S1B: Introduction

CS1101S AY20/21 Sem 1

Studio 1D

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Table of Contents

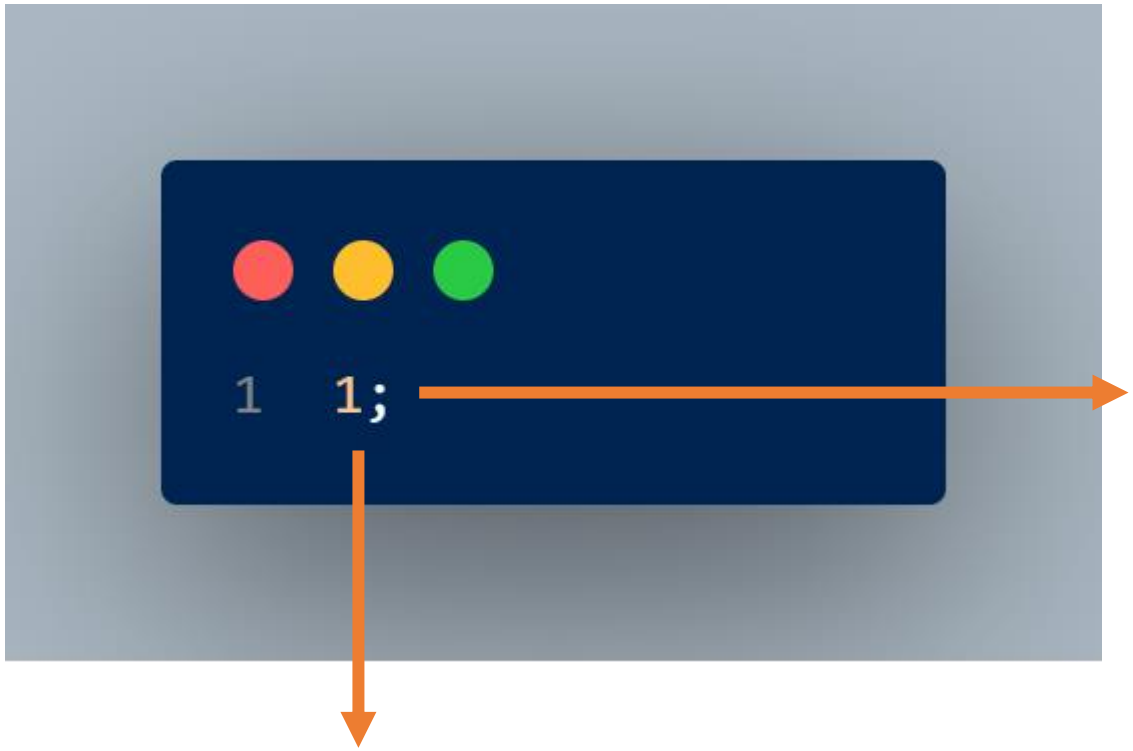
- Introduction to Source
- Primitives
- Combinations
- Abstraction
- Functions

Introduction to Source

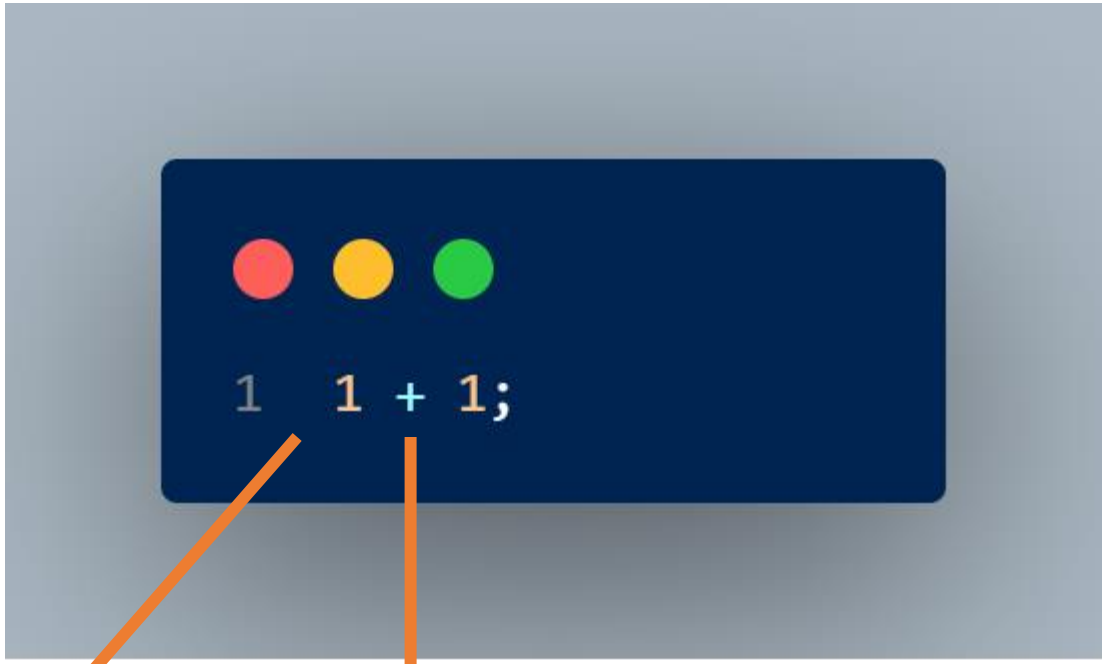
Javascript translation of Lisp

What Features Should a Programming Language Have?

Primitives


1 1;
Semicolon – to convert expression into program
Expression – in this case a number expression

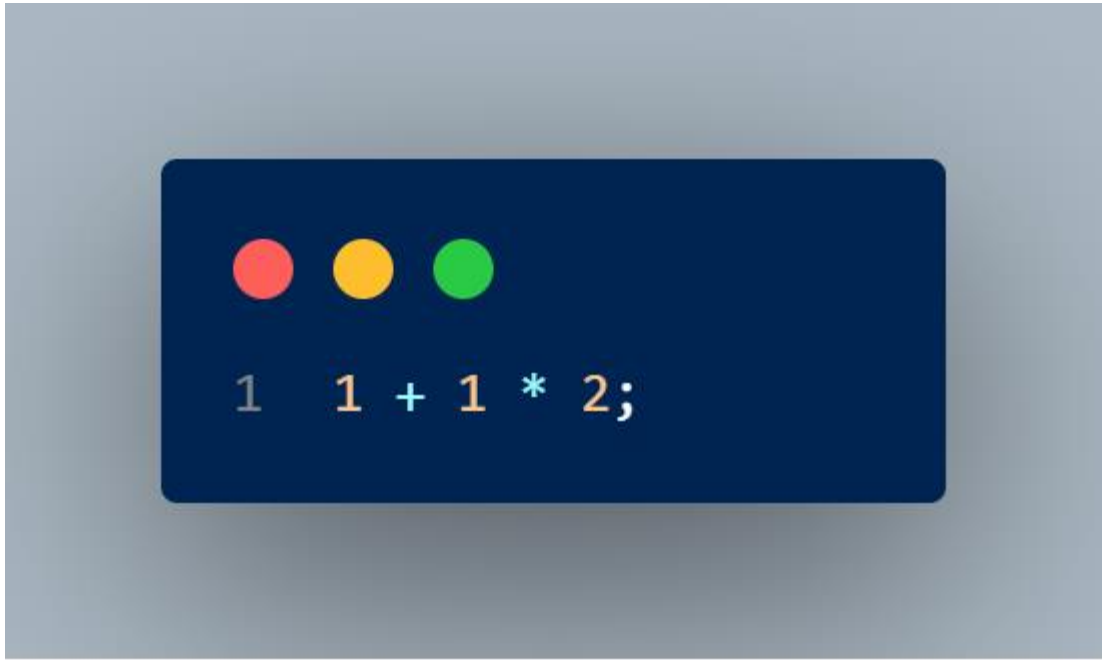
Combinations



1 + 1;

2;

Operator Precedence



1 + 1 * 2;

1 + 2;

3;

How do we model the real world?

How do we manage complexity?

Environment

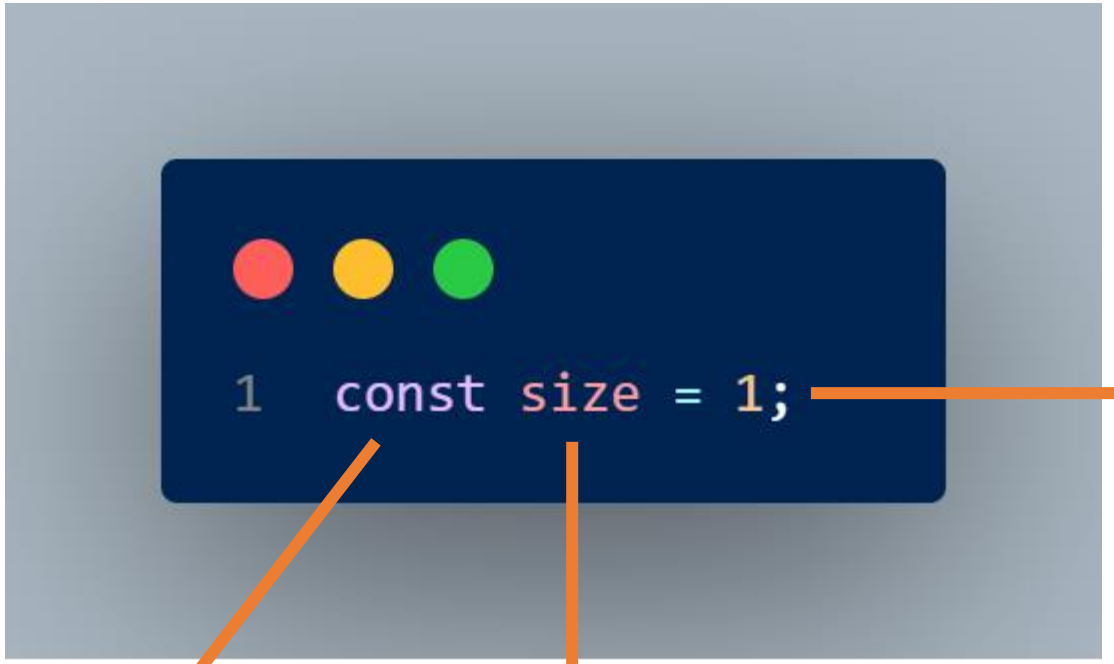
Purpose

The interpreter of JavaScript keeps track of an environment (table) that associates names with values.

Constant declarations

The keyword `const` adds a name-value entry to the table.

Naming



With a value 1

Keyword – declares a constant: adds name-value entry to environment

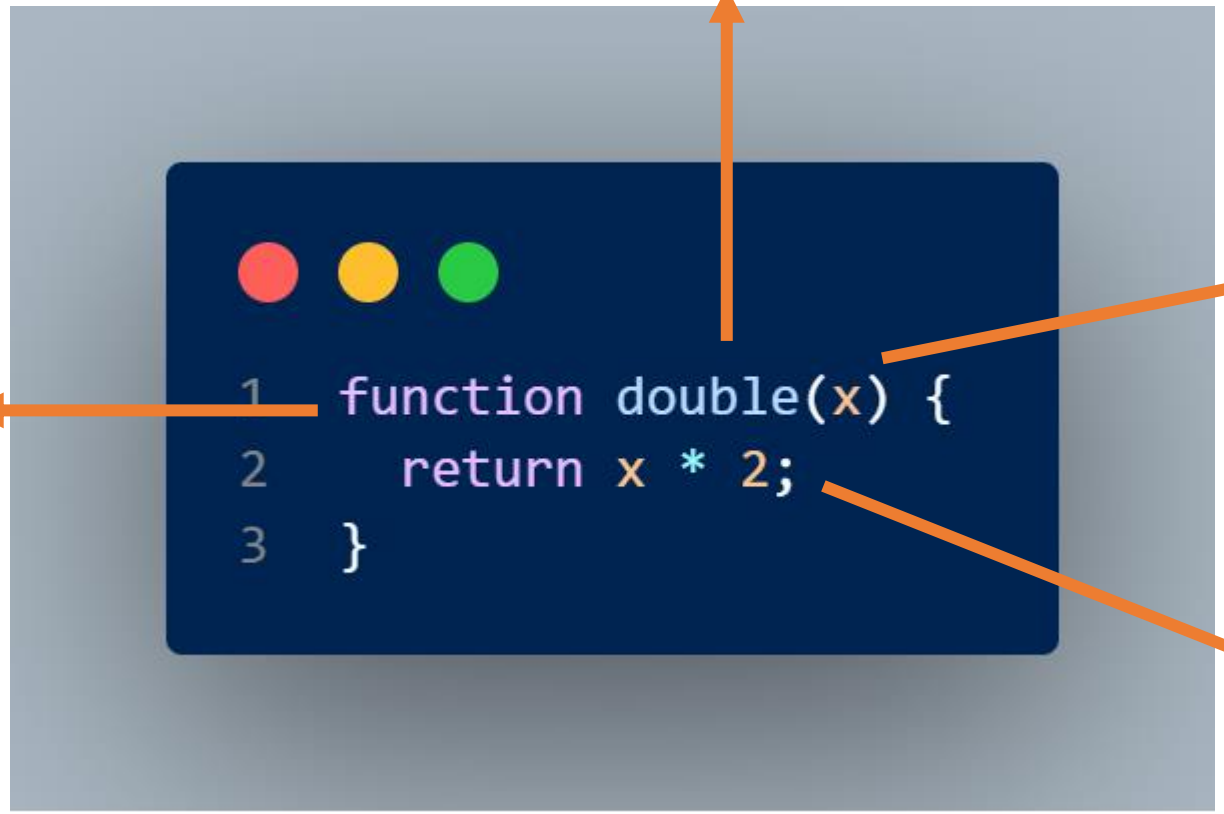
Name is “size”

Name	Value
size	1

Black-box Abstraction

Function Declaration

Name is "double"

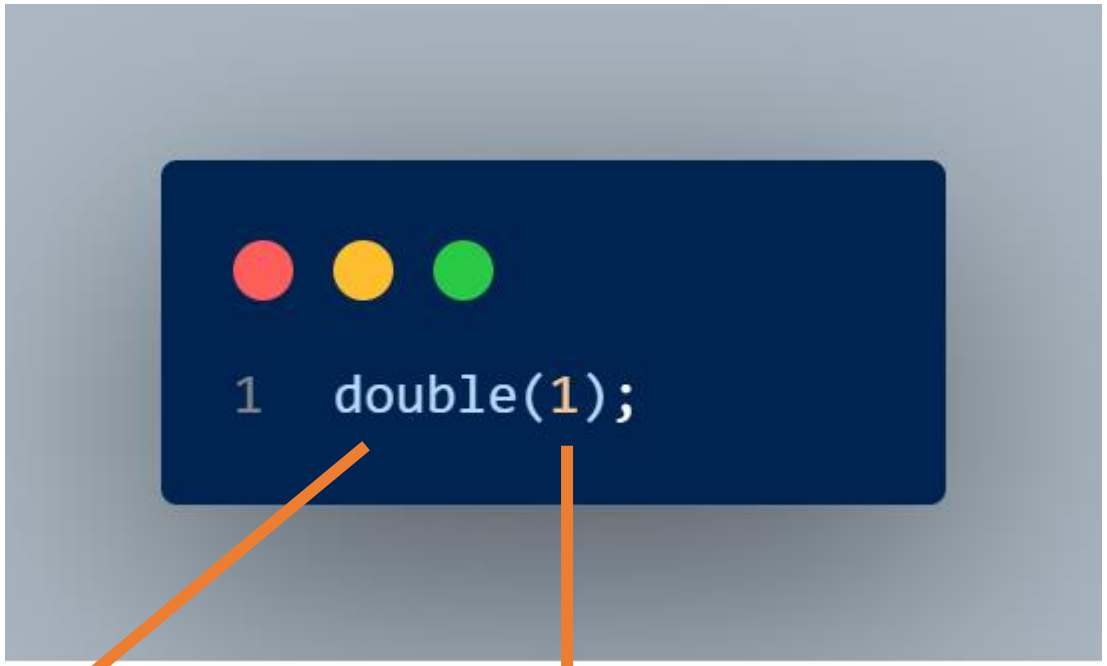


Keyword – declares a function: adds name-value entry to environment

Parameter: takes in a value and names it "x"

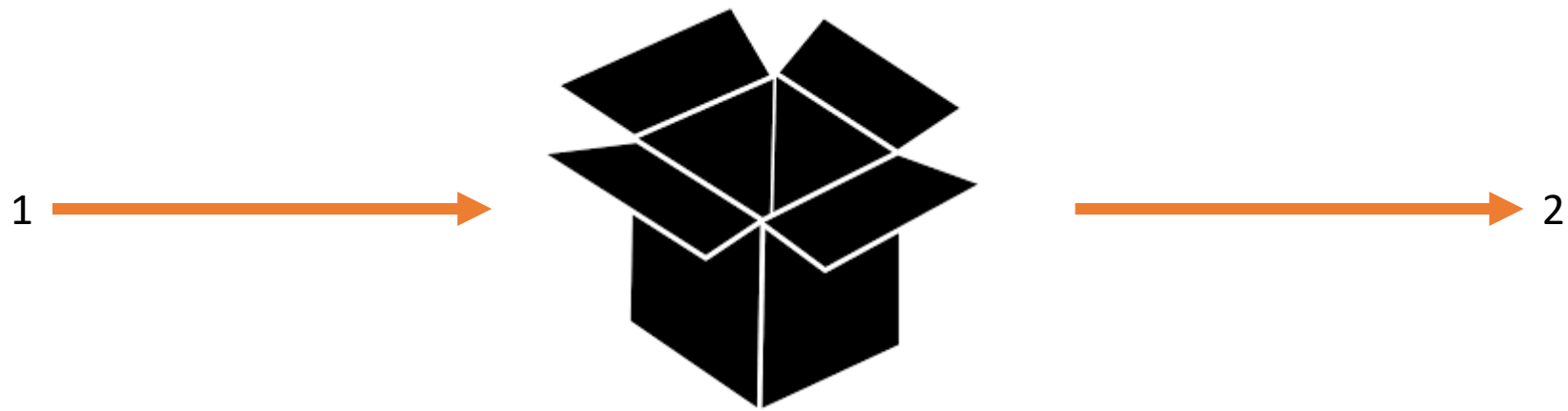
Returns x multiplied by 2

Function Application



Apply the function double using brackets

Pass in 1 as Argument


1
2
Double()

Pre-declared Functions and Constants

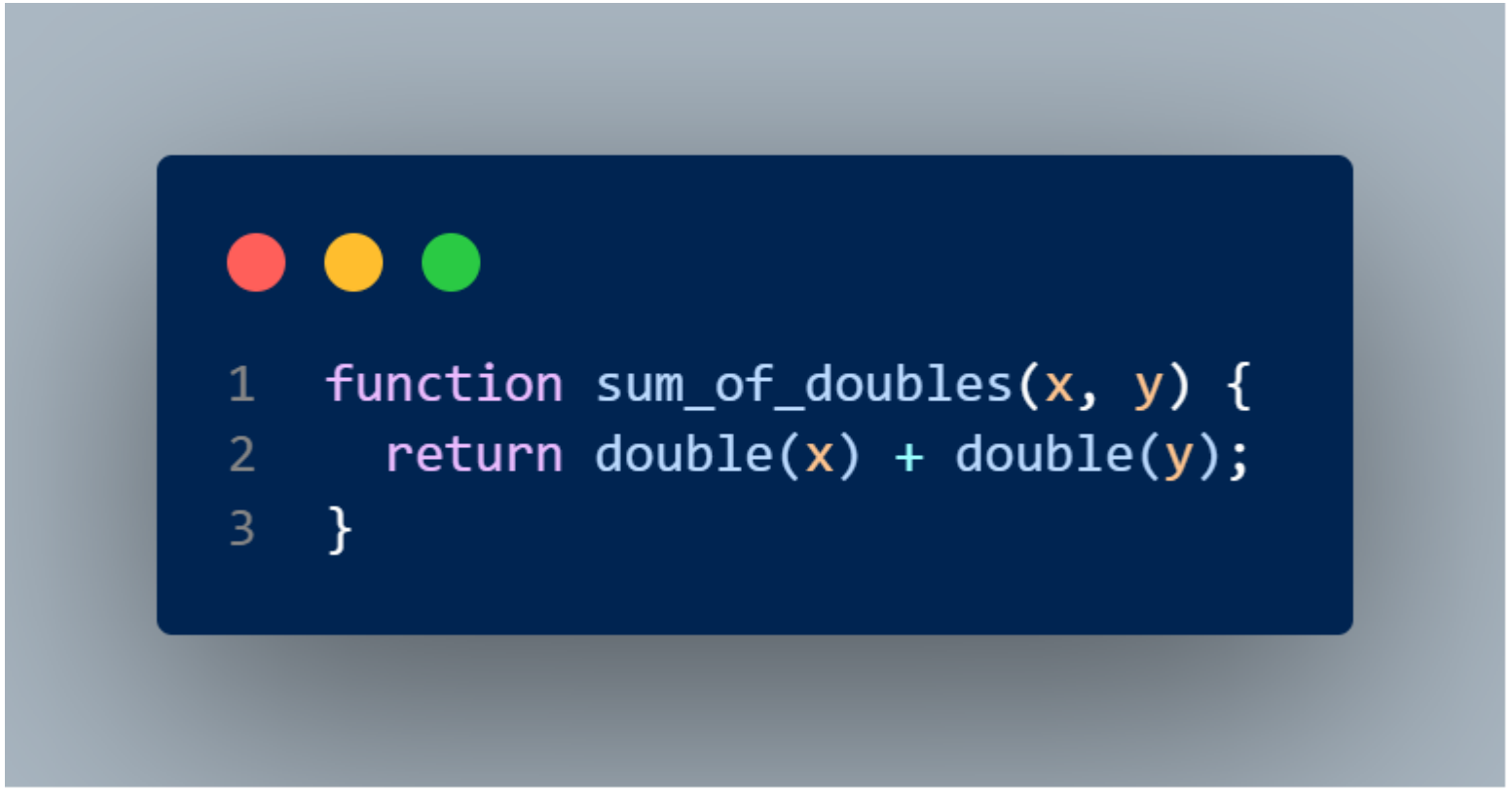
Pre-declared constants

Source has a few names pre-declared. For example, the name `math_PI` refers to the constant π.

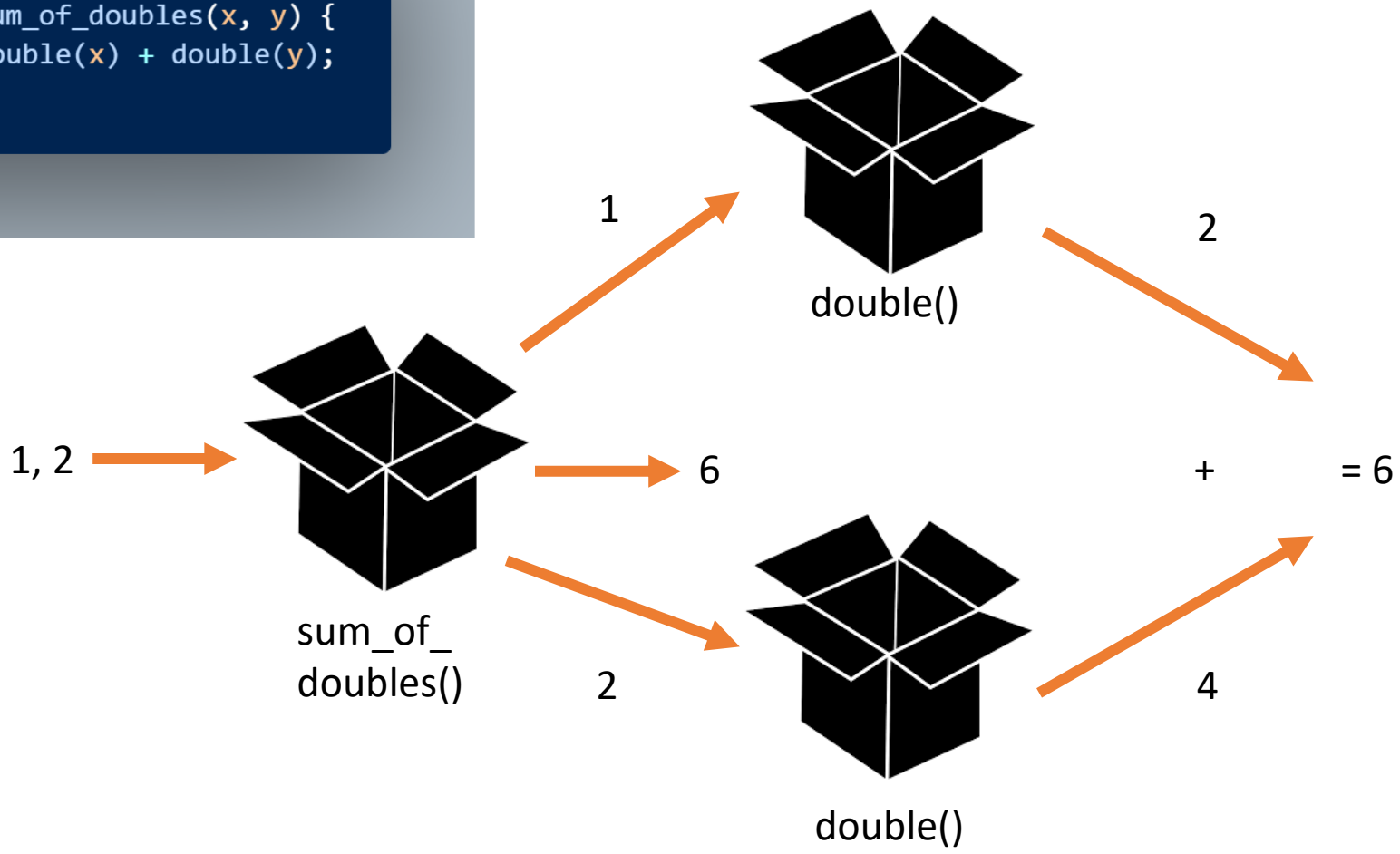
Pre-declared functions

In addition to operators such as +, Source has pre-declared functions. For example, `math_sqrt` is the square root function.

Compound Function



```
function sum_of_doubles(x, y) {
  return double(x) + double(y);
}
```



Booleans

Boolean values

The two boolean values `true` and `false` represent *answers* to yes-no questions

Predicates

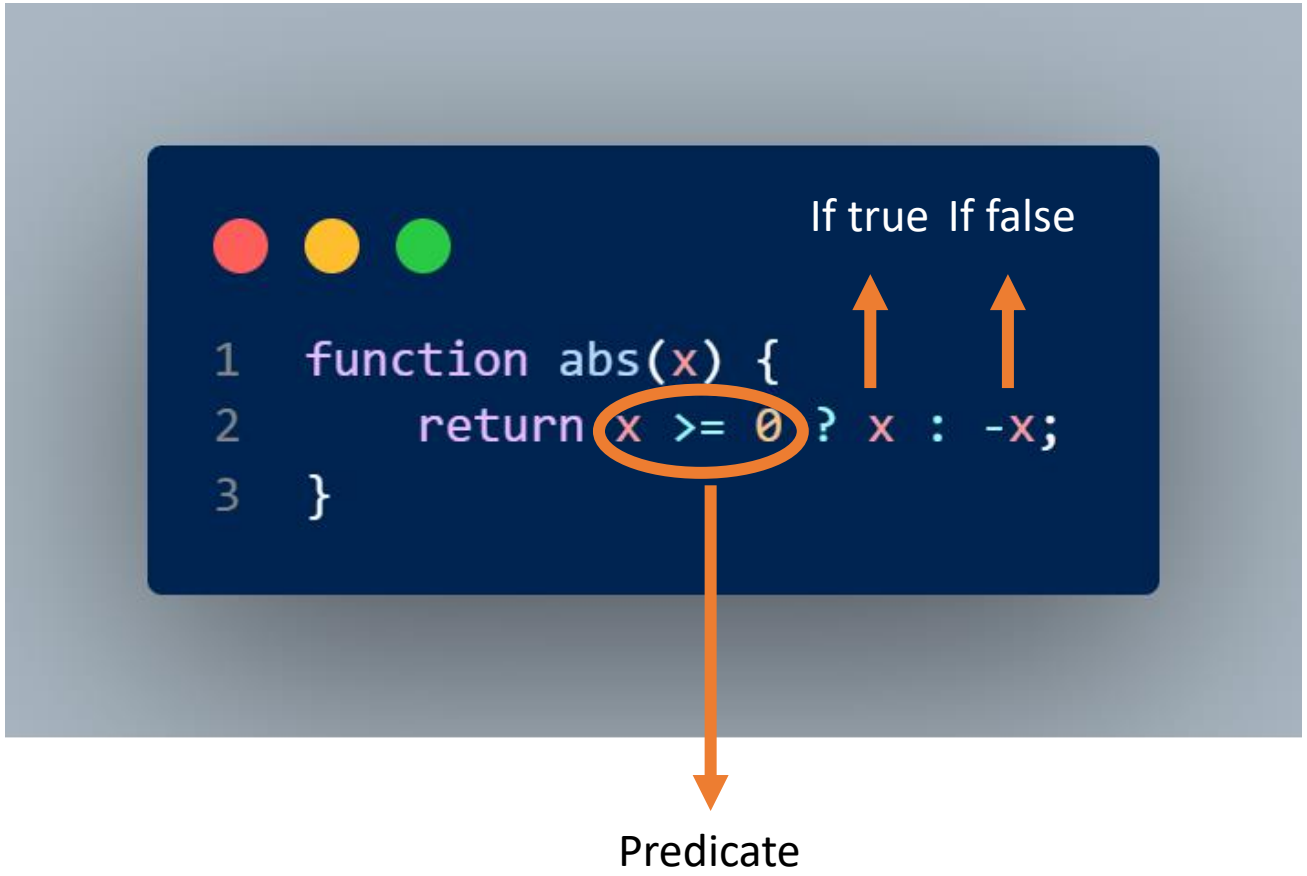
A *predicate* is a function or an expression that returns or evaluates to a boolean value.

Conditionals

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{otherwise} \end{cases}$$

Conditional Expression

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{otherwise} \end{cases}$$



Resources

- Lecture 1A
- Textbook: 1.1.1, 1.1.2, 1.1.4, 1.1.6

Shortcuts

- Autocomplete: tab
- Comment line: Ctrl + /
- Run program: Shift + Enter

Questions?

Studio sheet

Feedback

- https://leeweimin84964.typeform.com/to/vklpn325