Class 04

Decisions, Relational Operators, If, If-Else, Code Blocks
Truth

• In computer programming, truth is black and white
  • 1 or 0
  • true or false

• Any non-zero value can be interpreted as true, while 0 is interpreted as false

• An expression that can be evaluated as true or false involve comparing two things
# Relational Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Meaning</th>
<th>Sample Expression</th>
<th>Evaluates To</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>==</code></td>
<td>equal to</td>
<td><code>5 == 5</code></td>
<td>true</td>
</tr>
<tr>
<td><code>!=</code></td>
<td>not equal to</td>
<td><code>5 != 8</code></td>
<td>true</td>
</tr>
<tr>
<td><code>&gt;</code></td>
<td>greater than</td>
<td><code>8 &gt; 5</code></td>
<td>true</td>
</tr>
<tr>
<td><code>&lt;</code></td>
<td>less than</td>
<td><code>5 &lt; 8</code></td>
<td>true</td>
</tr>
<tr>
<td><code>&gt;=</code></td>
<td>greater than or equal to</td>
<td><code>8 &gt;= 5</code></td>
<td>true</td>
</tr>
<tr>
<td><code>&lt;=</code></td>
<td>less than or equal to</td>
<td><code>5 &lt;= 8</code></td>
<td>true</td>
</tr>
</tbody>
</table>

Source: Beginning C++ Through Game Programming
If Statements

• An if statement tests a condition to see if it is true
• If the condition is true, a statement or block of statements is executed
• If the condition is not true, the code branches to the statement after the if block

• Model:

if (true/false question) {
    statement(s); // executes only if question evaluates to true
}

Example: Score Rater Program

• Demonstrates the if statement

• Plan:
  • Ask the user to enter their score
  • Read the score into a variable
  • If the score is greater than or equal to 32, tell the user “Good job! Keep it up.”
If-Else Blocks

• An else statement can follow an if statement to execute code when the if condition is false

• Model:

```java
if (true/false question) {
    statement(s)1; // executes if condition is true
} else {
    statement(s)2; // executes if condition is false
}
```
Example: Score Rater 2.0

• Plan:
  • Ask the user to enter their score
  • Read the score into a variable
  • If the score is greater than or equal to 32, tell the user “Decent! Keep it up.”
  • If the score is less than 32, tell the user “You need some practice.”
Multiple Ways to Branch

- If there are more than two ways to branch, you can chain if statements together that get tested in order.
- The statement associated with the first if condition that evaluates to true is executed.
- If no if condition is true, the final (optional) else statement is executed.

Model:

```plaintext
if (true/false question1) {
    statement(s)1;
}
else if (true/false question2) {
    statement(s)2;
}
...
else if (true/false questionN) {
    statement(s)N;
}
else {
    statement(s)N+1;
}
```
Example: Score Rater 3.0

• Plan:
  • Ask the user to enter their score
  • Read the score into a variable
  • If the score is greater than 32, tell the user “Decent! Keep it up.”
  • If the score greater than 25, tell the user “Ok.”
  • If the score is greater than 20, tell the user “Passing...”
  • Otherwise tell the user “You need some practice.”