

## CSCI 330 (Programming Languages)

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### Review Sheet for Exam 1

This is intended as a guideline for studying for the first exam... but only as a guideline! I wouldn't have covered something if I didn't think it was important. If you are wondering about a topic and you don't see it here, ask me!

Approximate point distribution:

- 25-30% Chapter 1
- 65-70% Chapter 3
- 5-10% OCaml and functional programming

Sample Types of Questions

- Short answer, multiple choice and true/false, fill-in-the-blank
- Problem solving, for example:
  - Context-free grammars, parse trees, derivations
  - Attribute grammars
  - Operational semantics for program statements
  - Denotational semantics rules
  - Weakest preconditions
  - Simple program proof
  - Give the output of OCaml code
  - Write simple OCaml code

Chapter 1

- Language evaluation criteria (readability, writability, reliability, cost)
- Orthogonality
- Influences on language design (computer architecture, programming methodologies..)
- Language categories (imperative, functional, logic.. object-oriented?)
- Implementation methods (compilation, interpretation, hybrid)

Functional Programming

- Based on mathematical functions, lambda expressions
- No variables, no iteration
- Referential transparency
- Pattern matching
- OCaml code (understanding and writing simple functions. Writing tail recursive functions will not be required on this exam)
- Simple recursion vs tail recursion

Chapter 3 (Semantics)

- Definitions (lexemes, tokens, recognizer, generator)
- BNF and Context-Free Grammars, derivations and parse trees
- Ambiguity in grammars, operator precedence, left vs right associativity
- Attribute grammars
- Operational semantics (uses, basic concepts)
- Denotational semantics (uses, understanding rules)
- Axiomatic semantics (assertions, weakest preconditions, simple proofs)