Control Flow Revisited
Chris Piech
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Review
Java
Making a New Variable

```
int age = 29;
```

- **type**: `int`
- **name**: `age`
- **Initial value**: `29`

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My computer has space for about 2 billion boxes
// Create a variable, of type int
// called age with the value 30.
int age = 30;

// Modify age to be one greater.
age = age + 1;

// Use the value in age (output it)
println("age is: "+ age);
public class Receipt extends ConsoleProgram {
    public void run() {
        double subtotal = readDouble("Meal cost? $");
        double tax = subtotal * 0.08;
        double tip = subtotal * 0.20;
        double total = subtotal + tax + tip;

        println("Tax : $" + tax);
        println("Tip: $" + tip);
        println("Total: $" + total);
    }
}
public class Receipt extends ConsoleProgram {
    private static final double TAX_RATE = 0.08;
    private static final double TIP_RATE = 0.2;

    public void run() {
        double subtotal = readDouble("Meal cost? ");
        double tax = subtotal * TAX_RATE;
        double tip = subtotal * TIP_RATE;
        double total = subtotal + tax + tip;

        println("Tax : ");
        println("Tip: ");
        println("Total: ");
    }
}
End Review
Today’s Goal

1. Be able to use For / While / If in Java
Today’s Route

You are here

Simple Java

For Loops

Scope

The River of Java

Review

Conditions

The River of Java

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While Loop in Karel

```karel
while(frontIsClear()) {
    body
}
```

```karel
if(beepersPresent()) {
    body
}
```
While Loop Redux

```java
while(condition) {
    body
}
```
```
if(condition) {
    body
}
```

The condition should be a “boolean” which is either true or false
Cool Example: Carbon Dating

C14 = 1.2 dpm

C14 = 13.6 dpm
Cool Example: Carbon Dating

```java
// read the amount of C14 from the user
println("Carbon dating");

// read the amount of C14 from the user
double sampleC14 = readDouble("Amount of C14 in your sample: ");

// use the half life formula to calculate the age
double fractionLeft = sampleC14 / LIVING_C14;
double age = Math.log(fractionLeft) / Math.log(0.5) * HALF_LIFE;
println("Your sample is " + age + " years old.");
```

* It calculates the age of a C14 sample
while (true) {

    // read the amount of C14 from the user
    println("Carbon dating");

    // read the amount of C14 from the user
    double sampleC14 = readDouble("Amount of C14 in your sample: ");

    // use the half life formula to calculate the age
    double fractionLeft = sampleC14 / LIVING_C14;
    double age = Math.log(fractionLeft) / Math.log(0.5) * HALF_LIFE;
    println("Your sample is "+age+" years old.");
}

* It calculates the age of a C14 sample
Booleans

1 < 2
Booleans

1 < 2

true
## Comparison Operators

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<tr>
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<th>Meaning</th>
<th>Example</th>
<th>Value</th>
</tr>
</thead>
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<td>true</td>
</tr>
<tr>
<td>!=</td>
<td>does not equal</td>
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<td>false</td>
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</tr>
<tr>
<td>&lt;=</td>
<td>less than or equal to</td>
<td>126 &lt;= 100</td>
<td>false</td>
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<tr>
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* All have equal precedence
## Comparison Operators

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* All have equal precedence
if (1 < 2) {
    println("1 is less than 2");
}

int num = readInt("Enter a number: ");
if (num == 0) {
    println("That number is 0");
} else {
    println("That number is not 0.");
}
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else {
    if (num > 0) {
        println("Your number is positive");
    } else {
        println("Your number is negative");
    }
}
```java
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```
```java
int num = readInt("Enter a number: ");

if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
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int num = readInt("Enter a number: ");
if (num == 0) {
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} else if (num > 0) {
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int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```

Enter a number: 5
```java
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```

```
Enter a number: 5
```

```
num = 5
```
```java
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```

Enter a number: 5

5 num
```java
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```

Enter a number: 5
Your number is positive
```java
int num = readInt("Enter a number: ");
if (num == 0) {
    println("Your number is 0 ");
} else if (num > 0) {
    println("Your number is positive");
} else {
    println("Your number is negative");
}
```

Enter a number: 5
Your number is positive
Use **while** and **if** statements in Java.

They are the same as in Karel, except that the **test** can be any expression that evaluates to true or false.
Amazing
Secret
Once upon a time...
X was looking for love!

```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

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X was looking for love!

```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

X was looking for love!
```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

X was definitely looking for love!
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

And met y
```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

Hi, I’m y
“Wow!”
```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

Wow

```
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

```
<p>| | |</p>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>y</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
```java
int x = 5;
if (lookingForLove()) {
    int y = 5;
}
println(x + y);
```

We have so much in common
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

We both have value 5!
```java
int x = 5;
if (lookingForLove()) {
    int y = 5;
}
println(x + y);
```
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

println together?
They got along

```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

```
  5
 / \
 x
```

```
  5
 / \
 y
```
It was a beautiful match...
But then tragedy struck.
Tragedy Struck

```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```

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int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
Nooooooooooooooooooooo!
You see...
When a program exits a code block...

```
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
```
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

Get deleted from memory!
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

Since y was declared in the if-block
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);

It gets deleted from memory here
int x = 5;
if(lookingForLove()) {
    int y = 5;
}
println(x + y);
int x = 5;
if(lookingForLove()) {
  int y = 5;
}
println(x + y);

Error. Undefined variable y.

And doesn’t exist here
The End
Sad times 😞
public void run() {
    double v = 8;
    if (condition) {
        v = 4;
        ... some code
    }
    ... some other code
}
Variables have a lifetime (called scope)

```java
public void run(){
    double v = 8;
    if (condition) {
        v = 4;
        ... some code
    }
    ... some other code
}
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public void run(){
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    }
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}

It dies here (at the end of its code block)
public void run(){
    double v = 8;
    if(condition) {
        v = 4;
        ... some code
    }
    ... some other code
}

It dies here (at the end of its code block)
```java
public void run(){
    ... some code
    if(condition) {
        int w = 4;
        ... some code
    }
    ... some other code
}
```

Example 2

This is the scope of w
public void run() { 
    ... some code 
    if (condition) { 
        int w = 4; 
        ... some code 
    } 
    ... some other code 
}
A Variable love story

Chapter 2
The programmer fixed her bug
int x = 5;
if(lookingForLove()) {
    int y = 5;
    println(x + y);
}

x was looking for love!
int x = 5;
if(lookingForLove()) {
  int y = 5;
  println(x + y);
}

x was definitely looking for love...

x was definitely looking for love...
```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
    println(x + y);
}
```

x met y
Since they were both “in scope”

```java
int x = 5;
if(lookingForLove()) {
    int y = 5;
    println(x + y);
}
```

Since they were both “in scope”

![Diagrams of x and y variables](images/x_y_diagrams.png)
The story had a happy ending!
The scope of a variable refers to the section of code where a variable can be accessed.

- **Scope starts** where the variable is declared.
- **Scope ends** at the termination of the inner-most code block in which the variable was defined.

- A **code block** is a chunk of code between `{ }` brackets.
I am thinking of a number between 0 and 99...
Enter a guess: 50
Your guess is too high

Enter a new number: 25
Your guess is too low

Enter a new number: 40
Your guess is too low

Enter a new number: 45
Your guess is too low

Enter a new number: 48
Congrats! The number was: 48
```java
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99...");
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    }
    else {
        println("Your guess is too high");
    }
    println("\n"); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: "+secretNumber);
```
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99...");
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
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    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println(" "); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: " + secretNumber);
Guess My Number

```java
int secretNumber = getHeight() % 100;
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int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
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println("Congrats! The number was: " + secretNumber);
```
**Guess My Number**

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}
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```
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int secretNumber = getHeight() % 100;
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int guess = readInt("Enter a guess: ");
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    if(guess < secretNumber) {
        println("Your guess is too low");
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    }
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    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: "+ secretNumber);
```

### Values

50 92

guess secretNumber
Guess My Number

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}
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}
println("Congrats! The number was: " + secretNumber);
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99..."-Nazi
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println("Enter a new number: ");
}
println("Congrats! The number was: "+ secretNumber);

95

92

guess

secretNumber
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    } else {
        // Your guess is too high
        println("Your guess is too high");
    }
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}
println("Congrats! The number was: "+ secretNumber);
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guess
```

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secretNumber
```
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int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println(" "); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: " + secretNumber);
```
```java
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99...");
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println(" "); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: " + secretNumber);
```

92  
guess

92  
secretNumber
```java
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99...");
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println(" "); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: "+ secretNumber);
```
Binary Operators

+  Addition
−  Subtraction
*  Multiplication
/  Division
%  Remainder

Today is your day, tio
// an example of the % operator
println(17 % 4);

// reads a number from the user
int num = readInt("?: ");

// stores the ones digit
int onesDigit = num % 10;

// equal to 1 if num is odd,
// 0 if num is even.
int isOdd = num % 2;
```java
int secretNumber = getHeight() % 100;
println("I am thinking of a number between 0 and 99... ");
int guess = readInt("Enter a guess: ");
// true if guess is not equal to secret number
while(guess != secretNumber) {
    // true if guess is less than secret number
    if(guess < secretNumber) {
        println("Your guess is too low");
    } else {
        println("Your guess is too high");
    }
    println(" "); // an empty line
    guess = readInt("Enter a new number: ");
}
println("Congrats! The number was: "+ secretNumber);
```
Challenge: Sentinel Loops

- **sentinel**: A value that signals the end of user input.
  - **sentinel loop**: Repeats until a sentinel value is seen.

- Example: Write a program that prompts the user for numbers until the user types -1, then output the sum of the numbers.
  - In this case, -1 is the sentinel value.

```
Type a number: 10
Type a number: 20
Type a number: 30
Type a number: -1
Sum is 60
```
Example: Sentinel Loops

// fencepost problem!
// ask for number - post
// add number to sum - fence

```java
int sum = 0;
int num = readInt("Enter a number: ");
while (num != -1) {
    sum += num;
    num = readInt("Enter a number: ");
}
println("Sum is "+ sum);
```
Example: Sentinel Loops

// fencepost problem!
// ask for number - post
// add number to sum - fence

int sum = 0;
int num = readInt("Enter a number: ");
while (num != -1) {
    sum += num;
    num = readInt("Enter a number: ");
}
println("Sum is " + sum);
Example: Sentinel Loops

// Solution #2
// harder to see loop end condition here

int sum = 0;
while (true) {
    int num = readInt("Enter a number: ");
    if (num == -1) {
        break; // immediately exits loop
    }
    sum += num;
}
println("Sum is " + sum);
Logical Operators

In order of precedence:

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
<th>Example</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>not</td>
<td>!(2 == 3)</td>
<td>true</td>
</tr>
<tr>
<td>&amp;&amp;</td>
<td>and</td>
<td>(2 == 3) &amp;&amp; (-1 &lt; 5)</td>
<td>false</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or</td>
</tr>
</tbody>
</table>

Cannot "chain" tests as in algebra; use && or || instead

// assume x is 15
2 <= x <= 10
true <= 10
Error!

// correct version
2 <= x && x <= 10
true && false
false
Precedence Madness

Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) && !false
Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) && !false
5 * 7 >= 3 + 5 * 6 && !false
Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) && false
5 * 7 >= 3 + 5 * 6 && false
5 * 7 >= 3 + 5 * 6 && true
Precedence:

\[ 5 \times 7 \geq 3 + 5 \times (7 - 1) \land \lnot false \]
\[ 5 \times 7 \geq 3 + 5 \times 6 \land \lnot false \]
\[ 5 \times 7 \geq 3 + 5 \times 6 \land true \]
\[ 35 \geq 3 + 30 \land true \]
Precedence Madness

Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) && !false
5 * 7 >= 3 + 5 * 6 && !false
5 * 7 >= 3 + 5 * 6 && true
35 >= 3 + 30 && true
35 >= 33 && true
Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) && !false
5 * 7 >= 3 + 5 * 6 && !false
5 * 7 >= 3 + 5 * 6 && true
35 >= 3 + 30 && true
35 >= 33 && true
true && true
Precedence Madness

Precedence:

! > arithmetic > comparison > logical

5 * 7 >= 3 + 5 * (7 - 1) || !false
5 * 7 >= 3 + 5 * 6 && !false
5 * 7 >= 3 + 5 * 6 && true
35 >= 3 + 30 && true
35 >= 33 && true
true && true
true

Never write code like this 😊
George Boole

English Mathematician 1815 – 1864
Boole died of being too cool
// Store expressions that evaluate to true/false
boolean x = 1 < 2;       // true
boolean y = 5.0 == 4.0;   // false
// Store expressions that evaluate to true/false
boolean x = 1 < 2;  // true
boolean y = 5.0 == 4.0;  // false

// Directly set to true/false
boolean isFamilyVisiting = true;
boolean isRaining = false;
// Store expressions that evaluate to true/false
boolean x = 1 < 2;     // true
boolean y = 5.0 == 4.0; // false

// Directly set to true/false
boolean isFamilyVisiting = true;
boolean isRaining = false;

// Ask the user a true/false (yes/no) question
boolean playAgain = readBoolean("Play again?", "y", "n");
if (playAgain) {
  ...

boolean isAllowed = !food || drinks;

*know your logical precedence
Today’s Route

Simple Java

You are here

For Loops

Scope

Conditions

Review

The River of Java

Piech, CS106A, Stanford University
How would you println "Stanford rocks socks" 100 times
public void run() {
    for (int i = 0; i < 100; i++) {
        println("Stanford rocks socks!");
    }
}
For Loop Redux

for (int i = 0; i < 100; i++) {
    println("Stanford rocks socks!");
}

This line is run once, just before the for loop starts.

Enters the loop if this condition passes.

This line is run each time the code gets to the end of the 'body'.

Piech, CS106A, Stanford University
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
For Loop Redux

```java
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```
For Loop Redux

i 0

for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}

Piech, CS106A, Stanford University
For Loop Redux

\[
\begin{array}{c|c}
 i & 0 \\
\end{array}
\]

\begin{verbatim}
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
\end{verbatim}

Piech, CS106A, Stanford University
For Loop Redux

```java
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Piech, CS106A, Stanford University
For Loop Redux

```
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Piech, CS106A, Stanford University
For Loop Redux

\[
\begin{array}{c|c}
  i & 1 \\
\end{array}
\]

```java
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Stanford rocks socks
```java
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Stanford rocks socks
Stanford rocks socks
For Loop Redux

i | 2

```java
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Output:

```
Stanford rocks socks
Stanford rocks socks
```
For Loop Redux

```java
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

![Output of the for loop]

Stanford rocks socks
Stanford rocks socks
For Loop Redux

```
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks! ");
}
```

Output:

```
Stanford rocks socks
Stanford rocks socks
Stanford rocks socks
```
For Loop Redux

for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}

Stanford rocks socks
Stanford rocks socks
Stanford rocks socks
For Loop Redux

```java
for(int i = 0; i < 3; i++) {
    System.out.println("Stanford rocks socks!");
}
```

Output:

```
Stanford rocks socks
Stanford rocks socks
Stanford rocks socks
```
For Loop Redux

```java
for (int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
```

Stanford rocks socks
Stanford rocks socks
Stanford rocks socks
for(int i = 0; i < 3; i++) {
    println("Stanford rocks socks!");
}
You can use the for loop variable
How would you println the first 100 even numbers?
Printing Even Numbers

```plaintext
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
```
for(int i = 0; i < NUM_NUMS; i++) {
    println(i * 2);
}
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
Printing Even Numbers

```java
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```
Printing Even Numbers

\[
\begin{array}{c|c}
  i & 0 \\
\end{array}
\]

\[
\text{for} (\text{int } i = 0; i < 3; i++) \{ \\
  \text{println}(i \ast 2); \\
\}
\]
Printing Even Numbers

\[
\begin{array}{c}
i \quad 0 \\
\end{array}
\]

```java
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```

Piech, CS106A, Stanford University
Printing Even Numbers

```
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```
Printing Even Numbers

for(int i = 0; i < 3; i++) {
    println(i * 2);
}
Printing Even Numbers

for(int i = 0; i < 3; i++) {
    println(i * 2);
}
Printing Even Numbers

```
for (int i = 0; i < 3; i++) {
    println(i * 2);
}
```

```
0
2
```
Printing Even Numbers

\begin{align*}
&\text{for}(\text{int } i = 0; i < 3; i++) \{ \\
&\quad \text{println}(i * 2); \\
&\}
\end{align*}

\begin{center}
\begin{tabular}{c}
0 \\
2
\end{tabular}
\end{center}
Printing Even Numbers

```
for (int i = 0; i < 3; i++) {
    println(i * 2);
}
```

For Loop Redux

```
0
2
```
Printing Even Numbers

```
for (int i = 0; i < 3; i++) {
    println(i * 2);
}
```
Printing Even Numbers

```java
for (int i = 0; i < 3; i++) {
    println(i * 2);
}
```

For Loop Redux

0
2
4
Printing Even Numbers

```
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```
Printing Even Numbers

```
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```

0
2
4
Printing Even Numbers

```java
for(int i = 0; i < 3; i++) {
    println(i * 2);
}
```
That’s all

```java
public void run() {
    for(int i = 0; i < 999999; i++) {
        println("You rock!");
        println("See you on Friday");
    }
}
```
Today’s Route

For Loops

Scope

Conditions

Review

Simple Java

You are here

The River of Java

Piech, CS106A, Stanford University
Welcome to the CS106A game show!
Choose a door and win a prize
Door: 2
You chose door 2
You win $¥.
Choose a Door

```java
int door = readInt("Door: ");
// while the input is invalid
while (door < 1 || door > 3) {
  // tell the user the input was invalid
  println("Invalid door!");
  // ask for a new input
  door = readInt("Door: ");
}
```

```
|| or
&& and
```
```java
int prize = 4;
if (door == 1) {
    prize = 2 + 9 / 10 * 100;
} else if (door == 2) {
    boolean locked = prize % 2 != 0;
    if (!locked) {
        prize += 6;
    }
} else if (door == 3) {
    prize += 6;
}
```
```java
int prize = 4;
if (door == 1) {
    prize = 2 + 9 / 10 * 100;
}
else if (door == 2) {
    boolean locked = prize % 2 != 0;
    if (!locked) {
        prize += 6;
    }
}
else if (door == 3) {
    prize++;
}
```
The Door Logic

```java
int prize = 4;
if(door == 1) {
    prize = 2 + 9 / 10 * 100;
} else if(door == 2) {
    boolean locked = prize % 2 != 0;
    if(!locked) {
        prize += 6;
    }
}
else if(door == 3) {
    prize++;
}
```
```java
int prize = 4;
if(door == 1) {
    prize = 2 + 9 / 10 * 100;
} else if(door == 2) {
    boolean locked = prize % 2 != 0;
    if(!locked) {
        prize += 6;
    }
} else if(door == 3) {
    prize++;
}
```
```java
int prize = 4;
if (door == 1) {
    prize = 2 + 9 / 10 * 100;
} else if (door == 2) {
    boolean locked = prize % 2 != 0;
    if (!locked) {
        prize += 6;
    }
} else if (door == 3) {
    prize++;
}
```
Today’s Goal

1. Be able to use For / While / If in Java