

## CS328, Fall 2000, Test 1

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

YOU MUST RETURN THIS PAGE. NAME \_\_\_\_\_

- 1 Why was a 2-stage Pascal interpreter-compiler so popular some years ago? What were major advantages? What were disadvantages?
- 2 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?
- 3 You have an assembler where each instruction takes 1 argument. The instruction takes 4 bits, and the argument takes 12 bits (total of 2 bytes). 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? (code size, amount of data, data size, and whatever you can think of).
- 4 Show machine code, in dec digits for individual bytes, for  
LOAD Y  
ADD X  
SUB 10  
ADD X  
JUMP EXIT  
LOAD X  
EXIT: STOP  
X SPACE  
Y SPACE  
Assume storage directives reserve 2 bytes of data, aligned even, STOP takes no arguments and uses 1 byte, other opcodes take 1 byte and operands take 2 bytes. Assume opcodes are Add=1, Load=2, Sub=3, Stop=4, Jump=5, and that literals are appended at the end after the other space directives and that they are of the same size/alignment as other data.
- 5 Design an FA to recognize two tokens: integers and floating numbers. -/+ are optional and no space allowed after +/- and the number. Integers are any sequences of digits, and floating numbers are any combination of digits that include '.' anywhere. So .08 and 8. are valid floating numbers. If you cannot, defend your position.
- 6 Now recognize only floating numbers which have as many digits on the left as they have on the right. That is, 88.76 is good but 88.7 or .08 are bad. You may assume 0 is like any other digit (thus 0.8 is good).