

Name: \_\_\_\_\_

Directions: **Work only on this sheet** (on both sides, if needed). MAKE SURE TO COPY YOUR ANSWERS TO A SEPARATE SHEET FOR SENDING ME AN ELECTRONIC COPY LATER.

1. (20) Consider the program on pp.64-65. Suppose we wish to sum only the even-numbered indexed elements of the array, treating the word in line 6 as element 0, the one in line 7 as element 1 and so on. We'll need to change two lines in the code. State the line numbers and the changes. Your answer MUST have the form,

change line 28 to "incl %eax" and change  
line 168 to "addl \$2, w"

(The answer is drawn as two lines here so as to fit the column width, but remember that it must be a SINGLE-line answer in your electronic file.)

2. Consider the program in Section 3.6, pp.72ff. For each of the following, state whether the item is an instruction, label, addressing mode or directive:

- (a) (5) **swap** in line 37
- (b) (5) **call** in line 37
- (c) (5) **\$999999** in line 65
- (d) (5) **decl** in line 2
- (e) (5) **.long 18** in line 9

3. Consider the letter-counting code on pp.93-94.

- (a) (20) What is the maximum possible count for any given letter?
- (b) (10) Give a one-operand instruction (i.e. no comma in the assembly language) that we could use instead of the **addl** in line 33.

4. (25) Consider the program on pp.64-65. Show the line numbers of all the instructions that could cause cache misses during the execution (not fetch) part of the cycle.

**Solutions:**

1.

```
18:  movl $2, %eax
24:  addl $8, %ecx
```

2. label, instruction, addressing mode, instruction, directive

3.a 255

3.b incl %eax

4. 23, 27