

Divider (1A)

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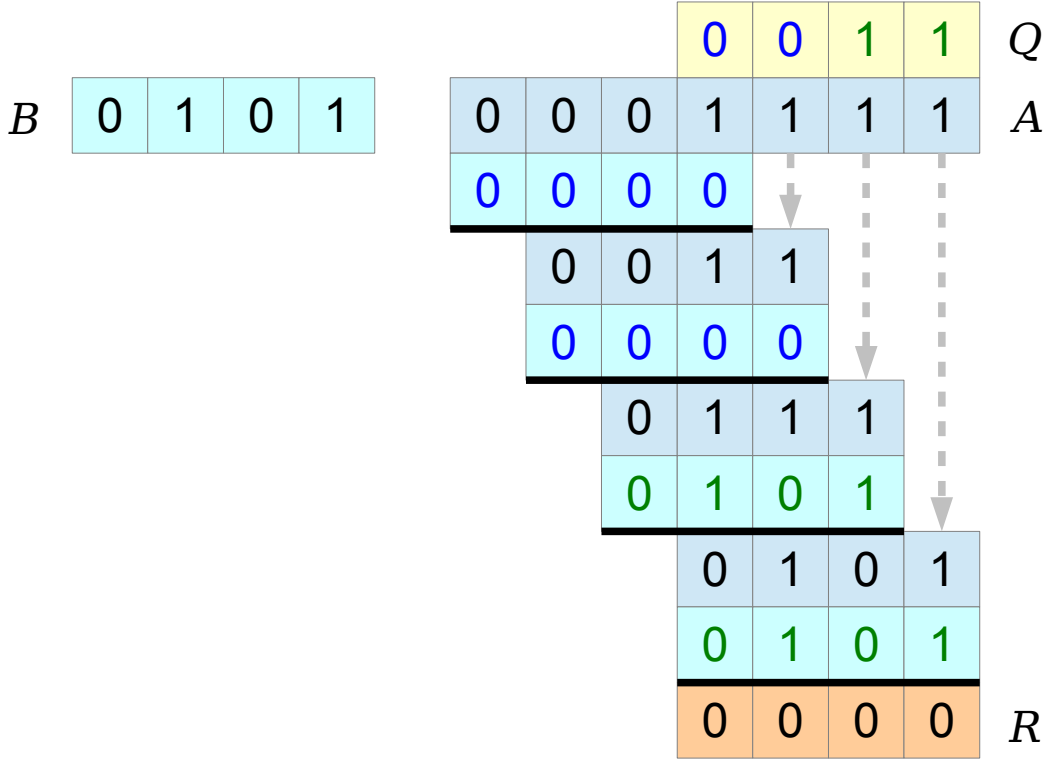
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Please send corrections (or suggestions) to youngwlim@hotmail.com.

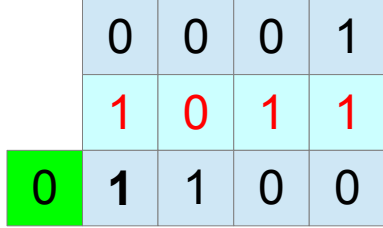
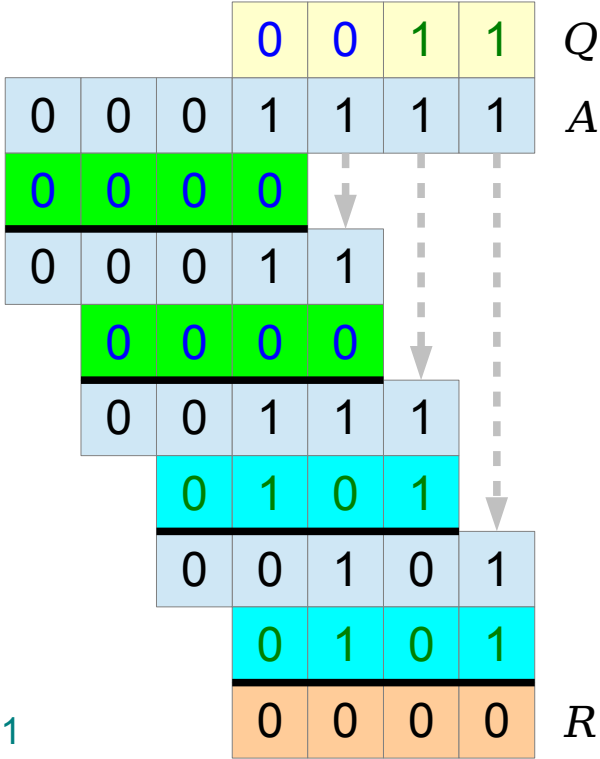
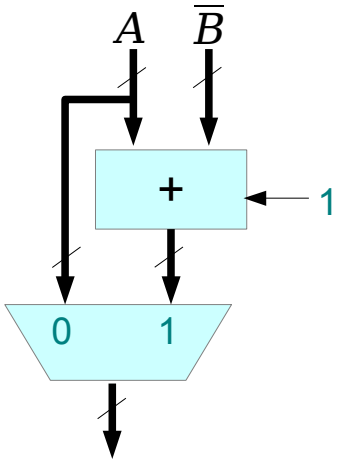
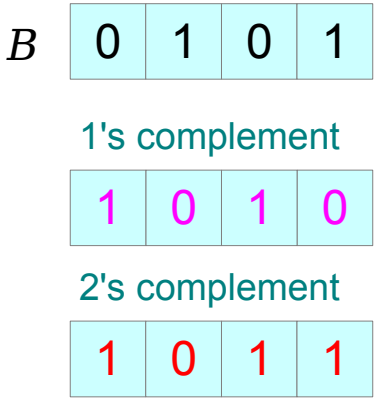
This document was produced by using OpenOffice and Octave.

Binary Division

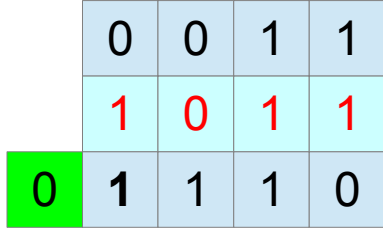


2's Complement Subtraction

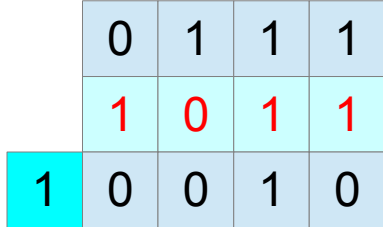
$A \div B$



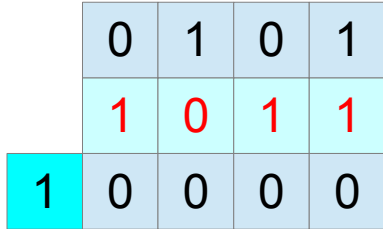
No Carry
Do not Subtract



No Carry
Do not Subtract

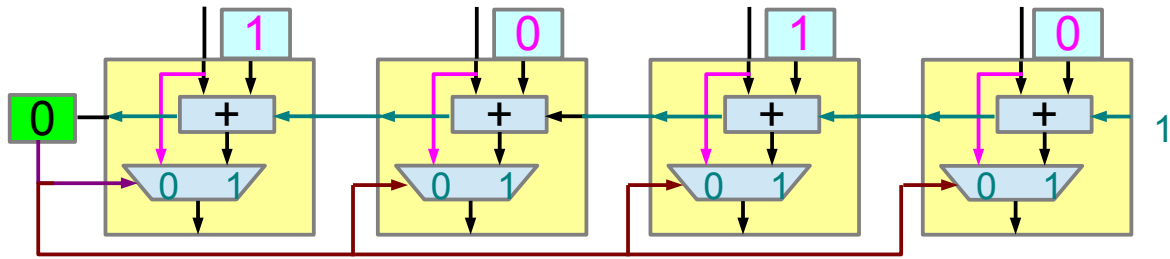


Carry
Q bit = 1



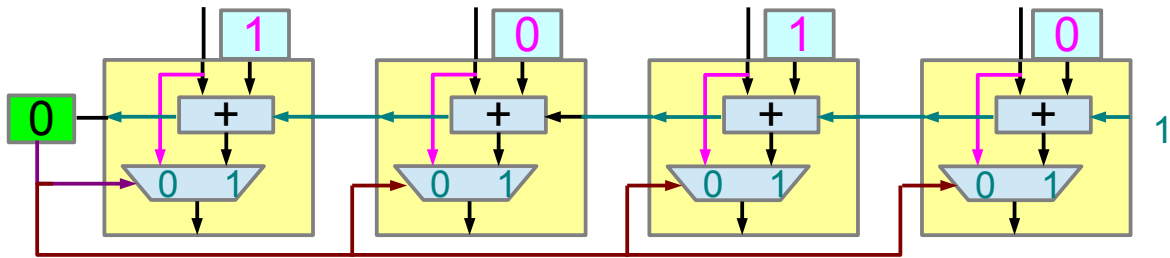
Carry
Q bit = 1

End Around Carry



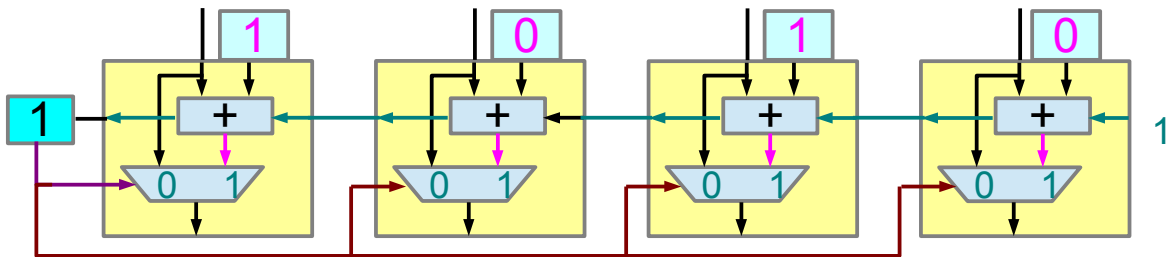
0	0	0	1	
1	0	1	1	
0	1	1	0	0

No Carry
No Subtraction



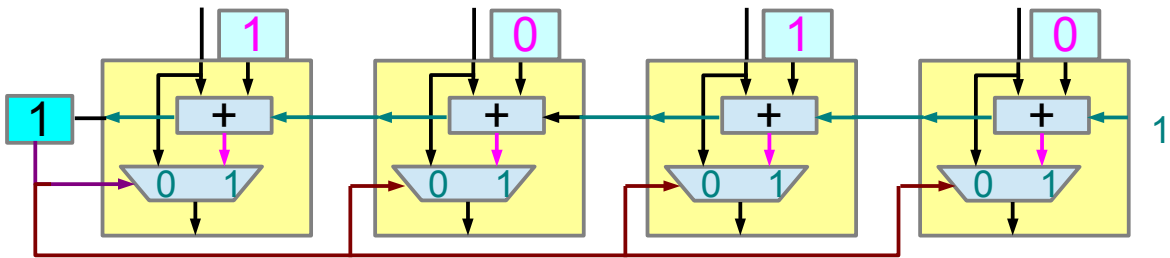
0	0	1	1	
1	0	1	1	
0	1	1	1	0

No Carry
No Subtraction



0	1	1	1	
1	0	1	1	
1	0	0	1	0

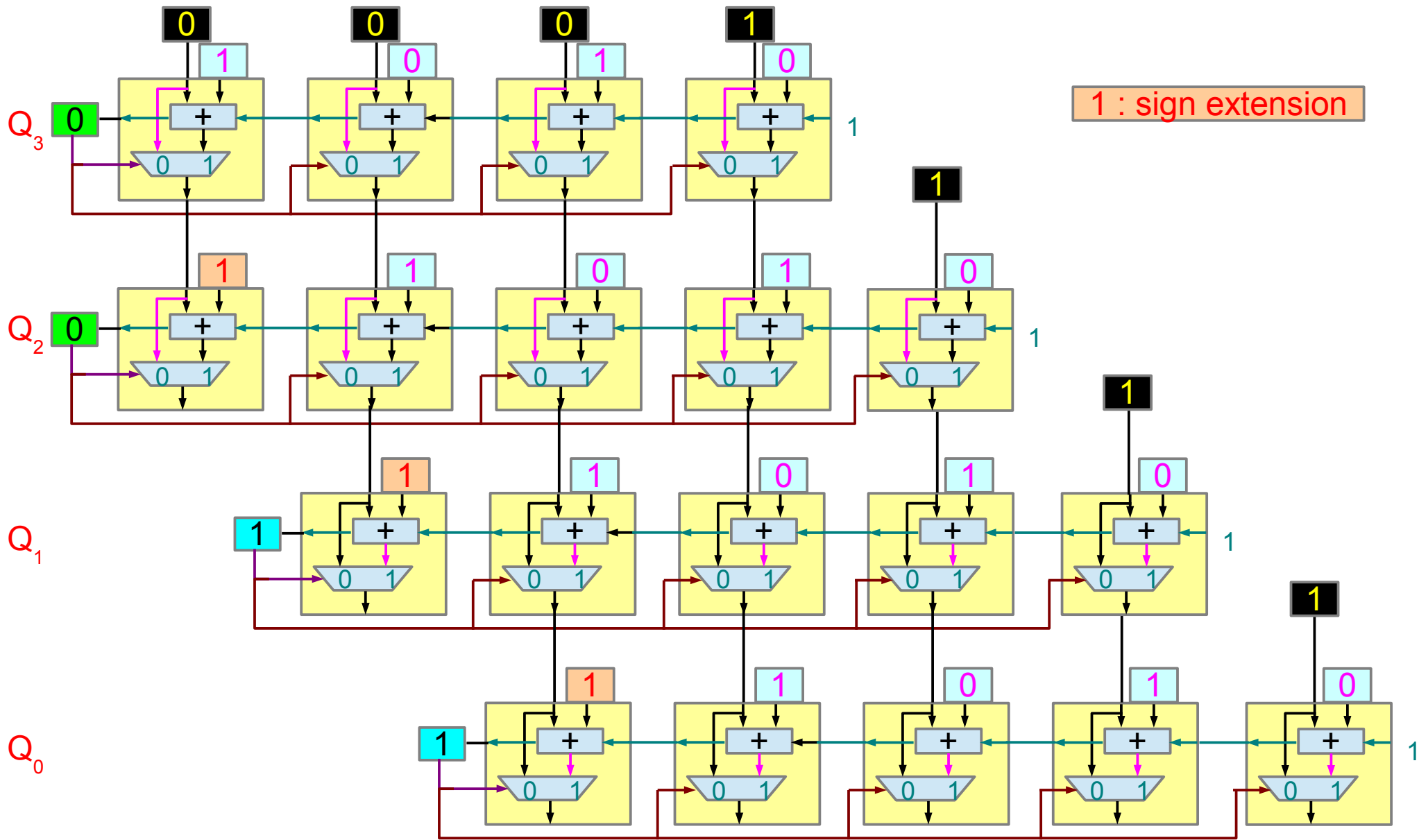
Carry
Q bit = 1



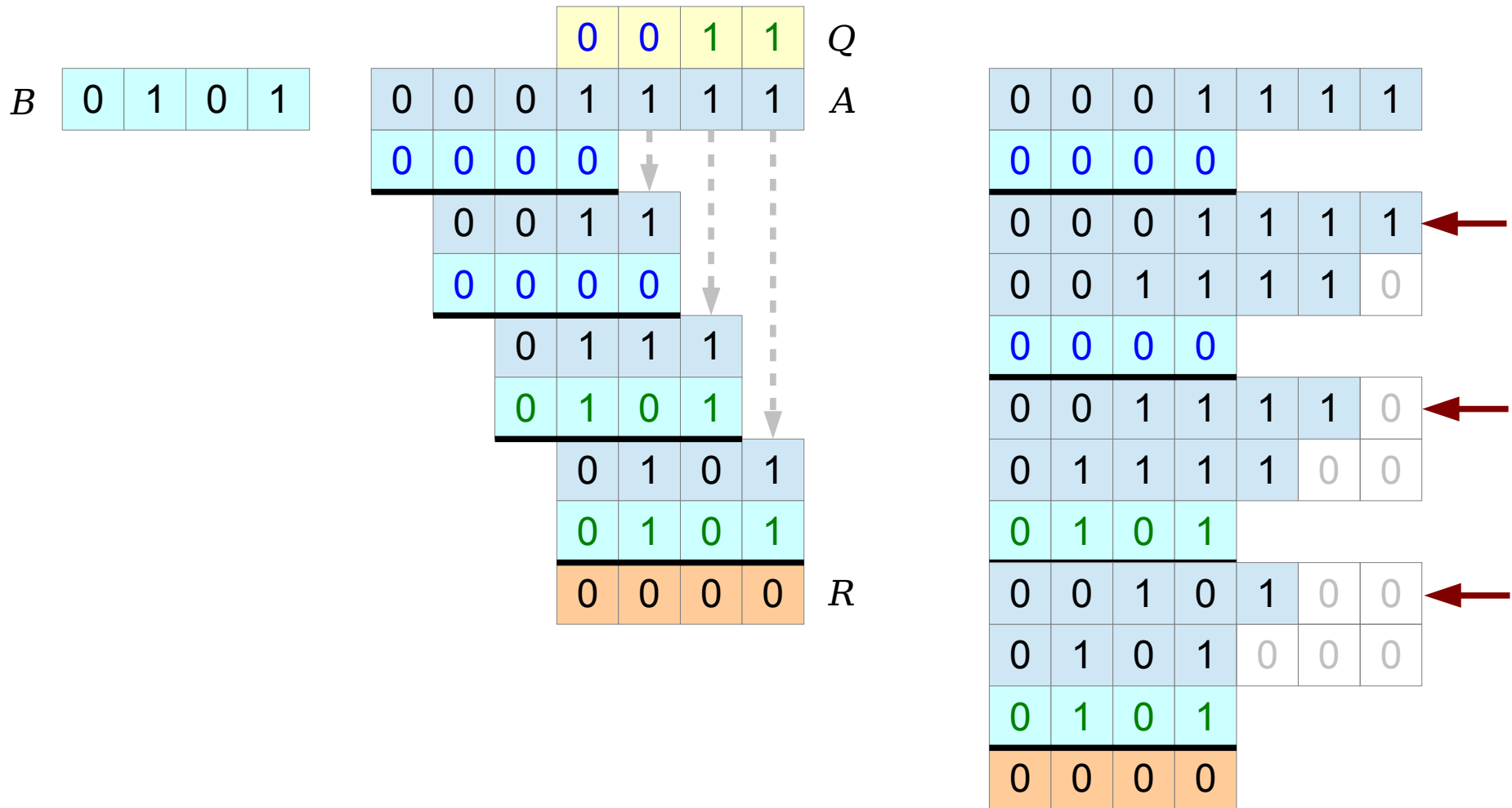
0	1	0	1	
1	0	1	1	
1	0	0	0	0

Carry
Q bit = 1

Divider



Binary Division – Dividend Shifting



Binary Division – Dividend Shifting Algorithm

$R = A$

for $i = N-1$ to 0

$D = R - B$

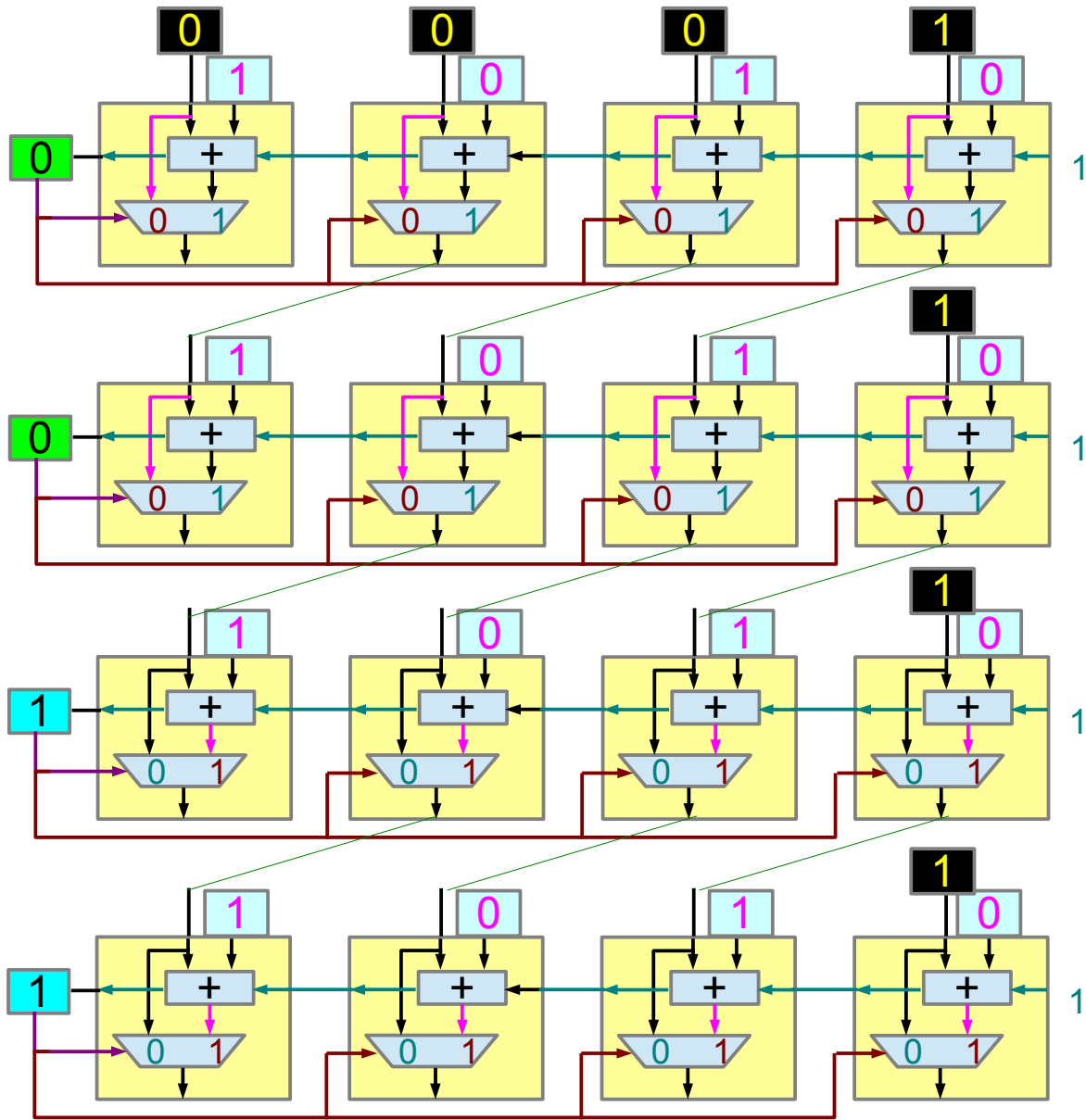
if ($D < 0$) then $Q_i = 0$, $R' = R$

else $Q_i = 1$, $R' = D$

if ($i > 0$) then $R = 2R'$

0	0	0	1	1	1	1
0	0	0	0			
0	0	0	1	1	1	1
0	0	1	1	1	1	0
0	0	0	0			
0	0	1	1	1	1	0
0	1	1	1	1	0	0
0	1	0	1			
0	0	1	0	1	0	0
0	1	0	1	0	0	0
0	1	0	1			
0	0	0	0			

End Around Carry



0	0	0	1
1	0	1	1
0	1	1	0

No Carry
Do not subtract

0	0	1	1
1	0	1	1
0	1	1	0

No Carry
Do not subtract

0	1	1	1
1	0	1	1
1	0	0	1

Carry
Q bit = 1

0	1	0	1
1	0	1	1
1	0	0	0

Carry
Q bit = 1

References

- [1] en.wikipedia.org
- [2] D.M. Harris, S. L. Harris, “Digital Design and Computer Architecture”