

## 2.10 CHAPTER PROBLEMS

### Fundamental

1. Write an instruction to load accumulator A with the 8-bit value in memory location \$6700.
2. Write two instructions with the same STAB op-code to store the contents of accumulator B to memory location \$0023. (Use two different addressing modes.)
3. Suppose you are required to load an 8-bit value in memory location at \$7001 into accumulator A using the index addressing mode. Suppose also that you decided to use index register X. What should be the contents of the index register to satisfy the desired task in the following instruction: LDAA \$1,X?
4. Write a program segment to compare the contents of register D with immediate value #\$1234.
5. Suppose accumulator A contains hexadecimal number \$20 and the HC12/S12 executes instruction ADDA #\$E0. What will be the values for the H, Z, N, and C bits as the result of the instruction? Use Appendix A to answer this question if necessary.
6. Discuss the benefits of the top-down programming approach.
7. What is the instruction to load an immediate hexadecimal number \$30 to accumulator B?
8. What does the following instruction do: LDAA \$20,X?
9. What does the following instruction do: STAA \$2,+X?
10. Write a program segment that initializes memory locations \$0000 and \$0001 with \$12 and \$10 using appropriate directives.
11. Suppose accumulator B has \$34. What are the contents of the accumulator if instruction CMPB #\$33 is performed? How will the value change if instruction BITB #\$33 is performed?
12. What do the following directives do?

(a) DATA	FDB	\$C200
(b)	FCB	%11110000
(c)	FDB	\$11

13. What is the difference between the RMB and FCB directives?
14. What addressing modes are used in the following two instructions: LDD #2000 and LDD \$2000?

## Advanced

1. Describe the function of the program counter in the programmer's model shown in Figure 2.1.
2. Suppose that accumulator A contains \$45. If we perform instruction SUBA #\$44, which of the following branch instructions will be activated? a) BGE, b) BNE, c) BLT, d) BHS, e) BLE, f) BNE.
3. What are the advantages of using the direct addressing mode over the extended addressing mode?
4. What are the disadvantages of using the direct addressing mode over the extended addressing mode?
5. What is the benefit of using the extended addressing mode over the direct addressing mode?
6. What is the disadvantage of using the extended addressing mode over the direct addressing mode?
7. When should the auto-increment feature of the index addressing be used?
8. Write a program segment to add \$20 and \$40 and store the result to memory location \$4000.
9. Given the following program segment:

```

        LDAA    #$03
A      DECA
        TSTA
        BNE XX

```

What should be the relative address XX following the BNE op-code to repeat the DECA instruction until the accumulator A value is 0?

## Challenging

1. Given the following program segment, compute the number of clock cycles required to complete the instruction sequence: LDAA \$20, ADDA #\$25, STAA \$1000. You need to use Appendix A to accomplish this problem.
2. If you want to copy a table from a memory location to another, which addressing mode should be selected? Why?
3. Write a program segment to copy a table with five items from a memory location starting at \$5000 to a memory location starting at \$6000.
4. Suppose you have the following set of hexadecimal values: \$20, \$25, \$40, \$50, \$12. Write a segment of program to find the minimum and maximum values of the set.

5. Consider the following program segment:

```
LDD    #F00D
LDX    #C100
STD    0,X
BSET   0,X,$44
BCLR   1,X,$11
```

What numbers are in memory locations \$C100 and \$C101 after the program is executed?

6. Write a program segment starting at \$C100 that checks bits 0 and 2 of address \$D000 and jumps to \$C0CC if both bits are clear.