Computational Expression

Repetition: While Loop

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Loops

- A portion of a program that repeats a statement or a group of statements is called a **loop**.
- The statement or group of statements to be repeated is called the **body of the loop**.
- There must be a means of exiting the loop.
While Loop

- A while statement repeats while a controlling boolean expression remains true.
- The loop body typically contains an action that ultimately causes the controlling boolean expression to become false.
While Loop

Syntax:

while (Boolean_Expression)
   Body_Statement

or

while (Boolean_Expression) {
   First_Statement
   Second_Statement
   ...
}

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Enter a number:
2
1, 2,
Buckle my shoe.

Enter a number:
3
1, 2, 3,
Buckle my shoe.

Enter a number:
0

Buckle my shoe.

The loop body is iterated zero times.
while (count <= number)
{
    System.out.print(count + "", "");
    count++;
}

Start

Evaluate
    count <= number

True

Execute
    System.out.print(count + "", "");
    count++;

False

End loop
**while** 

\( Boolean_{Expression} \)

**Body**

Start

Evaluate

\( Boolean_{Expression} \)

True

False

Execute **Body**

End loop
A break statement can be used to end a loop immediately.
The break statement ends only the innermost loop or if statement that contains the break statement.
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break statements make loops more difficult to understand.

Use break statements sparingly (if ever).
while (itemNumber <= MAX_ITEMS)
{
    ...  
    if (itemCost <= leftToSpend)
    {
        ...  
        if (leftToSpend > 0)
            itemNumber++;
        else
            {
                System.out.println("You are out of money.");
                break;
            }
    }
    else
    ...  
}
System.out.println( . . . );
A `continue` statement:
- Ends current loop iteration
- Begins the next one
- Do not use unless necessary
  - Introduce unneeded complications
Common loop bugs:

- Unintended infinite loops
- Off-by-one errors
- Testing equality of floating-point numbers
- The loop may terminate for some input values, but not for others.