

Divident

# 1.4 Division: algorithms and implementation

$$\begin{array}{r}
 \overline{5763} \quad \overline{131} \text{ Divisor} \\
 \underline{524} \quad \underline{43} \\
 = 523 \\
 \underline{393} \\
 \underline{130} \\
 \text{Remainder}
 \end{array}$$

← Quotient

$$\begin{array}{r}
 \overline{11010101} \\
 \underline{1001} \\
 = 10001 \\
 \underline{1001} \\
 = 1111 \\
 \underline{1001} \\
 = 0110
 \end{array}$$

$$\begin{array}{r}
 21 \uparrow \\
 64 \\
 \underline{128} \\
 213 \uparrow 9 \\
 \underline{18} \\
 33 \\
 \underline{27} \\
 = 6
 \end{array}$$

Quotient = 23<sub>ten</sub>

u+1 bits = 5

Remainder = 6<sub>ten</sub>

2u-1 Divident for a u-bit Divisor, such that the quotient is on u bits

## 1.4.1 Restoring division

u=8 => 15-bit Divident

$$\begin{array}{r}
 19 \\
 \underline{128} \\
 147
 \end{array}$$

$$\begin{array}{r}
 17 \\
 128 \\
 256 \\
 1024 \\
 2048 \\
 \underline{3473} \quad 147 \\
 294 \quad 23 \\
 = 533 \\
 441 \\
 = 92
 \end{array}$$

COUNT	A	Q	r
000	000011011	00100010	10010011
-	010010011		
	10001000	00100010	
+	010010011		
	000011011		
	000110110	01000100	
001	010010011		
	101000011	01000100	
+	010010011		
	000110110		
	001101100	10001000	
010	010010011		
	110110001	10001000	
+	010010011		
	001101100		
	011011001	00010000	
011	010010011		
	0000110	00010001	
	010001100	00100010	
100	010010011		
	11111001	00100010	
+	010010011		
	10001100	01000100	
	100011000		

101*	010010011	01000101
	010000101	01000101
	100001010	10001010
110-	010010011	
	001110111	10001011
	011101111	00010110
111-	010010011	
	001011100	00010111
	Reminder	Quotient ✓

$$\begin{array}{r}
 28 + \\
 64 \\
 \hline
 + 92 \checkmark
 \end{array}$$