1. Why do we study programming languages? (Give three reasons)

2. One day your project manager decides that every new program your team produces is to be written in machine language, since computers don't understand C++ anyway. Other than referring them to a therapist, what are some things you could tell them to alleviate the situation?

3. Define programming language:

4. What is the fetch-execute cycle?

5. What was the first high level language?

6. Who invented Fortran?

7. When was Fortran invented?

8. What is the only high level structure in Fortran?

9. What was the purpose of the do-loop with regards to efficiency?

10. Define a compiler

11. D efine an Interpreter:

12. H ow does a compiler differ from an interpreter?

13. W hat did the loader do in the first assignment (psuedo-code interpreter)?

14. E xplain how psuedo-code interpreters are related to virtual computers.

15. H ow many IO statements did Fortran have?

16. H ow was floating point calculation handled in the earliest computer systems?

17. N ame each advance related to the IBM 704 as discussed in class.

18. H ow were Fortran subprograms compiled with respect to the entire program?

19. E xplain how Fortran implemented recursion.

20. W hat is static allocation?

21. W hy are GOTO statements considered harmful?

22. D efine the Static Structure Principle

23. D efine the Zero, One, Infinity Principle

24. D erive the Fortran 1-D addressing equation

25. D erive a 2-D addressing equation from the previously derived equation.

26. W hat is the origin of Fortran control structures?

27. FORTRAN Syntax/Semantics
    (a) Do loop

    (b) Arithmitic IF

    (c) GOTO statement

    (d) Common block

    (e) EQUIVALENCE statement

28. A LGOL Statistics

(a) Year?

(b) Who invented it?

(c) Name three objectives/goals for the newly created ALGOL.

(d) Explain the main difference between ALGOL-60 and ALGOL-58.

(e) Practically nobody wrote programs for ALGOL and its definitly not used today. Why is it such a big deal?

(f) Why did nobody write programs for ALGOL?

29. BNF

(a) What does BNF stand for? (hint: its not Best New Friend)

(b) Who invented BNF

(c) Where was it first used?

(d) What is the purpose of BNF?

30. Define variable scope within the context of programming languages

31. Explain the dangling-else problem.

32. How long does each of the below scopes bind a variable to an address?
    (a) Global

    (b) Function

    (c) Block

33. What is the name of the area in memory that stores variables?

34. Isn't a compound statement just a fancy word for a block? Why/Why not? What is a block anyway?

35. Define feature interaction in the context of programming languages.

36. Name one feature interaction in FORTRAN.

37. What is dynamic scoping?

38. Define Grammar in the context of programming languages.

39. How do we define a Grammar for a programming language?

40. What is the syntax of the rewrite rule?

41. Produce a parse tree for the statement 'b c f d f' with the below grammar using a top down technique:

    $\langle S \rangle \rightarrow$ b ¡A¿ ¡S¿ — ¡B¿

    $\langle A \rangle \rightarrow$ ¡A¿ ¡B¿ d — c

    $\langle B \rangle \rightarrow$ f

42. Define parsing

43. List Chomsky's four types of grammar

44. Which types can today's programming languages parse?

45. Draw a link list structure for the following LISP code
    (car (cons '(a b c) (cdr (cons '(a b) '(c d)))))

46. What would be the results of the following LISP commands?
    (a) (cons '(too) '(be or not (to be)))

47. What ALGOL-60 feature does Jensen's device rely on?

48. Pascal Statistics
    (a) Year?
    (b) Who invented it?
    (c) What was Pascals contribution to programming languages?