CS 420 Advanced Programming Languages Fall Semester, 2022 Doc 1 Introduction Aug 23, 2022

Copyright ©, All rights reserved. 2022 SDSU & Roger Whitney, 5500 Campanile Drive, San Diego, CA 92182-7700 USA. OpenContent (http:// www.opencontent.org/openpub/) license defines the copyright on this document.

Course Issues

http://www.eli.sdsu.edu/courses/index.html

Waitlist Course Web Site Prerequisites Grading Books

Waitlist - How to get into a Class

Add yourself to the course waitlist

Instructors can not Add individuals to the class See who is on the waitlist Change your priority on the waitlist

Sep 2

Last day for regular students to add/drop classes

Last day to file for graduation

Office Hours

Tuesday & Thursday 10:30 am - Noon

Zoom: 914 283 418

Grading

1 exam About 5 assignments Final Exam

Course Website Demo

http://www.eli.sdsu.edu/courses/fall22/cs420/index.html

Prerequisites

CS 210 or CS 310 or CS 496 Data Structures

Books

Concepts of Programming Languages 12th Edition

The Rust Programming Language, <u>https://doc.rust-lang.org/book/</u>

Clojure for the Brave and True, Daniel Higginbotham No Starch Press, 2015, Available online through the library

Prolog Chapter 16 of Concepts of Programming Languages

C TBD

What is this Course About

Learning parts and variations in programming languages

Experiencing different programming paradigms

Understanding how languages work

Purpose of the course Make it easier for you to learn new languages

Lots of Material

Learning about languages

Concepts of Programming Languages - 1,000 pages

Learning Languages Rust Clojure Prolog C

Learning a New Language

Syntax

```
crt \leftarrow \{m|\omega+.\times\alpha(\neg \times \vdash |_{\circ} \supset \{0=\omega:1 \ 0 \ \cdot \ (\omega\nabla\omega|\alpha)+.\times 0 \ 1,_{;}1,-\lfloor\alpha\div\omega\})"\ddot{\sim}\alpha\div\ddot{\sim}m\leftarrow\times/\alpha\}
```

Semantics

applyTwice :: (a -> a) -> a -> a applyTwice f x = f (f x)

Libraries

Tools, Culture, Ways of Solving problems

Classifying Languages

Paradigms Procedural Object-Oriented Functional Data-Oriented Logical

Static vs Dynamic Typing

Memory Management

Interactive vs "Compiled"

Why Rust

New hot language

Fast & Safe

Replacement for C, C++

New ways of dealing with memory management & concurrency

Why Clojure

Functional lisp variant

Immutable data

Code is data

Data-Oriented Programming

Why Prolog

Logic Programing

Why C

Pointers



https://insights.stackoverflow.com/survey/2021#top-paying-technologies-18 programming-scripting-and-markup-languages

\$59,454

\$59,454

\$59,172

\$58,910

\$58,368

Loved VS Dreaded

Rust	86.98% 13.02%					
Clojure	81.12% 18.88%					
TypeScript	72.73%	2	7.27%			
Elixir	72.11%	2	7.89%			
Julia	70.69%		2	9.31%		
Python	67.83%			32.17%		
Dart	63.77%			36.23%		
Swift	63.56%			36.4	4%	
Node.js	63.22%			36.78%		
Go	62.74%			37.2	6%	
F#	62.44% 37.56%			5%		
C#	61.96% 38			38.04	1%	
SQL	61.83% 38.17%				7%	
Kotlin	61.55% 38.			38.45	5%	
JavaScript	61.51%	38.49%			9%	
HTML/CSS	60.19%	39.81%				
Crystal	59.44%	40.56%				
Bash/Shell	56.34%	43.66%				
LISP	55.29%	44.71%				
Erlang	53.76%	46.24%				
Ruby	53.24%	46.76%				
Haskell	53.00%	47.00%				

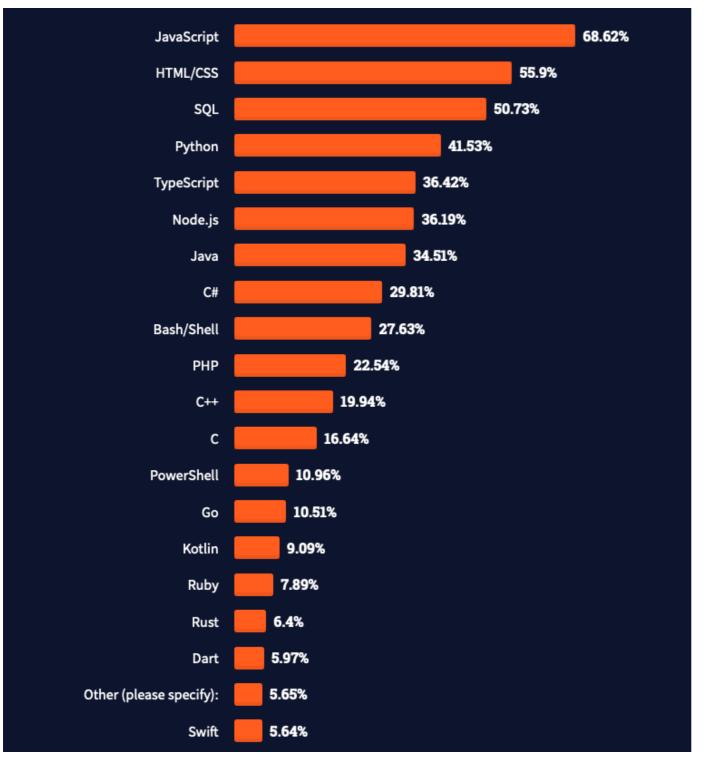
Scala	52.28%			47.72%			
APL	50.75%			49.25%			
C++	49.24%			50.76%			
Delphi	47.37%			52.63%			
Java	47.15%			52.85%			
R	44.23%			55.77%			
PowerShell	43.43%			56.57%			
PHP	40.24%			59.76%			
С	39.56%			60.44%			
Perl	36.00%			64.00%			
Assembly	33.92			66.08%			
Groovy	31.99%			68.01%			
Objective-C	26.93%	73.07%					
Matlab	21.61%	78.39%					
VBA	20.61%	79.39%					
COBOL	15.79%	84.21%					

Loved Dreaded

https://insights.stackoverflow.com/survey/2021#most-loved-

I9 dreaded-and-wanted-language-love-dread

What They use Professionally



https://insights.stackoverflow.com/survey/2021#section-most-

²⁰ popular-technologies-programming-scripting-and-markup-languages

TIOBE Index for August 2022

Python	15.42%		
С	14.59%		
Java	12.40%		
C++	10.17%		
C#	5.59%		
Visual Basic	4.99%		
JavaScript	2.33%		
Assembly language	2.17%		
SQL	I.70%		
PHP	1.39%		
Swift	I.27%		
Classic Visual Basic	I.27%		
Delphi/Object Pascal	I.22%		
Objective-C	I.22%		
Go	0.98%		
R	0.92%		
MATLAB	0.90%		
Ruby	0.82%		
Fortran	0.81%		
Perl	0.72%		

https://www.tiobe.com/tiobe-index/