

CS328, Winter 2000, Test 1

Time 75 min. Use extra paper as needed, but make sure to identify each answer.

YOU MUST RETURN THIS PAGE. NAME _____

- 1 You have a computer with a standard 2-stage Pascal compiler. You also have sources for both, written in Pascal. Using the tombstone notation show all that you have. You also write a program P1. Show all that is needed to execute P1.
- 2 For the above, assume you buy a new computer that you cannot find a Pascal compiler for. What would you do to execute P1 on it? Show all steps.
- 3 Why was a 2-stage Pascal compiler so popular some years ago? What were major advantages? What were disadvantages?
- 4 The 1st pass of a 2-pass assembler needs to construct the symbol table. All symbols (variables and labels) start all instructions/directives. Can the pass look only at the label name and the variable name of the storage directive? Why yes or no?
- 5 You have an assembler where each instruction takes 1 argument. The instruction takes 4 bits, and the argument takes 12 bits. Assembly arguments can be either symbols or immediate values, but the machine code has all arguments indirect (no immediate values). The code is in the tiny model (code+data in the same segment). What are the serious limits on this assembly language?
- 6 Using the above, show machine code, in hex digits, for
LOAD X
ADD Y
SUB 10
ADD 20
JUMP EXIT
LOAD Y
EXIT: STOP
X SPACE
Y SPACE
Assume storage directives reserve 2 bytes of data space aligned even, STOP takes no arguments and uses 1 byte, that opcodes are (Add=1, Load=2, Sub=3, Stop=4, Jump=5), and that literals are appended at the end.
- 7 Can we construct an FA for extracting variable tokens similar to those of early Fortran: a variable starting with k, l, m, n would be integer ID token, other would be float ID tokens. All identifiers must start with a letter and follow with letters or digits. If no, why not? If yes, draw the deterministic FA. Assume case insensitive FA.
- 8 Suppose we modify the above to say that identifiers starting with k, l, m, n are int ID tokens only if the first letter follows with no more than 2 digits, otherwise it is a float ID token. Can it be done? If no, why? If yes, construct a deterministic FA.