



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

ΣΧΟΛΗ ΗΜ&ΜΥ
Λειτουργικά Συστήματα 1^η Άσκηση
Ακ. έτος 2010-2011

Τμήμα Β, Ομάδα 3^η

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Άσκηση 1.ii

Χρονόμετρο δευτερολέπτων

```
1  START:
2      CALL BEEP
3      LXI B,03E8H
4      MVI A,FEH
5  LOOPA:
6      STA 3000H
7      CALL DELB
8      CPI FOH
9      JZ START
10     DCR A
11     JMP LOOPA
12  END
```

Άσκηση 2.i

```
1  START:
2      LDA 2000H
3      MOV D,A
4      RRC
5      RRC
6      RRC
7      RRC
8      ANI OFH
9      MOV E,A
10     ;E has MSB needed for ANAMMA
11     MOV A,D
12     ANI OFH
13     MOV D,A
14     ;D has LSB needed for SBHSIMO
15     CALL ANAMMA
16     CALL SBHSIMO
17     JMP START
18  ANAMMA:
19     LXI B,0000H
20     LXI H,0000H
21     MOV C,E
22     CALL SHIFTBC
23     CALL SHIFTBC
24     DAD B
25     CALL SHIFTBC
26     CALL SHIFTBC
27     CALL SHIFTBC
28     DAD B
29     CALL SHIFTBC
30     DAD B ;HL has the needed delay
31     MOV C,L
32     MOV B,H
33     ;need to turn on the led(s)
34     CALL ONN
35     CALL DELB
36     RET
37
38  SBHSIMO:
39     LXI B,0000H
40     LXI H,0000H
41     MOV C,D
42     CALL SHIFTBC
43     CALL SHIFTBC
44     DAD B
45     CALL SHIFTBC
46     CALL SHIFTBC
47     CALL SHIFTBC
48     DAD B
49     CALL SHIFTBC
50     DAD B ;HL has the needed delay
51     MOV C,L
52     MOV B,H
53     ;need to turn on the led(s)
```

```

54      CALL OFF
55      CALL DELB
56      RET
57  SHIFTBC: ;shifts BC a bit to the left :)
58      MOV A,C
59      RAL
60      CC ROTC
61      CNC ROTNC
62      RET
63
64  ROTNC:
65      MOV C,A
66      MOV A,B
67      RLC
68      MOV B,A
69      RET
70  ROTC:
71      MOV C,A
72      MOV A,B
73      RLC
74      MOV B,A
75      INR B
76      RET
77  ONN:
78      MVI A,00H
79      STA 3000H
80      RET
81  OFF:
82      MVI A,FFH
83      STA 3000H
84      RET
85
86
87  END

```

Άσκηση 2.ii

```

1  START:
2      LDA 2000H
3      RAL
4      CC DIAKOPH
5      DI
6      CALL INC_COUNT
7      ;CALL MDELAY
8      CALL SHOW_COUNTERS
9
10     JMP START
11
12  SHOW_COUNTERS:
13     MOV A,D
14     RAL
15     RAL
16     RAL
17     RAL
18     ADD E
19     CMA
20     STA 3000H
21     RET
22  MDELAY:
23     PUSH B
24     PUSH D
25     PUSH H
26     ;DI
27     LXI B,0032H
28     CALL DELB
29     LDA 2000H
30     RAL
31     CC DIAKOPH
32     ;DI
33     LXI B,0032H
34     CALL DELB
35     LDA 2000H
36     RAL
37     CC DIAKOPH
38

```

```

39
40         POP H
41         POP D
42         POP B
43
44         RET
45
46 INC_COUNT:
47         MOV A,E
48         INR A
49         ANI OFH
50         MOV E,A
51         RET
52 INC_INTR:
53         MOV A,D
54         INR A
55         ANI OFH
56         MOV D,A
57         RET
58
59 DIAKOPH:
60         PUSH D
61         MVI A,ODH
62         SIM
63         EI
64         POP D
65         RET
66
67 INTR_ROUTINE:
68         PUSH PSW
69         PUSH B
70         PUSH D
71         PUSH H
72         CALL BEEP
73         EI
74         POP H
75         POP D
76         POP B
77         POP PSW
78         CALL INC_INTR
79         RET
80 END

```