Comparing Data & the 'switch' Statement

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Quick review of last lecture

The if Statement

- The *if statement* has the following syntax:

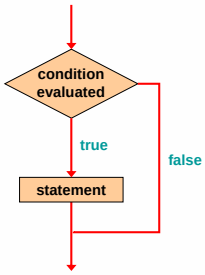
`if` is a Java reserved word

The *condition* must be a boolean expression. It must evaluate to either true or false.

```
if ( condition )
   statement;
```

If the *condition* is true, the *statement* is executed.
If it is false, the *statement* is skipped.

Logic of an if statement



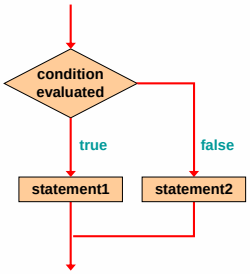
The if-else Statement

- An *else clause* can be added to an `if` statement to make an *if-else statement*

```
if ( condition )
   statement1;
else
   statement2;
```

- If the *condition* is true, *statement1* is executed; if the condition is false, *statement2* is executed
- One or the other will be executed, but not both

Logic of an if-else statement



Logical NOT

- The *logical NOT* operation is also called *logical negation* or *logical complement*
- If some boolean condition a is true, then `!a` is false; if a is false, then `!a` is true
- Logical expressions can be shown using a *truth table*

a	!a
true	false
false	true

Logical Operators

- A truth table shows all possible true-false combinations of the terms
- Since `&&` and `||` each have two operands, there are four possible combinations of conditions a and b

a	b	a && b	a || b
true	true	true	true
true	false	false	true
false	true	false	true
false	false	false	false

Boolean Expressions

- Specific expressions can be evaluated using truth tables

total < MAX	found	!found	total < MAX && !found
false	false	true	false
false	true	false	false
true	false	true	true
true	true	false	false

Other Stuff from Section 5.2

Indentation Revisited

- Remember that indentation is for the human reader, and is ignored by the computer

```
if (total > MAX)
   System.out.println ("Error!!");
   errorCount++;
```

Despite what is implied by the indentation, the increment will occur whether the condition is true or not

Block Statements

- Several statements can be grouped together into a *block statement* delimited by braces
- A block statement can be used wherever a statement is called for in the Java syntax rules

```
if (total > MAX)
{
   System.out.println ("Error!!");
   errorCount++;
}
```

Block Statements

- In an `if-else` statement, the `if` portion, or the `else` portion, or both, could be block statements

```
if (total > MAX)
{
   System.out.println ("Error!!");
   errorCount++;
}
else
{
   System.out.println ("Total: " + total);
   current = total*2;
}
```

- See Guessing.java (page 216)

The Conditional Operator

- Java has a *conditional operator* that uses a boolean condition to determine which of two expressions is evaluated
- Its syntax is:

```
condition ? expression1 : expression2
```

- If the *condition* is true, *expression1* is evaluated; if it is false, *expression2* is evaluated
- The value of the entire conditional operator is the value of the selected expression

The Conditional Operator

- The conditional operator is similar to an `if-else` statement, except that it is an expression that returns a value
- For example:

```
larger = ((num1 > num2) ? num1 : num2);
```

- If `num1` is greater than `num2`, then `num1` is assigned to `larger`; otherwise, `num2` is assigned to `larger`
- The conditional operator is *ternary* because it requires three operands

The Conditional Operator

- Another example:

```
System.out.println ("Your change is " + count +
   ((count == 1) ? "Dime" : "Dimes"));
```

- If `count` equals 1, then `"Dime"` is printed
- If `count` is anything other than 1, then `"Dimes"` is printed

Nested if Statements

- The statement executed as a result of an `if` statement or `else` clause could be another `if` statement
- These are called *nested if statements*
- See MinOfThree.java (page 219)
- An *else* clause is matched to the last unmatched `if` (no matter what the indentation implies)
- Braces can be used to specify the `if` statement to which an *else* clause belongs

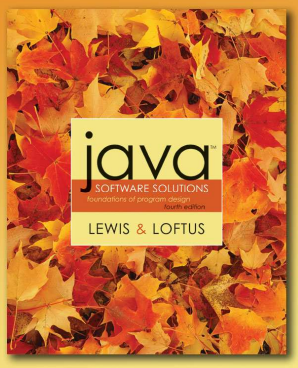
The Coin Class

- Let's examine a class that represents a coin that can be flipped
- Instance data is used to indicate which face (heads or tails) is currently showing
- See CoinFlip.java (page 213)
- See Coin.java (page 214)

Example: Guessing.java (page 216)

Chapter 5

Sections 5.3 – 5.4



The switch Statement

- The *switch statement* provides another way to decide which statement to execute next
- The *switch* statement evaluates an expression, then attempts to match the result to one of several possible *cases*
- Each case contains a value and a list of statements
- The flow of control transfers to statement associated with the first case value that matches

The switch Statement

- Often a *break statement* is used as the last statement in each case's statement list
- A *break* statement causes control to transfer to the end of the *switch* statement
- If a *break* statement is not used, the flow of control will continue into the next case
- Sometimes this may be appropriate, but often we want to execute only the statements associated with one case

The switch Statement

- An example of a switch statement:

```
switch (option)
{
   case 'A':
      aCount++;
      break;
   case 'B':
      bCount++;
      break;
   case 'C':
      cCount++;
      break;
}
```


The switch Statement

- A `switch` statement can have an optional *default case*
- The default case has no associated value and simply uses the reserved word `default`
- If the default case is present, control will transfer to it if no other case value matches
- If there is no default case, and no other value matches, control falls through to the statement after the switch

The switch Statement

- The expression of a `switch` statement must result in an *integral type*, meaning an integer (`byte`, `short`, `int`, `long`) or a `char`
- It cannot be a `boolean` value or a floating point value (`float` or `double`)
- The implicit boolean condition in a `switch` statement is equality
- You cannot perform relational checks with a `switch` statement
- See GradeReport.java (page 225)

The switch Statement

- The general syntax of a `switch` statement is:

`switch` and `case` are reserved words

```
switch ( expression )
{
   case value1 :
      statement-list1
   case value2 :
      statement-list2
   case value3 :
      statement-list3
   case  ...

}
```

If *expression* matches *value2*, control jumps to here

Example: GradeReport.java (page 225)

THE END