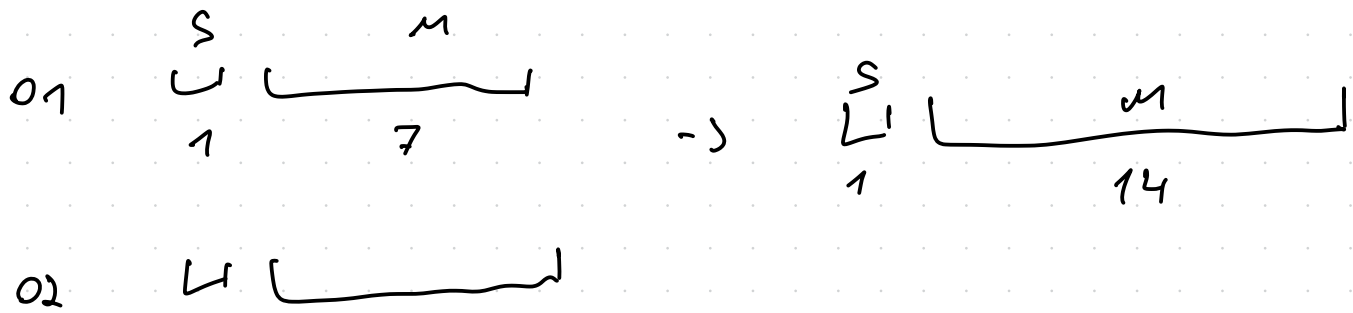


Chapter 1: Comp. Arithmetic



$$0.5270 = 0.5270$$

$$527 > 0527 \quad \rightarrow$$

$$X = -211$$

$$Y = -71$$

$$X_{SM} = 11111011_{SM}$$

$$Y_{C_2} = 10000101_{C_2}$$

$$X_{SM} = 11000111_{SM}$$

$$Y_{C_2} = 10111001_{C_2}$$

CNT	A	Q	Q[-1]	M
000 +	0000 0000 0111 1011 <u>0111 1011</u> 0011 1101	1011 1001	0 -M	1000 0101
001	+1000 0101 <u>1100 0010</u> 111000 01	0110 1110	0	
010	1111 0000	1011 0111	0 -M	
011	+0111 1011 <u>0110 1011</u> 00110101	11011 011	1	
100	00011 010	111 01101	1	
101	00001101	0111 0110	1	
110	+1001 0101 1001 0010 11001001	0011 1011	0 -M	
111	+0111 1011			

001 00010 0001 1101

1
↙
1

Chapter 1 Computer Arithmetic

$$0.527 = 0.5270$$

$$\neq 0.0527$$

$$01 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 7 \end{array}$$

$$\begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 14 \end{array}$$

$$527 = 0527$$

$$\neq 5270$$

$$02 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 7 \end{array}$$

$$X = -123$$

$$Y = -71$$

$$\begin{array}{r} 123 \\ 861 \\ + 8733 \checkmark \end{array}$$

$$X = 11111011 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 14 \end{array}$$

$$= 10000101 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 14 \end{array}$$

$$Y = 11000111 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 14 \end{array}$$

$$= 10111001 \begin{array}{c} S \\ \hline 1 \end{array} \begin{array}{c} M \\ \hline 14 \end{array}$$

$$Y^* = 11001011$$

$$\begin{array}{l} 1024 \\ 2048 \\ 4096 \\ 8192 = 2^{13} \end{array}$$

$$-M = 01111011$$

$$\begin{array}{r} 123- \\ 64 \\ \hline 59- \\ 32 \\ \hline 27 \\ 16 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 71- \\ 64 \\ \hline 7 \end{array}$$

Q[0]	Q[-1]	OP
0	0	0
0	1	1
1	0	1
1	1	0

$$X = -\frac{123}{128} = -\frac{123}{2^7}$$

$$Y = -\frac{71}{128} = -\frac{71}{2^7}$$

$$P = +\frac{123 \times 71}{2^{14}}$$

$$\Delta^{XXXX} XXXX XXXX XXXX$$

COUNT
000
001
010
011
100
101
110
111
+8

COUNT	A	Q	Q[-1]	M
000	0000 0000	1011 1001	0	1000 0101
+	0111 1011		-M	
	0111 1011			
	0011 1101	1101 1100	1	
001	+1000 0101		+M	
	1100 0010			
	1110 0001	0110 1110	0	
010	1111 0000	1011 0111	0	
011	+0111 1011		-M	
	0110 1011			
	0011 0101	1101 1011	1	
100	0001 1010	1110 1101	1	
101	0000 1101	0111 0110	1	
110	+1000 0101		+M	
	1001 0010			
	1100 1001	0011 1011	0	
111	+0111 1011		-M	
	0100 0100	0011 1011	0	
	0010 0010	0001 1101	1	

1.2. Modified Booth's Alg.

$X = 10000001$ \rightarrow Robertson \rightarrow 2 sp-
 $X^T = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$ (middle 1)

$X = 1111 \ 0111 \mid_0 \rightarrow 7 \text{ sp. pt. Robertson}$
 $X^* = 000\bar{1} \ 100\bar{1} \rightarrow 3 \text{ sp. pt Booth}$

$x = 0101 \quad 0101 \quad ; \quad 0$

X ; sbit current

Run of \mathcal{D}_S

x_{i+1} x_i ~~x_{i-1}~~

Rem

x_{i+1}	x_i	R	\mathcal{D}	$R^* (next)$
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	0	0
1	0	1	1	1
1	1	0	1	1
1	1	1	0	1

$$\begin{aligned}
 X &= 1 \begin{array}{c} 1 \\ 1 \end{array} 0000001 \\
 X^{**} &= 10000000 \\
 R &= 10000000
 \end{aligned}$$

$$\begin{aligned}
 X &= 0 \begin{array}{c} 1 \\ 1 \end{array} 01010101 \\
 X^{**} &= 01010101 \\
 R &= 00000000
 \end{aligned}$$

$$\begin{aligned}
 X &= 1 \begin{array}{c} 1 \\ 1 \end{array} 11110111 \\
 X^{**} &= 01011001 \\
 R &= 00001111
 \end{aligned}$$

Possibilitatea de overflow

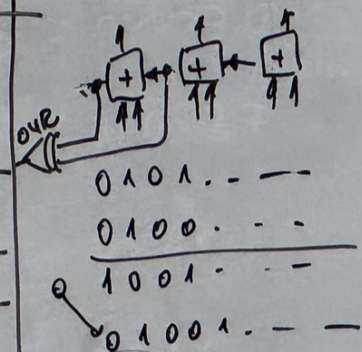
$$R^* = x_{i+1} x_i + x_{i+1} R + x_i R$$

$$A[7] = \overline{OVR} \cdot A[7] + OVR \cdot \overline{A[7]}$$

$$= OVR \oplus A[7]$$

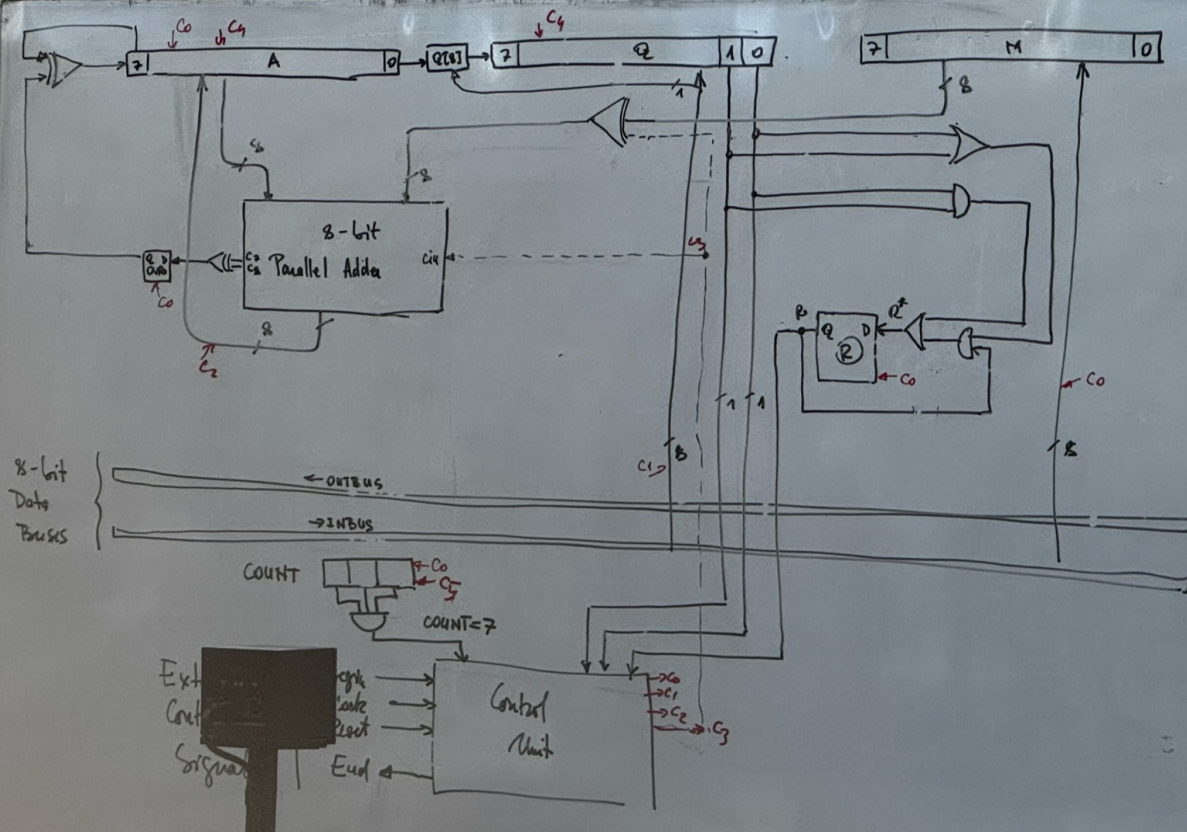
COUNT	OVR	A	Q	R	M
000	0	0000 0000 + 1000 0101 ----- 1000 0101 1100 0010	1011 1001	0	1000 0101
001	0	1110 0001	101 1100	0	
010	0	1111 0000	1110 1110	0	
011	0	+ 0111 1011 110 1011 0011 0101	0111 0111	0	
100	0	0001 0101	1011 1011	1	
101	0	0000 1101	1101 1101	1	
110	0	+ 0111 1011 000 1000 0100 0100	0111 0111	1	
111	0	0010 0010	0011 1011	1	

$$-M = 0111 1011$$



$$\overline{OVR} \cdot A[7] + OVR \cdot \overline{A[7]}$$

$$A[7] = OVR \oplus A[7]$$



OP	R ⁰
000	0 0
001	1 0
010	1 0
011	0 1
100	0 0
101	1 1
110	1 1
111	0 1

