Recap: Switch Syntax
- `switch` expression:
  - `case` values:
    - statements
  - `default`:
    - statements
- `case` and `break` are reserved words
- `case` value must be int or char
- `case` value cannot be variable
- `break` is important, or else control flow continues to next set
- statements can be one line or several lines
- default executed if no values match expression

Recap: Short-Circuiting Evaluation
- Java evaluates complex expressions left to right
- short-circuiting: Java stops evaluating once value is clearly true or false
- `if` 
  - parentheses mandatory
  - statement can be
  - single line
  - block of several lines enclosed in `{ }`

Recap: Comparing Strings
- Relational operator `==` is wrong way to compare
- `String name1 = "Bubba"; String name2 = "Bubba"; System.out.println(name1 == name2); // prints false`
- `equals` method is right way to compare Strings
- `String name1 = "Bubba"; String name2 = "Bubba"; System.out.println(name1.equals(name2)); // prints true`
- Why? diagrams will help

Recap: Comparing Floats/Doubles
- Relational operator for equality not safe for floating point comparison
- `if (.3 == 1.0/10.0 + 1.0/10.0 + 1.0/10.0) System.out.println("Essentially equal.");`
- Check if difference close to 0 instead
- `if (Math.abs(f1 - f2) < TOLERANCE)`

Recap: Comparing Characters
- Safe to compare character types with relational operators
- `char c = 'a'; char d = 'b'; if (c == d) System.out.println("They match");`

News
- Next week is reading week
  - no lectures or labs or tutorials
- Midterms returned today
- Grades, statistics already posted on WebCT
- Regraded end of class, line up by last name (A-Z)

Objectives
- Practice with conditionals
- Understand basic loops
- Computers good at performing same task many times
- Loops allow repetitive operations in programs
- Loops handy in real life too
Climbing Stairs
- Am I at the top of the stairs?
  - No.
  - Climb up one step.

If Versus While Statements
- boolean expression
- statement
- true

Washing Hair
- Lather
- Rinse
- Repeat

While Statement
- while (boolean expression)
  - body
  - Simplest form of loop in Java
  - Body of loop can be
    - single statement
    - whole block of many statements in curly braces
  - Control Flow
    - body executed if expression is true
    - then boolean expression evaluated again
    - if expression still true, body executed again
    - repetition continues until expression false
    - then processing continues with next statement after loop

If Versus While Statements
- how if statement works
- how while statement works

Using while Statements
- public class WhileDemo
  - public static void main (String[] args)
    - int limit = 3;
    - int counter = 1;
    - while (counter <= limit)
      - counter = counter + 1;
        System.out.println(counter * counter));
        System.out.println("End of demonstration");
  - }
  - System.out.println("End of demonstration");

These diagrams called flowcharts
Using while Statements

```java
public class WhileDemo {
    public static void main(String[] args) {
        int limit = 3;
        int counter = 1;
        while (counter <= limit) {
            System.out.println("The square of "+ counter + " is " + (counter * counter));
            counter = counter + 1;
        }
        System.out.println("End of demonstration");
    }
}
```

- boolean expression
- while statement body
- control flow resumes here when boolean is false

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 3 is 9" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 1 is 1" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 2 is 4" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 3 is 9" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 1 is 1" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 2 is 4" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 3 is 9" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 1 is 1" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 2 is 4" printed on monitor
```

```
limit 3 counter 3
Is counter <= limit? yes
"The square of 3 is 9" printed on monitor
```

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limit 3 counter 3
Is counter <= limit? yes
"The square of 1 is 1" printed on monitor
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Using while Statements

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Climbing Stairs Again

while (I'm not at the top of the stairs)
{ Climb up one step
    Am I at the top of the stairs?
    No.
    Climb up one step.
    Am I at the top of the stairs?
    No.
    Climb up one step.
    Am I at the top of the stairs?
    No.
    ...and so on...
}

Climbing Stairs Again

Am I at the top of the stairs?
No.
Climb up one step.
Am I at the top of the stairs?
No.
Climb up one step.
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...and so on...

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}

Infinite Loops

Infinite Loops

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Infinite Loops

Another while Example

Questions?