

CS/CIS Comprehensive Exam—Fall 1998
Programming Languages

Instructions: Please answer all the questions directly on the exam itself. Answer 10 of the following 14 questions in four or five sentences.

1. Explain the *principle of orthogonality* in programming language design.
2. The word “paradigm” means a theoretical framework within which theories, laws, and generalizations are formulated. What programming language paradigms are there? Explain.
3. Give an example of an ambiguous grammar.

4. What is the difference between static and dynamic scoping? Give a simple program that distinguishes them.

5. What is a variant record? What good are they? Give a scenario in which a variant record is appropriate. How are variant records allocated at runtime?

6. Write a subprogram that determines the order of operand evaluation.

7. What advantage does Ada's `exit` statement have over C's `break` statement?

8. Write a simple program that distinguishes pass by reference and pass by value result. Explain.

9. What is the purpose of the `display` in the implementation of ALGOL-like languages?

10. Write a very short C or C++ program that demonstrates that these languages do no inter-module type checking.

11. Name some differences in the way exception handling is done in different languages. Give examples from specify programming languages (do not use PL/I).

12. What does the following Scheme function do?

```
(define (y s lis)
  (cond
    ((null? lis) () )
    ((equal? s (car list)) list)
    (else (y s (cdr list)))))
```

13. What is meant by the *closed world assumption* in PROLOG?

14. What objected-oriented features are different in Java than in C++?