

Introduction to Programming

with Java, for Beginners

Loops (while & for)

How can we help Bart?

```
I will not surf in class  
I will not surf in class  
I will not surf in class  
I will not surf in class  
I will not surf in class  
I will not surf in class  
I will not surf in class  
.....
```



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A "Loop"

- A simple but powerful mechanism for "making lots of things happen!"
- Performs a statement (or block) over & over
- Usually set up to repeat an action until some condition is satisfied
- Computing Scenarios Examples
 - Run an application until user hits "quit" button
 - Deal card hands until game over

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Syntax of the *while* statement

```
while (condition){  
    statement(s)  
}
```

- *condition* is a true/false (boolean) expression
- If *condition* is initially false, the statement is never executed
- If *condition* is true, *statement* is executed and *condition* is re-evaluated
- The *statement* should eventually make the loop stop

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A *while* Loop to Print Numbers

```
// Print the numbers 1 thru 10
int x = 1;
while (x <= 10){
    System.out.println(x);
    x = x + 1;
}
```

- What happens if you forget the statement `x = x + 1` ?
 - We print value 1 forever
 - Known as *infinite* loop

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More *Infinite* Loops

```
// Some infinite loops are intentional
boolean notQuitKey = true;
while (notQuitKey){
    statement(s)
}

// Others are not
int x = 5;
while (x < 10){
    statement(s) which don't change x
}
```

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Compute Square of first 10 numbers

```
//In Square.java
int num = 1;
int sqNum = 0;
while (num <= 10) {
    sqNum = num * num;
    System.out.println(num + " " + sqNum);
    num = num + 1;
}
```

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For Loop

```
for (init; end-test; re-init){
    statement
}
```

- Executes loop body (statements within {}) as long as *end-test* evaluates to TRUE
- Initialization and re-initialization code included in loop statement
- Note: Test is evaluated **before** executing loop body

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While vs. For

Code	Explanation
<pre>int x = 1; while (x <= 10){ System.out.println(x); x = x + 1; }</pre>	<i>An example of a while loop that has this pattern</i>

<pre>for (int x = 1; x <= 10; x = x + 1){ System.out.println(x); }</pre>	<i>A for loop that does the same thing</i>
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Note: *For* loops are used generally for bounded iteration

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Summary of Loops

Type of Loop	Syntax
while	<pre>while (condition){ statement(s) }</pre>
for	<pre>for (expr1; condition; expr3){ statement(s) }</pre>

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