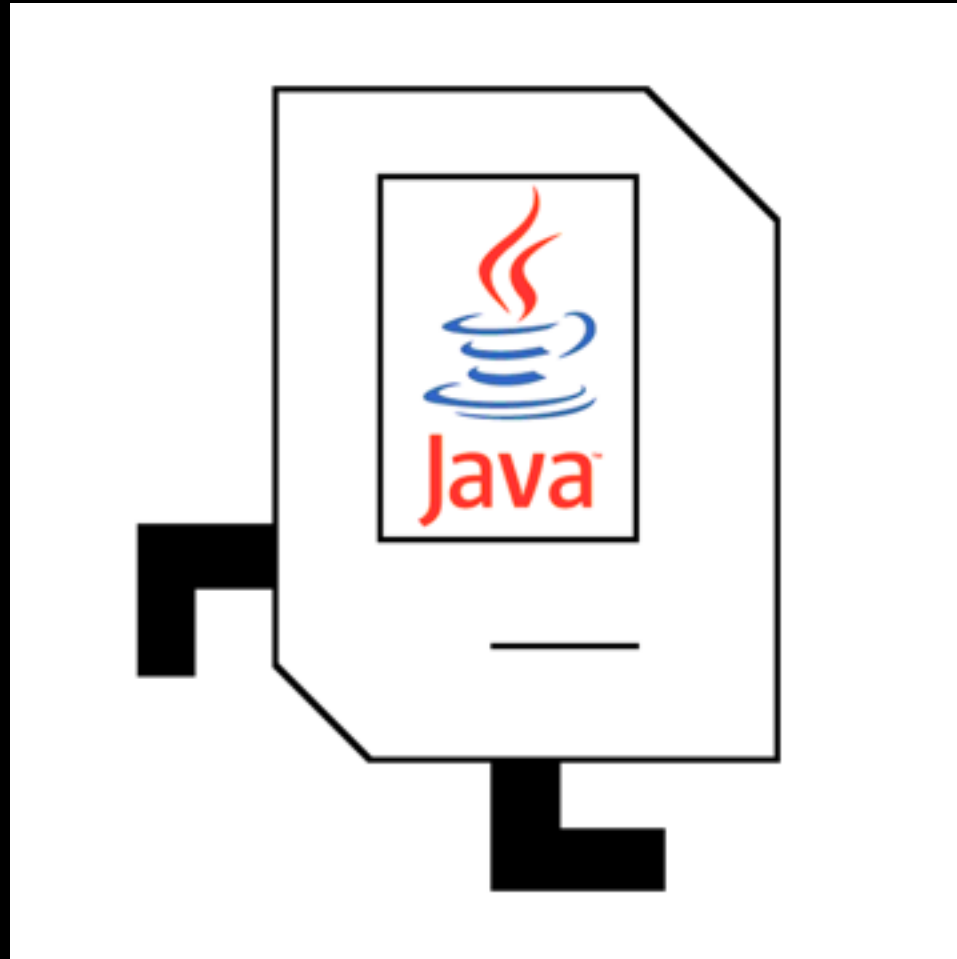


A person's hand is visible in the foreground, pointing towards the center of the image. The background is a dense field of green digital characters, resembling a computer terminal or data stream, with a slight blur effect. The overall color palette is dominated by green and black.

Variables

Review



Control Statements

method

```
private void solaDon() {  
    // three turnLeft()'s  
}
```

for-loop

```
for(int i = 0; i < N; i++) {  
    // to repeat N times  
}
```

while-loop

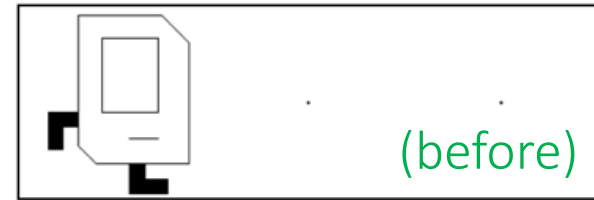
```
while(condition) {  
    // all the code in here repeats  
    // while the condition is true  
}
```

if-else
statements

```
if(condition) {  
    // do this code if true  
} else {  
    // do this code if false  
}
```

If-else statements

What do these two code snippets do?

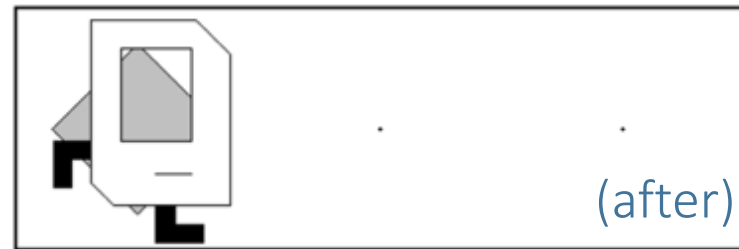
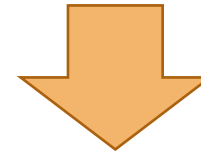


✓

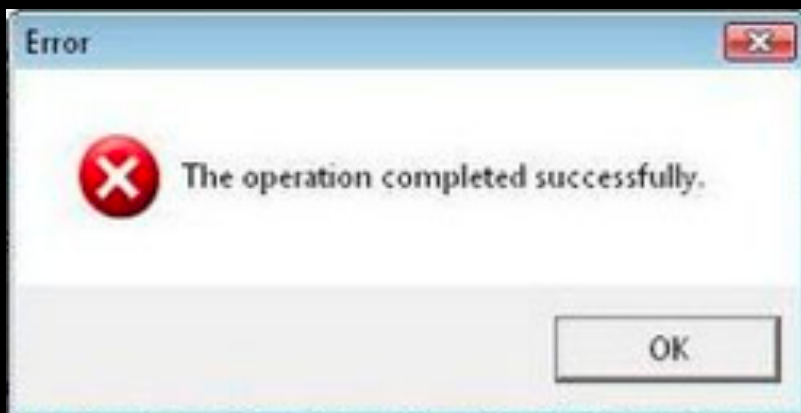
```
if(frontIsClear()) {  
    putBeeper();  
}  
turnLeft();
```



```
if(frontIsClear()) {  
    putBeeper();  
} else {  
    ✗ turnLeft();  
}
```



Errors



What kind of bugs did you find in your code?



Semicolons and Curly Braces { }

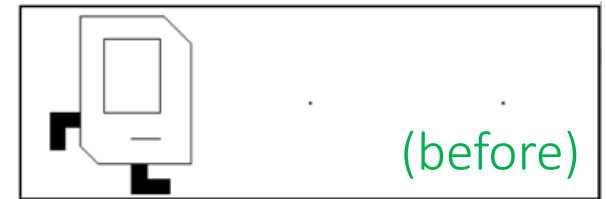
;

This line is a command.

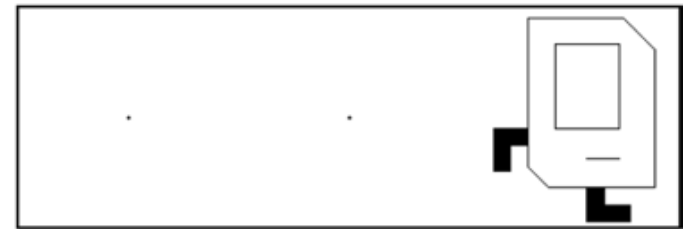
{ ... }

These lines are grouped.

What do these code snippets do?

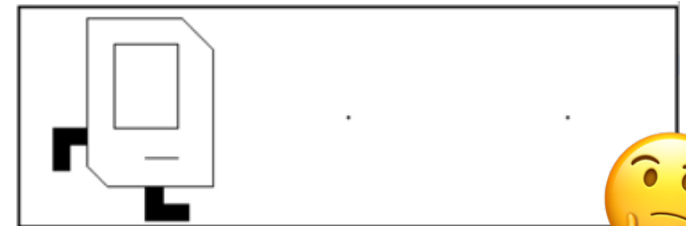


```
while (frontIsClear()) {  
  move();  
}
```



(done)

```
while (frontIsClear()); {  
  move();  
}
```



(running)

Semicolons ; and Curly Braces { }

```
while (frontIsClear()) {  
    move();  
}
```

```
while (frontIsClear())  
{  
    move();  
}
```



(done)

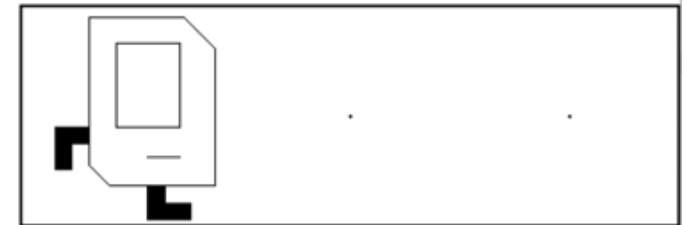


```
while (frontIsClear()); {  
    move();  
}
```

```
while (frontIsClear())  
{  
    "do nothing"  
}  
{  
    move();  
}
```



We never reach here!



(running)



Make It a Habit

```
for (int i = 0; i < N; i++) {  
    move();  
}
```

No semicolon
between () and { }

```
while (frontIsClear()) {  
    move();  
}
```

No semicolon
between () and { }

```
if (frontIsClear()) {  
    move();  
}
```

No semicolon
between () and { }

```
move();
```

A command

Questions?

Asking for Help



We love helping...

...but we love it when you help us help you.

Eclipse Is Actually Your Friend

```
BanishWinterFixed.java
1 import stanford.karel.*;
2
3 public class BanishWinterFixed extends SuperKarel {
4     public void run() {
5         while(beeperInBag()) {
6             moveToTree();
7
8
9             while(frontIsBlocked()) {
10                turnLeft();
11                move();
12                turnRight();
13            }
14            placeLeaves();
15            turnRight();
16            moveToWall();
17
18            while(frontIsClear()) {
19                move();
20
21                turnLeft();
22            }
23
24     }
25
26
27     public void moveToTree() {
28         moveToWall();
29     }
30
31     public void moveToWall() {
32         while(frontIsClear()) {
33             move();
34         }
35     }
}
```

Syntax error, insert ";" to complete Block

My code doesn't work.



Syntax error, insert ";" to complete Block



Style Is Also Your Friend

```
BanishWinterFixed.java
1 import stanford.karel.*;
2
3 public class BanishWinterFixed extends SuperKarel {
4     public void run() {
5         while(beepeersInBag()) {
6             moveToTree();
7
8
9             while(frontIsBlocked()) {
10                turnLeft();
11                move();
12                turnRight();
13            }
14            placeLeaves();
15            turnRight();
16            moveToWall();
17
18            while(frontIsClear()) {
19                move();
20
21                turnLeft();
22            }
23
24            moveToWall();
25        }
26    }
27
28    public void moveToTree() {
29        moveToWall();
30    }
31
32    public void moveToWall() {
33        while(frontIsClear()) {
34            move();
35        }
36    }
37 }
```



My code doesn't work.



Okay, what does your code do?



I can't read it.



Yeah me neither tbh



You Understand Your Code Best

- ➔ Section Leaders are GREAT at...
 - Clarifying logic and strategy
 - Debugging
 - Making you feel at peace
- ➔ You are just as good as Section Leaders at...
 - Reading (most) Eclipse errors
 - Fixing brackets { } and indentation (tab)
- ➔ You are BETTER than Section Leaders at...
 - Explaining your own code
 - Coding your own program

Programming takes practice.

Computers *execute* code,
but humans *read* code.

See You Later!



I will miss you.

Enjoy Java!

Call me maybe?

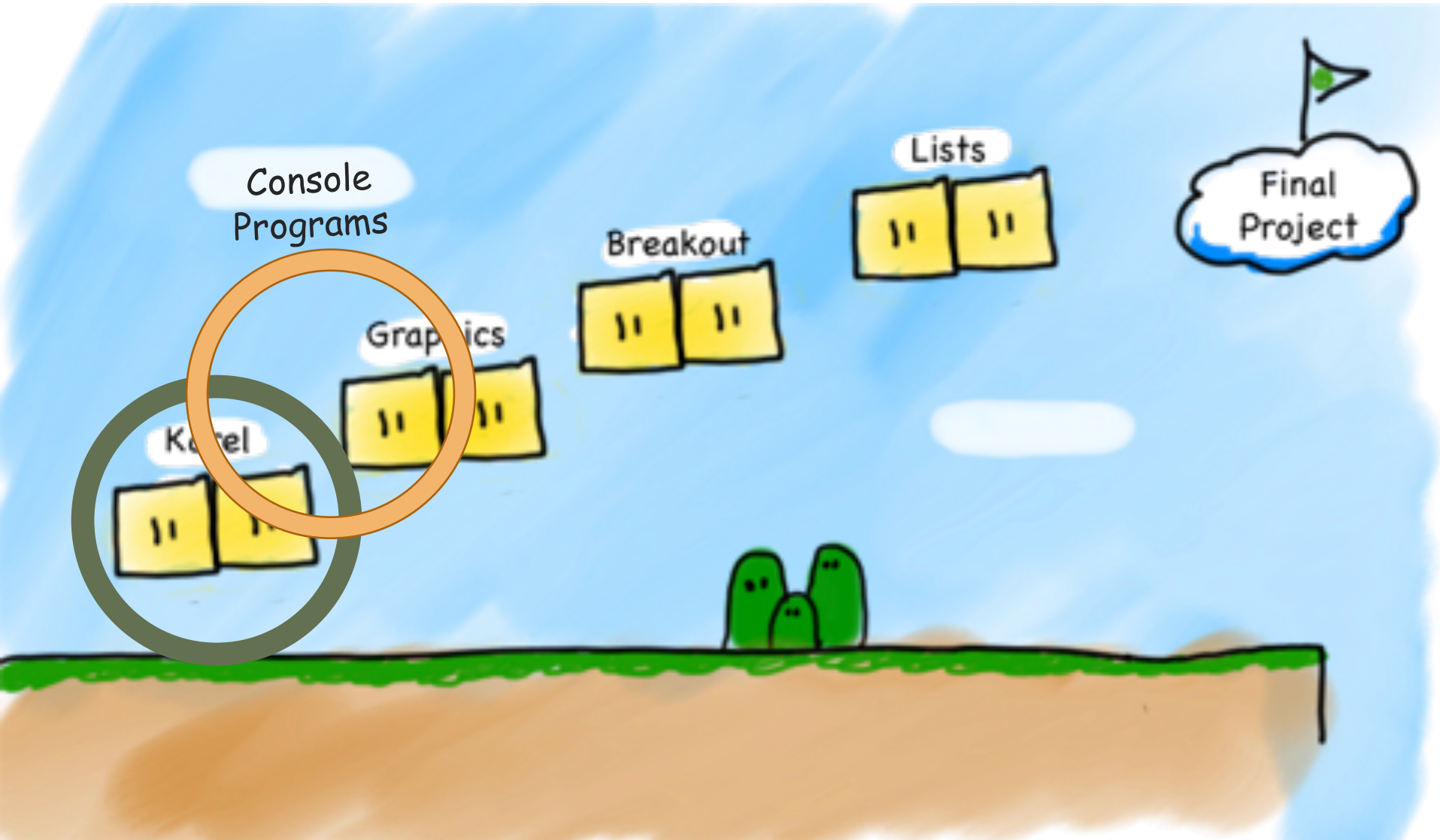


Carly Rae Jepsen - Call Me Maybe - YouTube

Java



Our First Step



Today's Goals

1. How do I write a console program?
2. What are variables and how do I use them?
3. How do I get user input in a console program?



Console Program



Takes text input

Prints text output

A screenshot of a terminal window with a grey title bar and an orange background. The title bar contains a home icon, a tilde '~', a double line '—', '-bash', and '80x24'. The main content area shows the text 'Last login: Mon Jul 3 17:20:41 on ttys007' followed by the prompt '/Users/Lisa \$' and a blue cursor block.

```
~ — -bash — 80x24
Last login: Mon Jul 3 17:20:41 on ttys007
/Users/Lisa $
```


First Console Program: Hello World

```
import acm.program.*;

public class HelloProgram extends ConsoleProgram {
    public void run() {
        println("hello, world");
    }
}
```



In Pop Culture



You had me at
"Hello, world"

Today's Goals

- ✓ 1. How do I write a console program?
- 2. What are variables and how do I use them?
- 3. How do I get user input in a console program?



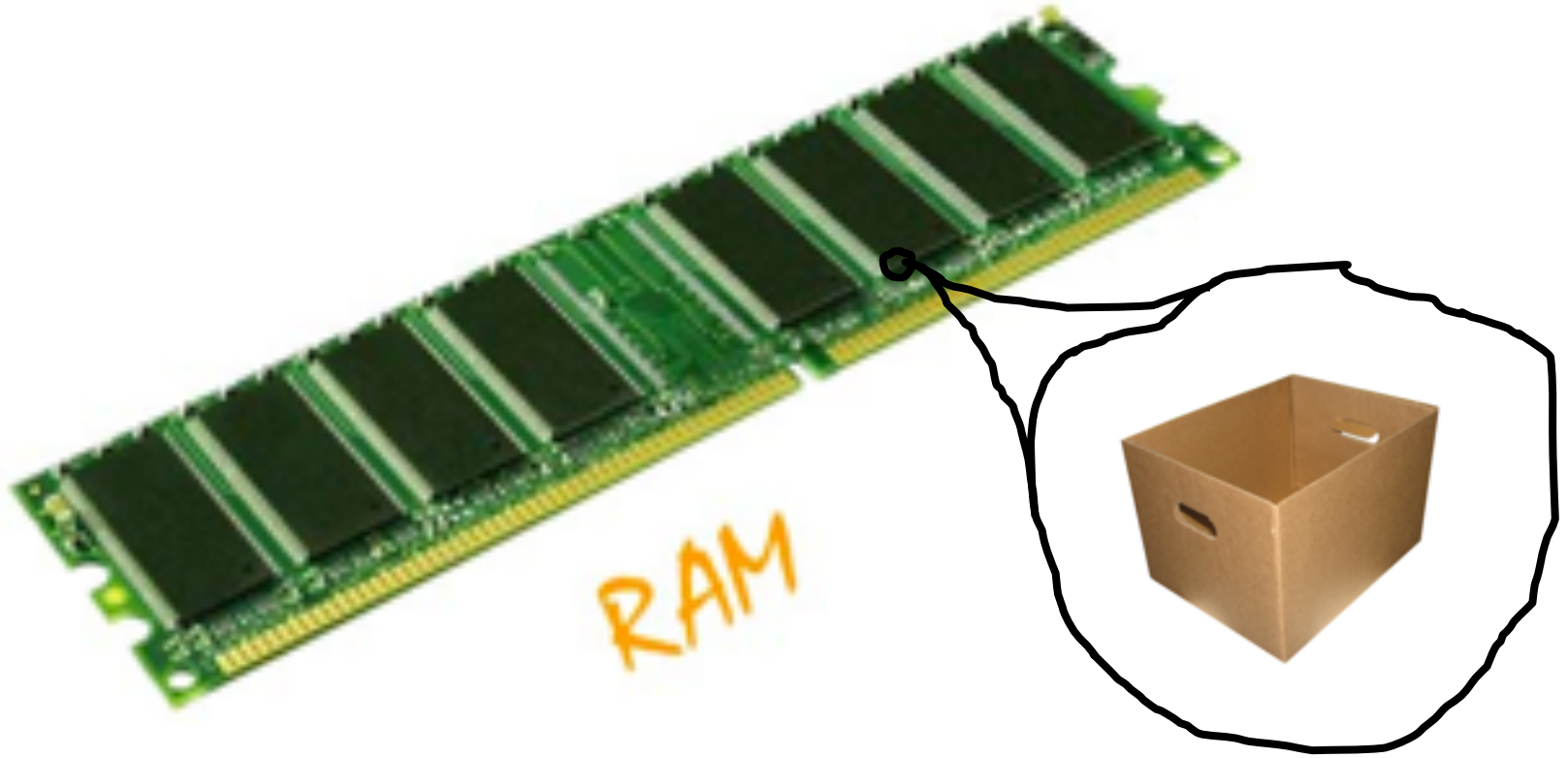
What is a variable?

[suspense]

Variables are Like Boxes



Teeny Tiny Boxes

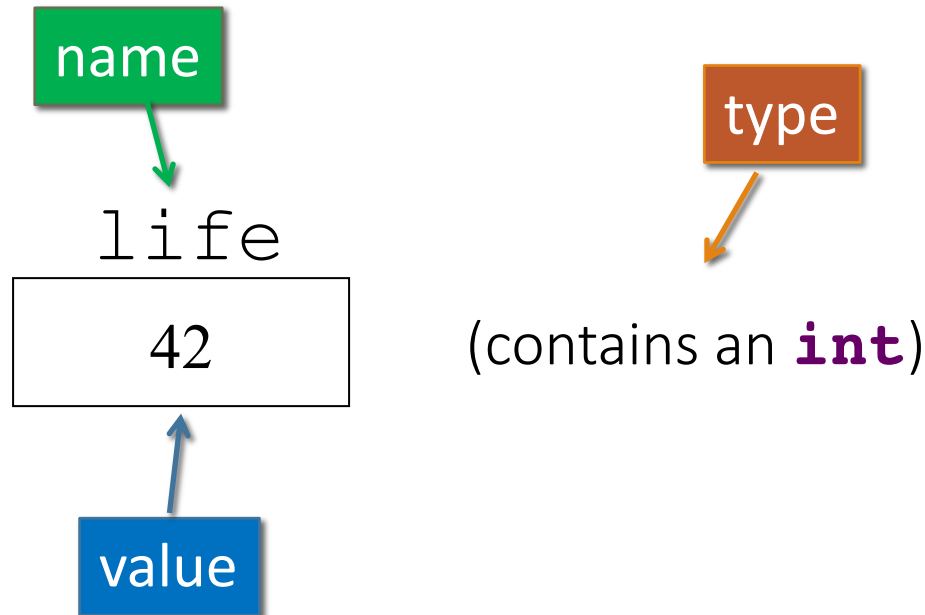


My computer has space for about 64 trillion boxes

Variables are Like Boxes

type	name	value
------	------	-------

```
int life = 42;
```



Types

```
// integer values
```

```
int num = 5;
```

```
// real values
```

```
double fraction = 0.2;
```

```
// letters
```

```
char letter = 'c';
```

```
// true or false
```

```
boolean isLove = true;
```

double: How Much Do I Weigh?



* Answers could be real valued numbers

int: How Many Children Do I Have?



* It is weird to say something like 1.7

Binary Operators

+ Addition

− Subtraction

* Multiplication

/ Division

% Remainder

Binary Operators

```
→ double width = 2.5; // meters  
→ double height = 3.0;  
→ double area = width * height;
```

name	width	height	area
value	2.5	3.0	7.5
type	double	double	double

Today's Goals

- ✓ 1. How do I write a console program?
- ✓ 2. What are variables and how do I use them?
- ③ 3. How do I get user input in a console program?



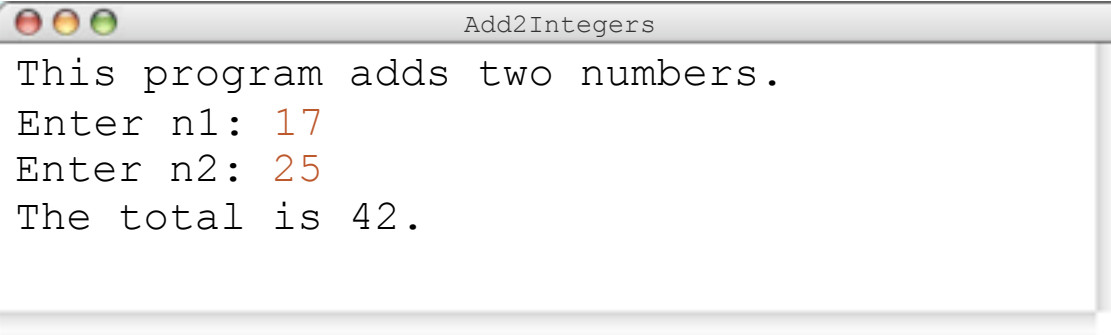
User Input

```
int a = readInt("Give me an int!");  
double b = readDouble("And a double");
```

Add2Integers

```
public class Add2Integers extends ConsoleProgram {  
    public void run() {  
        println("This program adds two numbers.");  
        int n1 = readInt("Enter n1: ");  
        int n2 = readInt("Enter n2: ");  
        int total = n1 + n2;  
        println("The total is " + total + ".");  
    }  
}
```

n1	n2	total
17	25	42

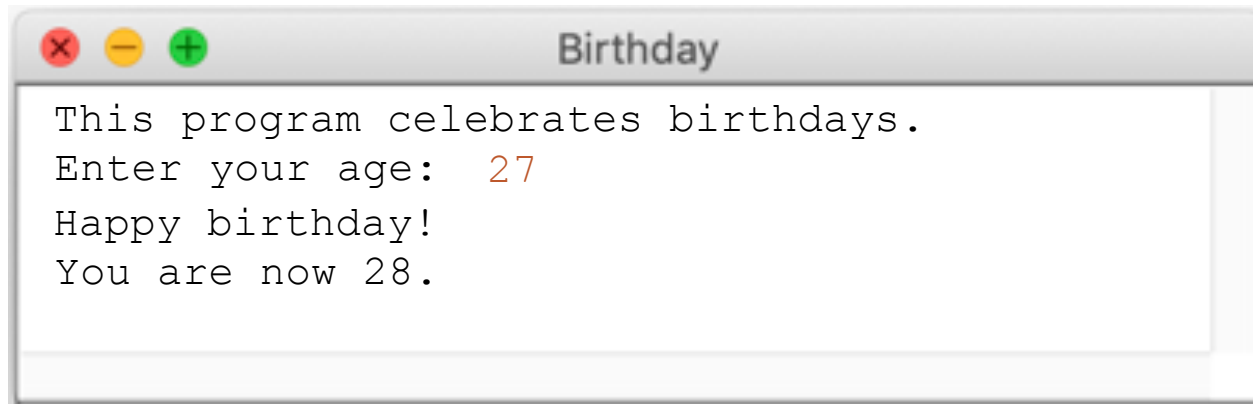


The screenshot shows a window titled "Add2Integers" with the following text:

```
This program adds two numbers.  
Enter n1: 17  
Enter n2: 25  
The total is 42.
```

Questions?

Birthday



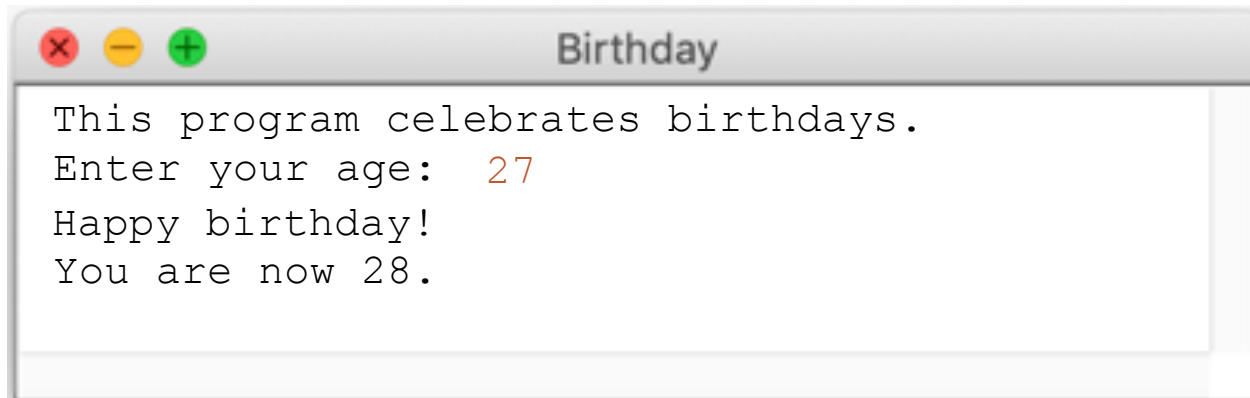
Birthday

```
public class Birthday extends ConsoleProgram {
    public void run() {
        println("This program celebrates birthdays.");

        // creates a new int variable age
        ???????????? = readInt("Enter your age: ");

        // increments the age variable by one
        ????????????

        println("Happy birthday!");
        println("You are now " + age + ".");
    }
}
```



The screenshot shows a window titled "Birthday" with a standard macOS-style title bar (red, yellow, and green buttons). The window contains the following text:

```
This program celebrates birthdays.
Enter your age: 27
Happy birthday!
You are now 28.
```

Let's try it!

Birthday

(1)

```
int age = readInt( "Enter your age: " );
```



(1) Get a new **int** box.



Birthday

(1) (2)

```
int age = readInt( "Enter your age: " );
```



(1) Get a new **int** variable.

(2) The variable's name is **age**.

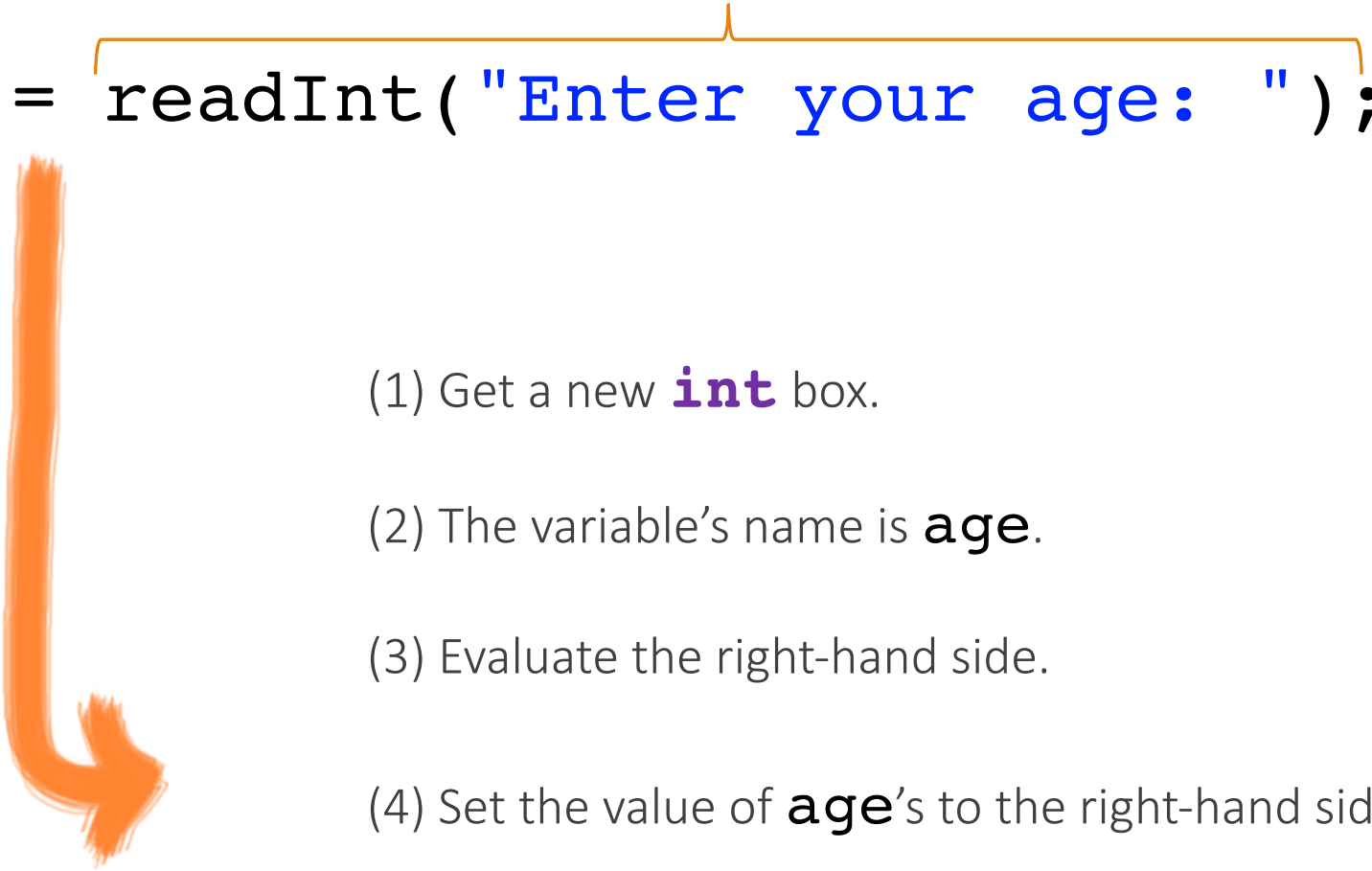
age



Birthday

(1) (2) (4) (3)

```
int age = readInt( "Enter your age: " );
```



(1) Get a new **int** box.

(2) The variable's name is **age**.

(3) Evaluate the right-hand side.

(4) Set the value of **age**'s to the right-hand side.

age

27

Incorrect Birthday

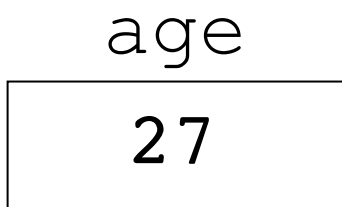
```
int age = readInt( "Enter your age: " );
```

(1) (2)

```
int age = age + 1;
```

(1) Get a new **int** box.

(2) The variable's name is **age**.



Duplicate
variable age

Birthday

```
int age = readInt( "Enter your age: " );
```

(1) (3) (2)

```
age = age + 1;
```

(1) Get the variable named **age**.

(2) Evaluate the right-hand side. 28

(3) Set the value of **age**'s to the right-hand side.

age

28

Questions?

What do you think this does?

```
println(1 / 2);
```

AHHHHHHH!!!!!!

```
println(1 / 2);
```


Resulting Type

int + **int** results in an **int**

double + **double** results in a **double**

int + **double** results in a **double**

* The general rule is: operations always return the most expressive type

Pitfalls of Integer Division

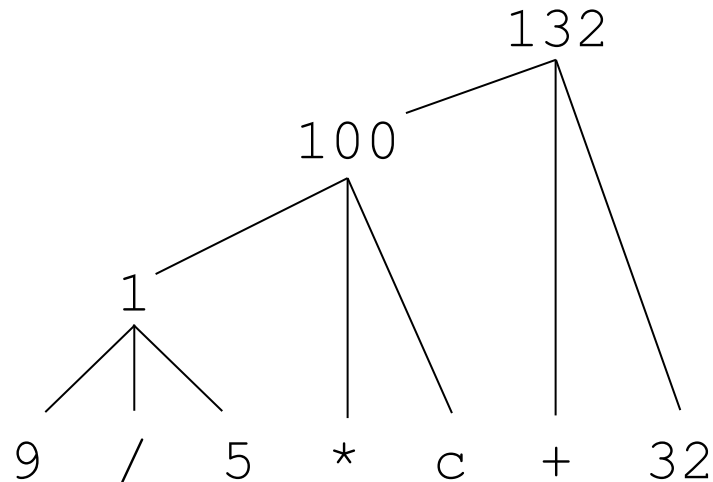
Convert 100 Celsius temperature to its °Fahrenheit equivalent:

```
double c = 100;  
double f = 9 / 5 * c + 32;
```



The computation consists of evaluating the following expression:

The problem arises from the fact that both 9 and 5 are of type `int`, which means that the result is also an `int`.

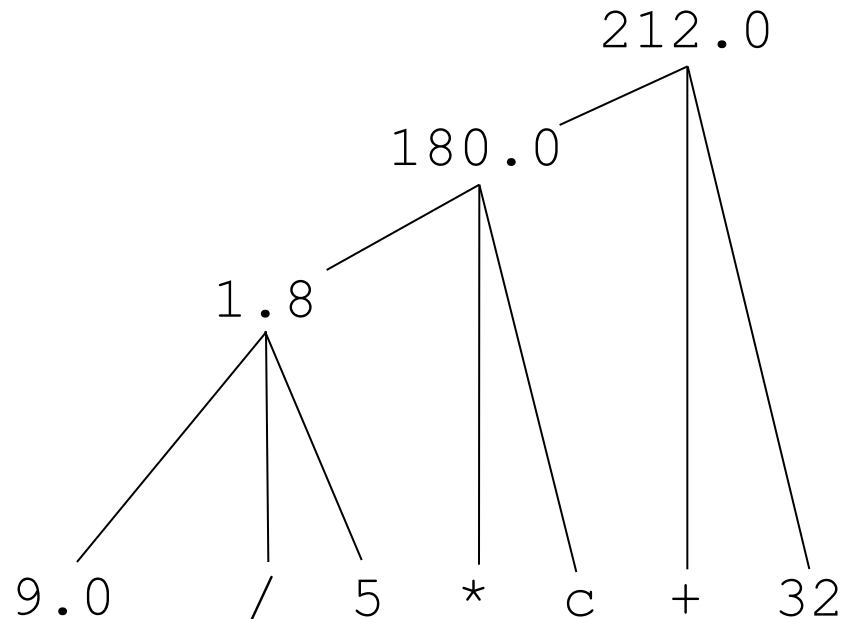


Pitfalls of Integer Division

You can fix this problem by converting the fraction to a **double**, either by inserting decimal points or by using a type cast:

```
double c = 100;  
double f = 9.0 / 5 * c + 32;
```

The computation now looks like this:



Conditions

Conditions

<	Less Than	==	Equal To
>	Greater Than	>=	More or Equal
		<=	Less or Equal

Equal or Equals equals?

Set variable

“equals”

=

```
double c = 100;
```

```
c = 25;
```

Equivalent

“equals equals”

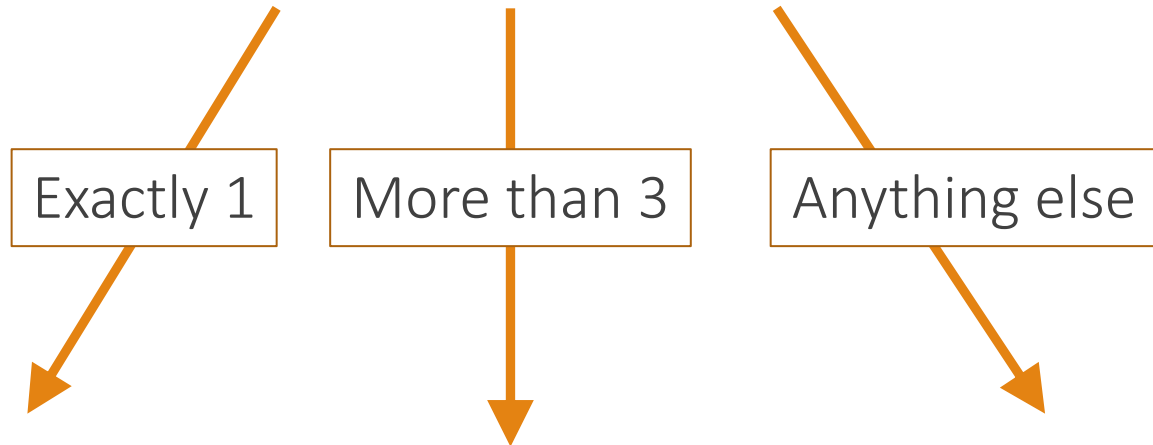
==

```
if (c == 100) {  
    println("Hi!");  
}
```

Music Lover



User enters
an **int**:



Print out:

You only
know Yolla!

Okay, you're
pretty cool.

I don't know
anymore.

Demo

Music Lover

```
public void run() {
    println("This program tells you if you are cool or nah.");
    int numberOfSongs = readInt("How many Tarkan songs can you name?");

    if (numberOfSongs == 1) {
        println("You only know Yolla!");
    }
    else if (numberOfSongs > 3) {
        println("Okay, you are pretty cool.");
    } else {
        println("I don't know anymore.");
    }
}
```

Today's Goals

- ✓ 1. How do I write a console program?
- ✓ 2. What are variables and how do I use them?
- ✓ 3. How do I get user input in a console program?




Sandcastles



Website

CS Bridge Handouts ▾ Projects ▾ Examples ▾ **Slides ▾**

 **Intro to Comp**

- Karel
- ControlFlow
- Variables**

