Flow of Control

✴ the order of statement execution
✴ default is top-to-bottom

Example

```java
public class Sum {
    public static void main(String[] args) {
        double x, y;
        double sum;
        x = 32.5;
        y = 9.4;
        sum = x + y;
        Output.showValue("The first number is ", x);
        Output.showValue("The second number is ", y);
        Output.showValue("The sum is ", sum);
    }  // method main
}  // class Sum
```

Default Flow
Conditional Statements

- We can change the flow of control using **conditional statements**
- Conditional statements let us choose which statement to execute next
- They include:
  - if-statements
  - if-else statements

Boolean Expressions

- The choice is determined by whether a particular condition is **true** or **false**
- A condition that can either be true or false is called a **boolean expression**
- For now, we will use simple boolean expressions involving numbers and relational operators

Relational Operators

<table>
<thead>
<tr>
<th>operator</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;</td>
<td>less-than</td>
</tr>
<tr>
<td>&gt;</td>
<td>greater-than</td>
</tr>
<tr>
<td>==</td>
<td>equal-to</td>
</tr>
<tr>
<td>!=</td>
<td>not-equal-to</td>
</tr>
<tr>
<td>&lt;=</td>
<td>less-than-or-equal-to</td>
</tr>
<tr>
<td>&gt;=</td>
<td>greater-than-or-equal-to</td>
</tr>
</tbody>
</table>

Boolean Expressions

**Syntax:**

```
value1 relationalOp value2
```

- `relationalOp` can be any one of the relational operators
- `value1` and `value2` can be anything that resolves to a number
  - A literal value (EX: 67.5)
  - A variable of type `double` (EX: `x`, `width`)
  - An arithmetic expression (EX: `x + 5.0`)
Examples

✴ the boolean expression \( x > 25 \) is either true or false, depending on whether or not the current value of \( x \) is greater than 25
✴ the boolean expression \( a == b \) is either true or false, depending on whether or not the current value of \( a \) is equal to the current value of \( b \)

The If-Statement

✴ syntax:

\[
\text{if (condition)} \\
\text{statement;}
\]

✴ if the condition is true, execute the statement. Otherwise skip it.

The If-Statement

Example 8.1

```java
double width;
width = Input.readDouble("Enter width: ");
if (width < 0.0)
    Output.showMessage("NEGATIVE WIDTH");
Output.showMessage("I am here.");
```

- if user enters a negative width, outputs NEGATIVE NUMBER then I am here.
- otherwise outputs just I am here
Example 8.1

```java
double width;
width = Input.readDouble("Enter width: ");
if (width < 0.0)
    Output.showMessage("NEGATIVE WIDTH");
Output.showMessage("I am here.");
```

• if user enters a negative number, outputs "NEGATIVE WIDTH"
• otherwise outputs "I am here."

Example 8.2

```java
double answer;
answer = Input.readDouble(  
    "Enter the answer: ");
if (answer == 42.0)
    Output.showMessage("YES!");
Output.showMessage("Here I am.");
```

• if user enters 42.0, outputs YES! then Here I am.
• otherwise outputs just Here I am.

Example 8.3

```java
double max = 100.0, length;
length = Input.readDouble(  
    "Enter the length: ");
if (length > max)
    length = max;
Output.showValue("length is ", length);
```

• if user enters a number greater than max, length is assigned the value max
• otherwise assigns length is unchanged

Examples on Website

```java
public class IfExamples
{
    public static void main (String [] args)
    {
        // Example 8.1
        double width;
        width = Input.readDouble("Enter width: ");
        if (width < 0.0)
            Output.showMessage("NEGATIVE WIDTH");
        Output.showMessage("I am here.");

        // Example 8.2
        double answer;
        answer = Input.readDouble("Enter the answer: ");
        if (answer == 42.0)
            Output.showMessage("YES!");
        Output.showMessage("Here I am.");

        // Example 8.3
        .......
    }
}
```

Module 8 Vocabulary

- flow of control
- conditional statement
- boolean expression
- relational operator
Questions?

Email Kevin at sahrk@sou.edu