

Programming Concepts

Single and open source of programming concepts.

Syntax and Semantics

Peter Norvig, in a blog post [1], explains syntax and semantics as follows. “The syntax of a language is the arrangement of characters to form correct statements or expressions; the semantics is the meaning of those statements or expressions.” Syntax and semantics are not unique concepts to programming, infact they are used in formal logic. Peter Smith [2] describes semantics as *meaning* and *truth*. He describes *syntax* as the grammar of logic-baese languages: “The syntax of a language tells us, which strings of symbols count as grammatical sentences” [2], p.72.

monad

A monad is composed of three functions and encodes control flow which allows pure functions to be strung together.

Pure functions

Pure functions always return the same output for a given input regardless of environment and cause no side effects.

Lambda functions

A lambda is an unnamed function.

Fold

Fold applies a function between elements of a list.

map

- On JavaScript `array1.map(x => x * 2);`

reduce

- `arr.reduce(callback(accumulator, currentValue, [, index[, array]])[, initialValue])`

filter

- **Python** `filter(func, iterable)` returns only elements in iterable when `func` returns `True` for the element.

Strings

- **Python**
 - `string.replace(x, y)`
 - `string.split(x)`
 - `string.count(x)`
 - `x.join(y)`
 - `string.find(x)`
 - `string.format(x,y,...)` Replaces {} with the given arguments.
 - `string.lower()`
 - `string.strip()`
 - `string.title()` Returns string in title case
 - `string.upper()`

Clojure Strings ## Installation

```
$ pip install sphinx
$ sphinx-quickstart
$ sphinx-build -b html sourcedir builddir
```

OR if you're using mkdocs

```
$ pip install mkdocs
```

Books

- **M. Scott.** Programming Language Pragmatics (2nd edition). Morgan Kaufmann, 2006.
- **J.C. Mitchell.** Concepts in programming languages. Cambridge University Press, 2003.
- **T.W.Pratt and M.V.Zelkowitz.** Programming Languages: Design and implementation (3rd edition). Prentice Hall, 1999.

Resources

- **Prof Alan Mycroft** - Cambridge course on Programming Concepts

Copyrights 2021 Sirvan Almasi

- [1] P. Norvig, “(How to Write a (Lisp) Interpreter (in Python)),” (*How to Write a (Lisp) Interpreter (in Python)*). Mar-2021.
- [2] P. Smith, *An Introduction to Formal Logic*, Second. Cambridge: Cambridge University Press, 2020.