Add tests until you have 100% test coverage

Work Time

- Finish `CubicPlot` from last time
- Other homework problems if time permits