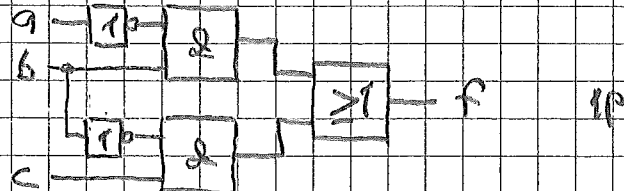


a) $90_{10} = 1011010_2 = \underline{5A}_{16}$ 0.5P

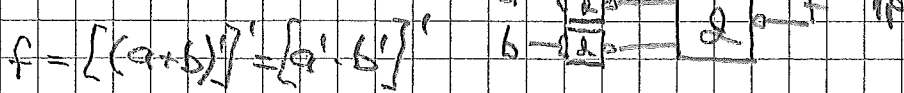
b) $15A_{16} = \underline{110001011010_2}$ 0.5P

c) -73 $73 = 01001001 \Rightarrow -73 = \underline{10110111}_{10}$
8 BITAR

d) $f = a \cdot b + b' \cdot c$



e) $f = a + b$



$f = [(a+b)]' = [a' \cdot b']'$

f) $a + b \cdot c + b \cdot c' + a' \cdot b + a' \cdot b' = a + b + a' = 1$

	bc			
	00	01	10	11
a	0	1	1	1
a'	1	1	1	1

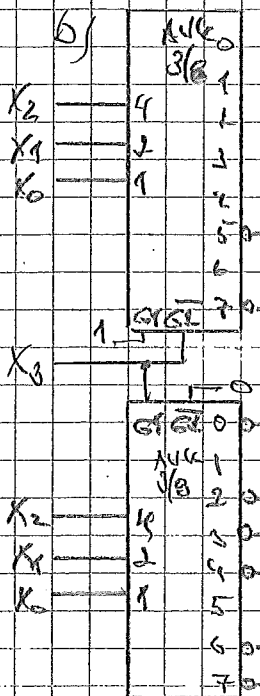
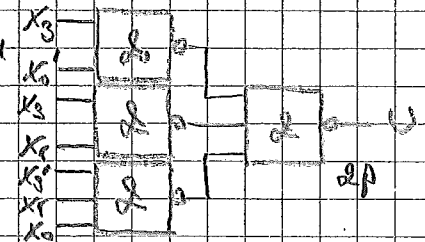
~~g) 1010, 1011 ARE THE ALTERNATE ABCD-CODE~~

~~h) TOGGLE - OUTLAGE q, q', q''~~

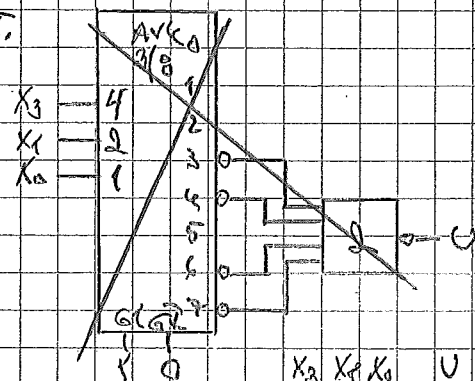
DD	a	x_3, x_2		
6P	00	00	11	10
$x_3 x_2$	01	0	1	0
	11	1	1	1
	10	1	1	1

$U = X_3 \cdot X_0' + X_3 \cdot X_1 + X_2' \cdot X_2 \cdot X_0$

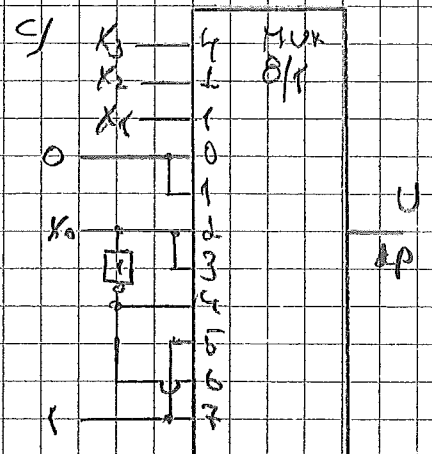
$U = [(X_3 \cdot X_0')' \cdot (X_3 \cdot X_1)' \cdot (X_2' \cdot X_2 \cdot X_0)']'$



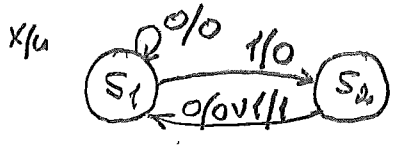
ALU



x_3	x_1	x_0	U
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1



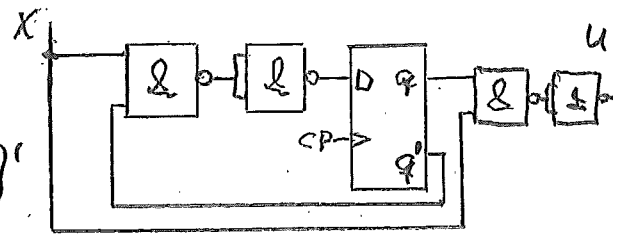
D3.
5P



	x	
	0	1
S_0	0/0	1/0
S_1	1/0	0/1
	q^*/u	

$$q^* = D = q \cdot K = [(q \cdot X)]'$$

$$u = q \cdot K = [(q \cdot X)]'$$



D4.
4P

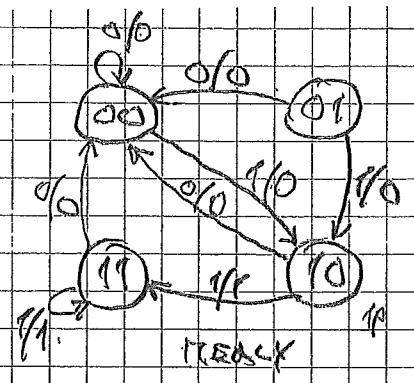
$$D_1 = Q_1^* = X$$

$$D_0 = Q_0^* = X \cdot Q_1$$

$$U = X \cdot Q_1$$

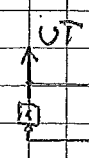
	x	
	0	1
$Q_1 Q_0$	00/0	10/0
01	00/0	10/0
10	00/0	11/1
11	00/0	11/1

$$Q_1^* Q_0^* / u$$



D5.
4P

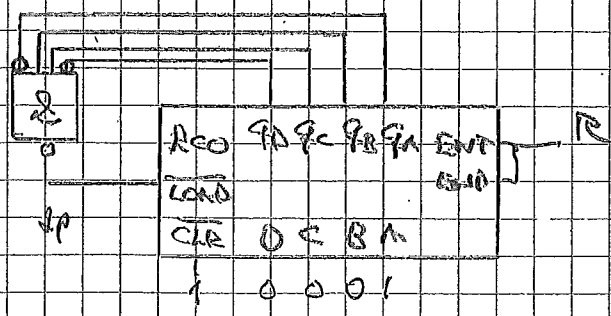
a) 120 - RKN - 10 x 12



	R	0	1	2	3	ENT	ENT
R	0	1	2	3	0	1	0
	$0 \ 1 \ 1 \ 0$						

	R	0	1	2	3	ENT	ENT
R	0	1	2	3	0	1	0
	$0 \ 1 \ 0 \ 0$						

b)



	R	0	1	2	3	ENT	ENT
R	0	1	2	3	0	1	0
	$1 \ 0 \ 0 \ 0$						

M11. POLLOVE

INTERRUPT

JAN-71

- 3P AUPPAGNING, LASER LOOP
- SKER SYNKRONI
- + EKKELT
- + INGEN EXTRA HÅRDVARA (PROGRAMMÄR)
- SÄSSET MED CPU-TID
- KAN TA LÄNGRE TID TILL SERVICE

- CAU IN AVBRYT AV EN EXTERNA HÄNDELSE
- SKER NÄR SOM HÖRST (ASYNKRON)
- + SNABB SERVICE
- HÄRRA EXTRA HÅRDVARA
- EXTRA INITIERING

M12.

3P

```

TMP      EQU      0X20

MAIN     ORG      0X00
         MOVLW   0XFE
         MOVWF  TMP
         CALL   SUBM12
         GOTO   MAIN

SUBM12   ANDLW   0X01
         BTFSZ  STATUS, Z
         CLRF  TMP
         RETURN
EXIT
         END

```

ENCLOSURE:

```

SUBM12   BTFSZ  TMP, 0
         CLRF  TMP
         RETURN

```

M13.

4P

```

LIST     P=16F877A
INCLUDE  <P16F877A.INC>

```

```

INDATA   EQU      0X20
UTDATA   EQU      0X21
TEMP     EQU      0X22
COUNT   EQU      0X23

MAIN     ORG      0X00
         MOVLW   9
         MOVWF  COUNT      ;håller reda på antalet skift
         CLRF   UTDATA     ;nollställer resultatfilen
         MOVF   INDATA, W
         MOVWF  TEMP       ;lägg INDATA i TEMP
         SUBLW  0X00       ;kolla om bara nollor
         BTFSZ  STATUS, Z
         GOTO   EXIT       ;bara nollor => hoppa till EXIT
LOOP     DECF   COUNT, F   ;dekrementera antalet skift
         GOTO   NEXT
NEXT     GOTO   EXIT       ;klar => hoppa till EXIT
         RLF   TEMP, F     ;vänsterskifta
         BTFSZ  STATUS, C   ;kolla om etta
         GOTO   LOOP
         INCF  UTDATA, F   ;etta => inkrementera UTDATA
         GOTO   LOOP
EXIT     GOTO   EXIT
         END

```

M14

a/ PÅSTÄENDE (1) SLUT

b/

```

ANTAL EQU 0X20 ;VÄLJES HÄR TILL 8
NEG EQU 0X21
ORG 0x00 ;RESETVEKTOR
START CLRF NEG ;0-->(NEG)
LOOP DECf ANTAL,0 ;(ANTAL)-1-->(W)
CALL TABELL
ENKLARE;
MOVWF TMP ;ANDLW 80 ;MASKA FRAM BIT7
RTRSC TMP ;XORLW 80 ;KOLLA ÖM BIT7=1
BTfSS STATUS,Z
GOTO FIX
INCF NEG,1 ;(NEG)+1-->(NEG)
FIX DECfSZ ANTAL,1 ;DEKREMENTERA (ANTAL)
GOTO LOOP
SLUT GOTO SLUT
TABELL ADDWF PCL,1 ;(PC)+(W)-->(PC)
RETLW 0XD7 ;NR 0
RETLW 0XF3 ;NR 1
RETLW 0X1A ;NR 2
RETLW 0X0A ;NR 3
RETLW 0X08 ;NR 4
RETLW 0X13 ;NR 5
RETLW 0XCA ;NR 6
RETLW 0X27 ;NR 7
END

```

M15
7P

```

HIGH1 EQU 0X20
LOW1 EQU 0X21
X EQU 0X22
RESULT EQU 0X23

ORG 0X00 ;RESETVEKTOR
; INITIERING
INIT BSF STATUS,RP0 ;BANK1
BCF TRISB,3 ;RB3 UT
BCF STATUS,RP0 ;BANK0

; HUVUDPROGRAM
MAIN CALL JFR
BTfSS RESULT,7 ;TESTA BIT
GOTO MAIN
BTfSS RESULT,6 ;TESTA BIT 6
GOTO OFF
ON BSF PORTB,3 ;VÄRME PÅ
GOTO MAIN
OFF BCF PORTB,3
GOTO MAIN

; SUBROUTIN
JFR MOVF X,W ;PLOCKA IN (X)
SUBWF HIGH1,W ;(HIGH) - (W) ->(W)
BTfSS STATUS,C
GOTO OVER
MOVF X,W ;PLOCKA IN (X)
SUBWF LOW1,W ;(LOW) - (W) ->(W)
BTfSS STATUS,C
GOTO UNDER
BSF RESULT,7 ;(X) MELLAN GRÄNSERNA
GOTO SLUT
OVER BCF RESULT,7 ;FÖR STORT, BIT7=0
BCF RESULT,6 ;BIT6=0
GOTO SLUT
UNDER BCF RESULT,7 ;FÖR LITET, BIT7=0
BSF RESULT,6 ;BIT6=1
; SLUT
SLUT GOTO SLUT
END

```