COSE212: Programming Languages

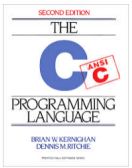
Lecture 22 — Course Review

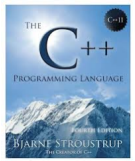
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2026 Fall

About This Course (from Lecture 0)

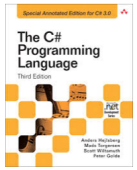
This course is *not* about

- to learn particular programming languages



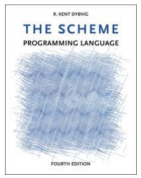















- to improve your "programming skills" (e.g., tools, libraries, etc)

Instead, in this course you will learn

- fundamental principles of modern programming languages
- how programming systems are designed and implemented
- thinking formally and rigorously

To succeed in this course, you must

- have basic programming skills
- be familiar with at least two PLs (e.g., C, Java)
- have taken Theory of Computation, Discrete Math, etc
- be prepared to learn new things

Design and Implementation of Programming Languages (from Lecture 0)

We will learn programming language concepts by designing and implementing our own programming language system.

- We will define a programming language. For example, "factorial" is written in our language as follows:

```
let x = read in
letrec fact(n) =
  if iszero n then 1
  else ((fact (n-1)) * n)
in (fact x)
```

- We will design and implement an interpreter for the language:

$$\text{Program} \rightarrow \boxed{\text{Interpreter}} \rightarrow \text{Result}$$

- We will design and implement a type checker for the language:

$$\text{Program} \rightarrow \boxed{\text{Type Checker}} \rightarrow \text{Safe/Unsafe}$$

Checklist

Have you pick up the following ideas from this course?

- Designing programming languages (i.e., syntax and semantics)
- Implementing programming languages (i.e., interpreters)
- Detecting runtime errors at compile-time (i.e., type system)

Applications of Programming Language Foundations

A good understanding of programming language foundations is essential for

- Software engineering
- Software security
- Software analysis
- ...

한 학기 수고 많았습니다!