Java: Day 2

with
Project Include

Review

Operation	Definition	Syntax
Comments	Notes for yourself and other coders	//
Printing	Showing things to us, the user	System.out.println(“ ”);
Concatenating	Sticking text together to print the final result	System.out.println(“ ” + “ ”);

Review

Operation	Definition	Syntax
Variables	Hold things, like **strings** or **integers**	**varType varName =** varInfo
Strings	Sequences of text	**String** varName = “your string here”
Integers	Whole numbers	**int** varName = 10

Review

Operation	Definition	Syntax
Input	Gives the computer more information	System.out.println(“ Do this”); **String varName = reader.nextLine();**
Math	Addition (+) Subtraction (-) Multiplication (*) Division (/)	System.out.println(2+3); System.out.println(2-3); System.out.println(2*3); System.out.println(2/3);
Type conversion	Converting from one variable type to another; ex. string to integer	int intVar= Integer.parseInt(stringVar);

Your Code

tiny.cc/join-class

or plain code: tiny.cc/java-day2

repl.it/languages/java

Booleans & Conditions

Booleans: “true” or “false”

```
boolean myBoolean = true;
```

Conditions: “true” or “false”

- **String** conditions:

```
myString.equals("another string")
```

- **int** conditions:
  - == Equals
  - != Not Equals
  - > Greater Than
  - < Less Than

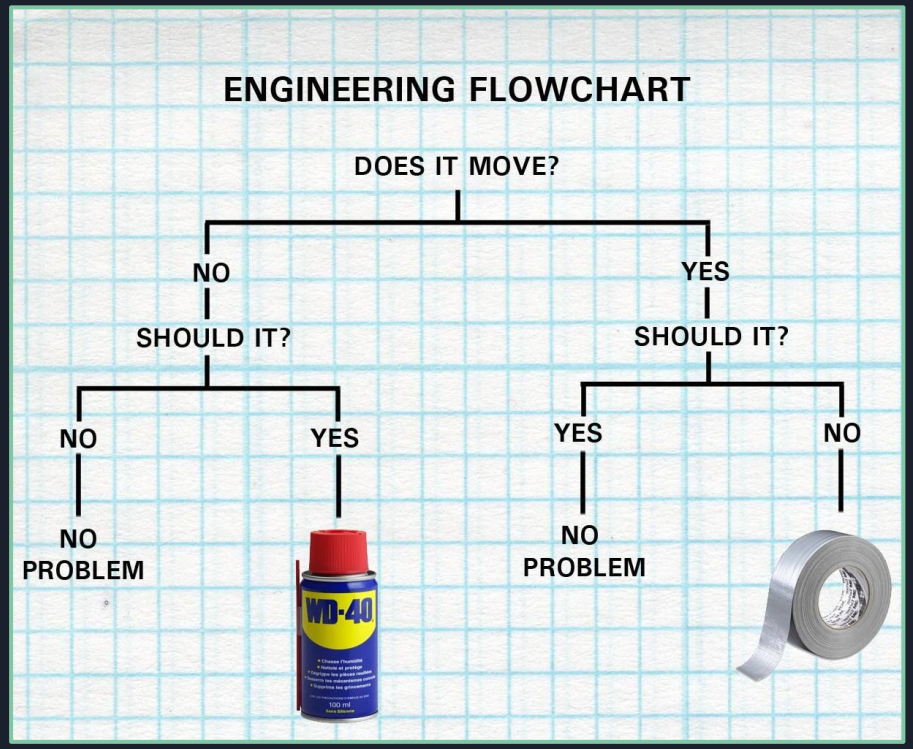
Try out one of each!

Conditions: “true” or “false”

```
String secret = "password123";
System.out.println(secret.equals("password123"));

int magicNumber = 249;
System.out.println(magicNumber > 300);
```

IF and ELSE


ENGINEERING FLOWCHART
DOES IT MOVE?
NO
YES
SHOULD IT?
SHOULD IT?
NO
YES
YES
NO
NO PROBLEM
NO PROBLEM
WD-40

IF and ELSE: making decisions

```
if ("a condition is true") {
  // Do something
}
else {
  // Do something else if condition is false
}
```

IF and ELSE: making decisions

```
if (myBoolean == true) {
  System.out.println("myBoolean must be true");
}
else {
  System.out.println("myBoolean must be false");
}
```

TRY: ask for a number, and say if it's positive or negative

IF and ELSE: making decisions

```
System.out.println("What number do you choose?");
int mysteryNumber = Integer.parseInt(reader.nextLine());

if (mysteryNumber < 0) {
  System.out.println(mysteryNumber + " is a negative number");
}
else {
  System.out.println(mysteryNumber + " is a positive number");
}
```

TRY: ask for a word, and say if it's equal to some secret word

IF and ELSE: making decisions

```
System.out.println("Say my name, and I disappear. What am I?");
String answer = reader.nextLine();

if (answer.equals("silence")) {
  System.out.println("You solved my riddle!");
}
else {
  System.out.println("Sorry, wrong answer.");
}
```

Calculator Challenge 2.0

Steps

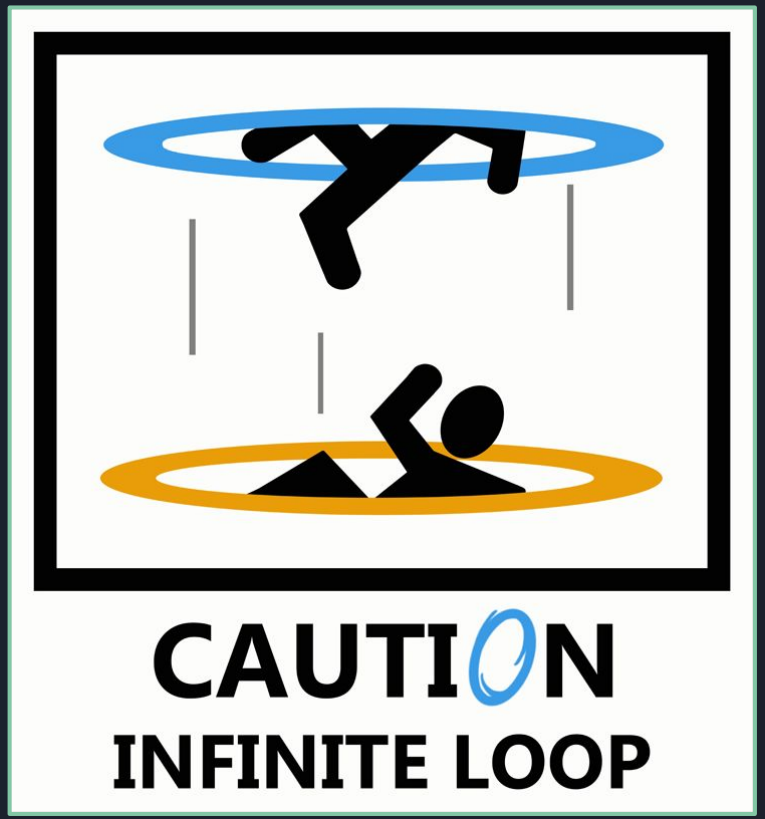
- Modify your previous calculator so that:
  - You ask the user if they want to add or subtract
  - You take in the user's response
  - Your code returns the answer that the user asked for

Result

```
System.out.println("What is the first number?");
int number1 = Integer.parseInt(reader.nextLine());
System.out.println("What is the second number?");
int number2 = Integer.parseInt(reader.nextLine());
System.out.println("Would you like to add or subtract?");
String operation = reader.nextLine();

if ((operation.equals("add"))) {
  System.out.println(number1 + number2);
}
else {
  System.out.println(number1 - number2);
}
```

WHILE Loops



WHILE: introducing repetition

```
while("a condition is true") {
  // Do something
}
```

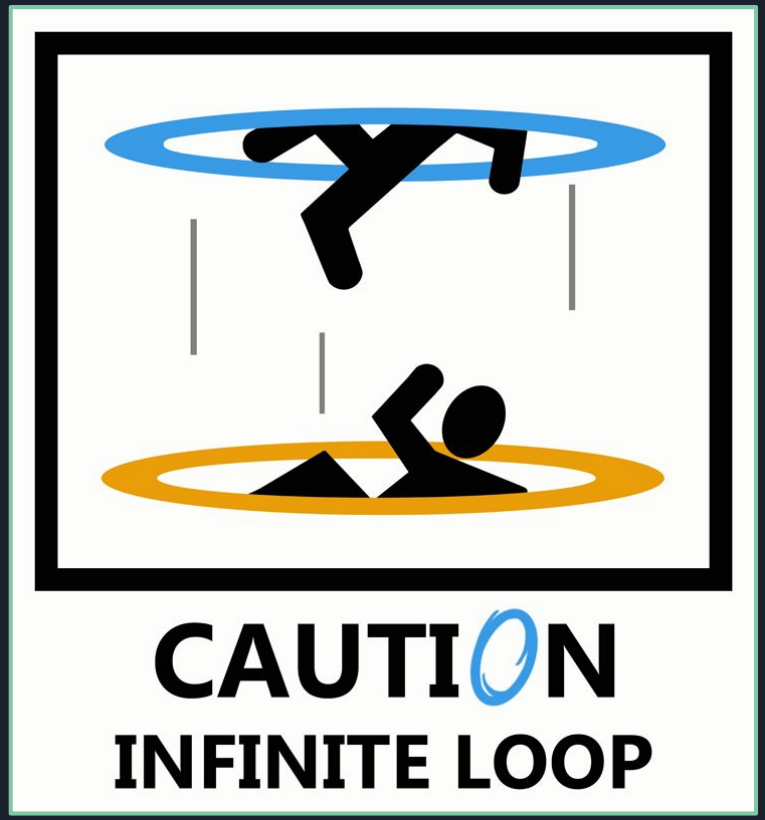
- Can run infinitely if the condition is always true!

Result: counting 0-9

```
int counter = 0;
while(counter < 10) {
    System.out.println(counter);
    counter += 1;
}
```

TRY: Modify this so it only prints even numbers!

FOR Loops



Factorial Challenge

Values of factorials

0! = 1
1! = 1
2! = 2
3! = 6
4! = 24
5! = 120
6! = 720
7! = 5 040
8! = 40 320
9! = 362 880
10! = 3 628 800
11! = 39 916 800
12! = 479 001 600
13! = 6 227 020 800
14! = 87 178 291 200
15! = 1 307 674 368 000
16! = 20 922 789 888 000
17! = 355 687 428 096 000
18! = 6 402 373 705 728 000
19! = 121 645 100 408 832 000
20! = 2 432 902 008 176 640 000

FOR: repetition simplified

```
for (int i = 0; i < 5; i++) {
    // Do something 5 times;
    // i = 0 --> 1 --> 2 --> 3 --> 4
}
```

- Now write a FOR loop to do the exact same thing as the WHILE loop you just wrote!

Result: counting 0-9

```
for (int i = 0; i < 10; i++) {
  System.out.println(i);
}
```

- Very compact, and takes care of all the counting

Factorials with FOR loops

- Factorial = “The product of all positive integers less than or equal to X”
- 5! = 1 * 2 * 3 * 4 * 5 = 120
- They grow *very* quickly!

TRY: ask for a number, then find the factorial of the number and print it out

Result

```
System.out.println("What number should we find the factorial of?");
int factorialNumber = Integer.parseInt(reader.nextLine());

int total = 1;
for (int i = 1; i < factorialNumber + 1; i++) {
  total = total * i;
}
```

PROBLEM:

Factorials get way too big.

How can we stop calculating?

Multiple Conditions

- && and
- || or
- ! not

```
if (animalColor.equals("white") && animalLegs == 4) {
  System.out.println("I must be a polar bear!");
}
```

```
else if (animalColor.equals("green") || animalLegs == 8) {
  System.out.println("I'm either a lizard or a spider?");
}
```

```
else if (!animalColor.equals("white") && animalLegs != 4) {
  System.out.println("I'm definitely NOT a polar bear then.");
}
```

TRY: Modify your factorial calculator so it stops working if the total grows above one million!

Limited Factorial Calculator

```
System.out.println("What number should we find the factorial of?");
int factorialNumber2 = Integer.parseInt(reader.nextLine());

int total2 = 1;
int i = 1;

while (i < factorialNumber2 + 1 && total2 < 1000000) {
  total2 = total2 * i;
  i += 1;
}

System.out.println("The factorial of " + factorialNumber2 + " =");
System.out.println(total2);
```

Feedback

tiny.cc/PI_feedback