CS 410P/510

PROGRAMMING LANGUAGE

COMPARISON

9/27/22
Compiler Structure
Program Representations
Machine Code Generation
Register Allocation
Garbage Collection
Dataflow Analysis
Optimization
Efficient Implementation
Correctness (+ Verification)
HIGH LEVEL

EXPRESSIONS
STRUCTURED CONTROL
DATA TYPES
FUNCTIONS (LOCAL DATA)
MANAGED MEMORY

LOW LEVEL

PRIMITIVE INSTRUCTIONS
FLAT MEMORY + LIMITED REASONS
LABELS + (CONDITIONAL) JUMPS
EVERYTHING IS BITS
Errors <- Parse + Scanner
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Abstract (AST) -> Interpreter

Errors <- Static Analysis
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AST' -> IR Generator

(Machine-Independent)

Optimiser

Intermediate (IR)

Intermediate Language

High Performance Interpreted

Optimised

Machine Code (Assembly Code)

Binary

Running System

2 Pass Compiler

Binary Code Image