



## **ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ**

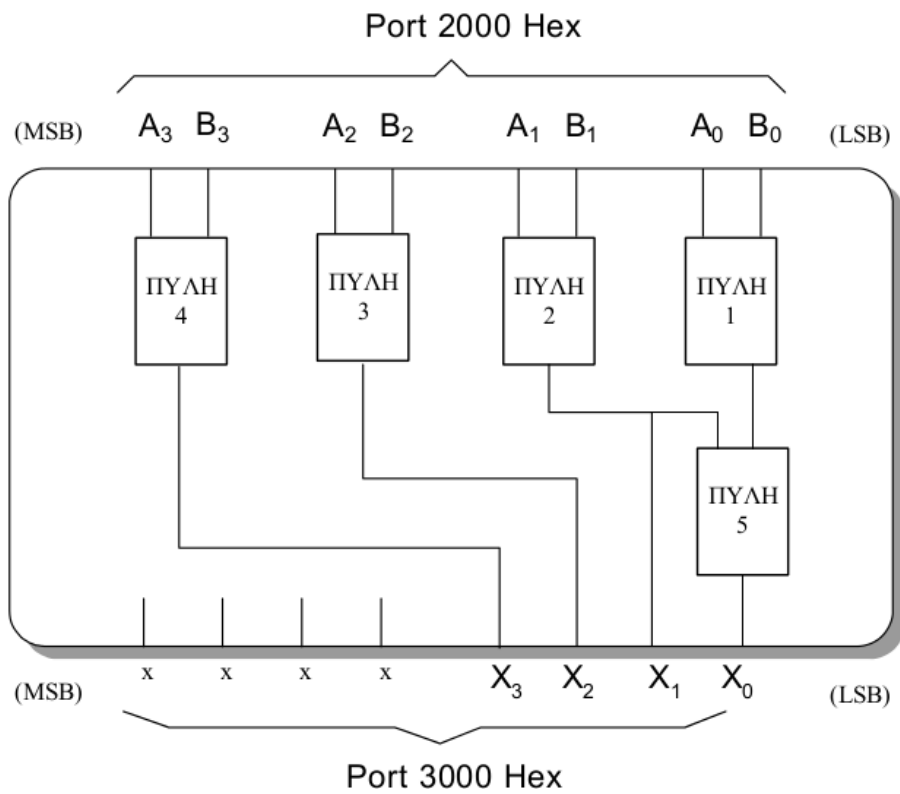
ΣΧΟΛΗ ΗΜ&ΜΥ

Εργαστήριο Μικροϋπολογιστών 2<sup>η</sup> Εργαστηριακή Άσκηση  
Ακ. έτος 2011-2012

Ομάδα C07

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7 Δεκεμβρίου 2011



Σχήμα 1: Το IC του θέματος

### Άσκηση 3(i)

```

1  START: LDA 2000H
2      CALL XOR
3      CALL XOR
4      CALL XOR
5      CALL XOR
6      MOV D,C
7      MOV A,C
8      RAR
9      MOV C,A
10     MOV A,D
11     RAL
12     RAL
13     RAL
14     RAL
15     RAL
16     RAL
17     CALL OR
18     MOV A,C
19     CMA
20     STA 3000H
21     JMP START
22
23
24     ;diabazei apo ton A,
25     ;arhsimopoiei ton b ws buffer
26     ;grafei to apotelesma ston C
27 XOR:  RAL          ;CALL XOR
28       JC ONE       ;XY
29       RAL          ;OY
30       JC TRUE      ;OY
31       JMP FALSE    ;00
32 ONE:  CMC          ;1Y
33       RAL          ;1Y
34       JC FALSEX    ;11
35       JMP TRUE     ;10
36

```

```

37  OR:    RAL      ;CALL OR;XY
38        JC TRUE   ;1Y
39        RAL      ;0Y
40        JC TRUE   ;11
41        JMP FALSE ;00
42
43  TRUE:   CMC
44        MOV B,A    ;USE B AS BUFFER
45        MOV A,C    ;LOAD PREVIOUS OUTCOME FORM C
46        RAL      ;SHIFT A
47        ORI 01H    ;ADD 1 IN THE END
48        JMP RESTORE
49
50  FALSEX: CMC
51  FALSE:  MOV B,A  ;USE B AS BUFFER
52        MOV A,C    ;LOAD PREV FROM C
53        RAL      ;SHIFT A
54        ANI FEH    ;ADD 0 IN THE END
55        JMP RESTORE
56
57  RESTORE
58        MOV C,A    ;RESTORE BUFFERS AS THEY WERE
59        MOV A,B
60        RET
61  END

```

## Άσκηση 4(ii)

1		MVI A,10H
2		STA 0BB0H
3		STA 0BB1H
4		STA 0BB2H
5		STA 0BB3H
6		STA 0BB4H
7		STA 0BB5H
8		LXI D,0BB0H
9		CALL STDM
10	LP:	CALL KIND
11		MOV B,A
12		ANI 0FH
13		STA 0BB4H
14		MOV A,B
15		RLC
16		RLC
17		RLC
18		RLC
19		ANI 0FH
20		STA 0BB5H
21		LXI D,0BB0H
22		CALL STDM
23		JMP LP
24	END	

## Άσκηση 4(iv)

```
1  START:
2      IN 10H
3
4  READ_BINARY:
5      LDA 2000H
6      RAL
7      JC NEGATIVE
8      JNC POSITIVE
9
10     ;ARNHTIKOS EINAI MONO OTAN MSB==1 , OPOTE KAI TON "METATREPW"
11
12  NEGATIVE:
13      RAR                ;GIA UNDO THN RAL
14      CMA                ;TO SUMPLHRWMA WS PROS 2 TOY SUMPLHRWMATOS WS PROS 2 MAS DINEI TON ARX ARIΣMO
15      INR A
16      MVI E,1CH         ;O E EXEI TO PROSHMO. 17 GIATI AYTO ANTISTOIXEI SE - STHN DCD
17      ;CMA                ;TO CMA XREIAZETAI GIATI PLEON OLOI ARITHMOI MOU EINAI 8ETIKOI
18      JMP DEC_CONVERSION
19
20  POSITIVE:
21      RAR                ;GIA UNDO RAL
22      MVI E,10H         ;O E EXEI TO PROSHMO , TO 10 GIATI AUTO ANTISTOIXEI SE KENO STHN DCD
23
24  DEC_CONVERSION:
25
26      MVI C,00H         ;STON C OI MONADES
27      MVI B,FFH         ;STON B OI DECADES , EBALA FF GIATI META KSEKINAW KANONTAS INR
28      MVI D,00H         ;STON D OI EKATONTADES
29
30  BCD_FINDER:
31      CPI 64H           ;SUGKRINW ME TO 100
32      JM ELEGX_DEC      ;AN EINAI DHL. NUMBER<100 H' ALLIWS (A)-100<O TOTE ELEGXEI DECADES
33      MVI D,01H         ;ALLIWS O ARITHMOS MAS EXEI MIA EKATONTADA
34      SUI 64H           ;AFAIRW TO 100 KAI SUNEXIZW GIA DECADES
35
36  ELEGX_DEC:
37      INR B
38      SUI 0AH           ;AFAIRW 10 KAI METRAW POSES DECADES AFAIRESA
39      JNC ELEGX_DEC     ;MEXRI NA MEINOUNE MONADES
40      ADI 0AH           ;DIORTHWSH YPOLOIPOU, PROSTHETW 10
41      MOV C,A           ;STON C OI MONADES
42
43  EMFANISH_STA_3DEKSIA_7SEGM:
44
45      ;===1o LSB PSHFIO===
46      LXI H,0990H       ;BAZW STON H::=C =LEAST SIGN BIT, TIS MONADES @ THESH MNMHMS 0990
47      MOV M,C
48
49      ;===2o LSB PSHFIO===
50      LXI H,0991H       ;BAZW STON H::=B =2o LSB TIS DEKADES @ THESH MNMHMS 0991
51      MOV M,B
52
53      ;===3o LSB PSHFIO===
54      LXI H,0992H       ;BAZW STON H::=L THN EKATONTADA (AN YPARXEI) @ THESH MNMHMS 0991
55      MOV M,D
56
57      ;===4o LSB PSHFIO===
58      LXI H,0993H       ;BAZW STON H::=E TO PROSHMO
59      MOV M,E
60
61      ;===5o LSB PSHFIO===
62      LXI H,0994H       ;EMFANIZEI KENA TA YPOLOIPA BITS
63      MVI M,10H
64
65      ;===6o (MSB)PSHFIO===
66      LXI H,0995H
67      MVI M,10H
68
69
70      LXI D,0990H       ; BAZW STON D THN THESH APO OPOU ARXIZEI TO LSB
71      CALL STDM         ; TA METAFEREI TA BITS NA TA PAREI H DCD KAI NA TA PAEI STA 7SEG
72      CALL DCD
73      JMP START         ; H DCD PAIRNEI TA PSHFIA KAI TA BAZEI STOUS 7SEGMENTS
74  END
```

