Java AP

Chapter | Conditionals

Introduction

Conditional or *selection* statements

- Allow a program to decide which statements to execute or ignore

- Decision is based on a *condition*

- Simplest variation is the `if` statement

The `if` Statement

```
if ( expression )
{
   statements
}
```

"If *expression* is true, execute *statements*."

Notes

- Parentheses are required for *expression*
- *expression* is a *boolean* (**true** or **false**) expression

Boolean expressions

Examples (assume a is 5 and b is 0):

- `a > b  a > 2  2 < a  b < 2 a - b  a * 5 * b + 4`
- (all **true**)

- `B > a  a < 2  2 > a  a - 5 a * 5 * b`
- (all **false**)

Boolean expressions

Relational operators:

<	less than
>	greater than
<=	less than or equal to
>=	greater than or equal to

Equality operators:

Operator	Meaning
==	equal to
!=	not equal to

Example usage:

Statement	Correct/Incorrect
`if (a > 5)` `  statement`	Correct
`if a < 5` `  statement`	Missing parentheses
`IF` `(a < 5)` `  statement`	Wrong 'if' keyword
`if (a < 5)` **`then`** `  statement`	No 'then' keyword
`if ()` `  statement`	Missing expression

More on the `if` Statement

Single and *compound* statements

```
/* single statement */
if (a > b)
{
  System.out.format("a = %d, b = %d%n", a, b);
}

/* compound statement */
if (a > b)
{
  System.out.format("a = %d%n", a);
  System.out.format("b = %d%n", b);
}
```

More on the `if` Statement

```
/* Not consistent */
if (a > b)
  System.out.format("a = %d, b = %d%n", a, b);

/* Pointless, but fine. */
if (a > b)
{
}

/* Pointless again, but legal. */
if (a > b)
    ;

/* Common beginner's error. */
if (b > a);
{
  System.out.println("b is greater than a");
}
```

The `else` Clause

```
if ( expression )
{
 statement1
}
else
{
 statement2
}
```

"If *expression* is true, execute *statement1,* else execute *statement2*."

Notes

- Can be *singular* or *compound*
- Optional

The `else` Clause

Example:

```
int average = 85;
char grade;

if (average >= 70)
{
    grade = 'P';
    System.out.println("You passed. Your average is "
+ average + "%");
}
else
{
    Grade = 'F';
    System.out.println("You didn't pass. Your average is "
+ average + "%");
}
```

More boolean expressions

Logical operators:
- Used to create more complex expressions
- Perform *short circuit evaluations*

Operator	Meaning
!	logical not (negation)
&&	logical and
||	logical or

Short circuits (assume a is **true** and b is **false**):
- `a || b` evaluates to **true** for any value of b
- `b && a` evaluates to **false** for any value of a

Nested `if` Statements

The “Dangling” `else`

The `switch` Statement

The `switch` Statement

The `switch` Statement