SOLUTIONS FOR CHAPTER 8

1. (a) AL = B6 AH = F4 AX = F4B6 EAX = 9823F4B6
   (b) BL = C2 BH = 85 BX = 85C2 EBX =000985C2
   (c) DL = 80 DH = 84 DX = 8480 EDX =001E8480
   (d) SI = 0000 ESI = 00120000

2. (a) EAX = 02CEFF93
   (b) EBX = 00124F80
   (c) EDX = 024B76A0
   (d) EAX = 09090804
   (e) EBX = 0F90EC52

3. (a)

   DS:2000 = 56
   DS:2001 = F4
   DS:2002 = 23
   DS:2003 = 98

   (b)

   DS:348C = 91
   DS:348D = 34
   DS:348E = F2
   DS:348F = 01

   (c) register EBX = 4CA26D92H

4. The programs follow:

```
TITLE     PROB4
PAGE      60,132
          .MODEL SMALL
          .STACK 200H
          .DATA
ORIG_DATA   DW    50 DUP (1234H)
COPY_DATA   DW    50 DUP (?)
          .CODE
BEGIN:    MOV  AX,@DATA
          MOV  DS,AX
          MOV CX,50
          MOV SI,OFFSET ORIG_DATA
          MOV DI,OFFSET COPY_DATA
COPY_LP:  MOV AX,[SI]              ;clocks = 8 + EA (EA = 5)
          MOV [DI],AX              ;clocks = 9 + EA
          ADD SI,2                 ;clocks = 4
          ADD DI,2                 ;clocks = 4
          LOOP COPY_LP             ;clocks = 17,noj 5
          MOV AH,4CH               ;total = 52 for one iteration
          INT 21H
          END BEGIN
```

```
     TITLE PROB4
     PAGE 60,132
          .MODEL SMALL
          .386
          .STACK 200H
          .DATA
ORIG_DATA   DW    50 DUP (1234H)
COPY_DATA   DW    50 DUP (?)
          .CODE
BEGIN:    MOV  AX,@DATA
          MOV  DS,AX
          MOV CX,25
          MOV SI,OFFSET ORIG_DATA
          MOV DI,OFFSET COPY_DATA      ;          386    486
COPY_LP:  MOV EAX,[SI]                 ;clocks = 4      1
          MOV [DI],EAX                 ;clocks = 2      1
          ADD SI,4                     ;clocks = 2      1
          ADD DI,4                     ;clocks = 2      1
          LOOP COPY_LP                 ;clocks = 11+m  7,noj 6  (m=2)
          MOV AH,4CH
          INT 21H
          END BEGIN
```

	8086
iterations 1 - 49	52
iteration 50	40

8086: 49 iterations × 52 = 2548 + 40 (last iteration) = 2588 clocks

	386	486
iterations 1 - 24	23	11
iteration 25	13	6

386: 24 iterations × 23 = 552 + 13 (last iteration) = 565 clocks

486: 24 iterations × 23 = 264 + 6 = 270 clocks

5. The program follows, and clock times are given in the comments.

```
TITLE PROB5
PAGE 60,132
                .MODEL SMALL
                .386
                .STACK 200H
                .DATA
DATA_1          DT    1234567890
DATA_2          DT    1234567890
SUM             DT    ?
                .CODE
BEGIN:          MOV  AX,@DATA
                MOV  DS,AX
                MOV BX,OFFSET DATA_1
                MOV SI,OFFSET DATA_2
                MOV DI,OFFSET SUM
                MOV CX,10           ;86     286     386     486
ADD_LP:         MOV AL,[BX]         ;10     5       4       1
                ADC AL,[SI];9+5     7       6       2
                DAA                 ;4      3       4       2
                MOV [DI],AL         ;10     3       2       1
                INC BX              ;3      2       2       1
                INC DI              ;3      2       2       1
                INC SI              ;3      2       2       1
                LOOP ADD_LP         ;17     8+m     11+m    7
                MOV AH,4CH          ;totals:
                INT 21H             ;64     34      35      16
                END BEGIN
```