



CMSC 131

Object-Oriented Programming I

Loops (while, do while)

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This material is based on material provided by Ben Bederson, Bonnie Dorr,
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Overview

- ▶ while loops
- ▶ do while
- ▶ scope

Loops in Java

- ▶ So far our programs execute every program statement at most once
 - ▶ Often, we want to perform operations more than once
 - “Sum all numbers from 1 to 10”
 - “Repeatedly prompt user for input”
 - ▶ Loops allow statements to be executed multiple times
- Loop types in Java:
- while
 - do-while
 - for
- ▶ Called “iteration”

while and do-while Loops

- ▶ **while** and **do-while** loops contain
 - A statement, called the body
 - A boolean condition
 - Idea → the body is executed one more time as long as the condition is true
- ▶ **while-loop** → The condition is tested before each body execution

```
while ( <condition> ) {  
    <body>  
}
```
- ▶ **do-while-loop** → The condition is tested after each body execution

```
do{  
    <body>  
} while ( <condition> );
```
- ▶ **Main difference:** do-while loop bodies always executed at least once because it is “bottom tested” rather than “top tested”
- ▶ No need for { } if only one statement is executed (you should always use them regardless the number of statements 😊)
- ▶ **Example:** SimpleWhile.java, SimpleDoWhile.java, AskAge.java

Types of loops

▶ Indefinite iteration

- Usually tests something that is coming from outside the loop structure (e.g. input)
- Needs to eventually change from true to false

▶ Counted iteration

- Something that is controlled inside the loop
- To start at some value and count up or down until some set ending point

Infinite Loops

- ▶ Loops can run forever if condition never becomes false
- ▶ Be careful when programming loops!
 - Add statements for termination into loop body first
 - Often these statements are at end of body
 - How to stop a loop in Eclipse?
- ▶ **Example:** FastArithmetic.java

Variables, Blocks and Scoping

- ▶ Variables can be declared anywhere in a Java program
- ▶ When are the declarations active?
 - After they are executed
 - *Only inside the block in which they are declared*
- ▶ **Scope rules** formalize which variable declaration are active when
 - **Global variables** → scope is entire program
 - **Local variables** → scope is a block

Trace Tables

- ▶ Mechanism to keep track of values in a program
- ▶ Allows you to understand the program behavior
- ▶ Let's create a trace table for one of our examples

Combination of Statements

- ▶ You can have any combination of conditionals and iteration statements
 - Conditionals inside of loops
 - Conditionals inside conditionals
 - Loops inside conditionals
 - Loops inside loops

JOptionPane

- ▶ JOptionPane
 - Provides dialog boxes
 - We need “import javax.swing.*”;
- ▶ showDialogDialog
 - For input
 - Returns a string
 - For numerical operations we need
 - Integer.parseInt → Conversion to int
 - Double.parseDouble → Conversion to double
- ▶ showMessageDialog
 - For output
- ▶ **Example:** DaysCalculator.java