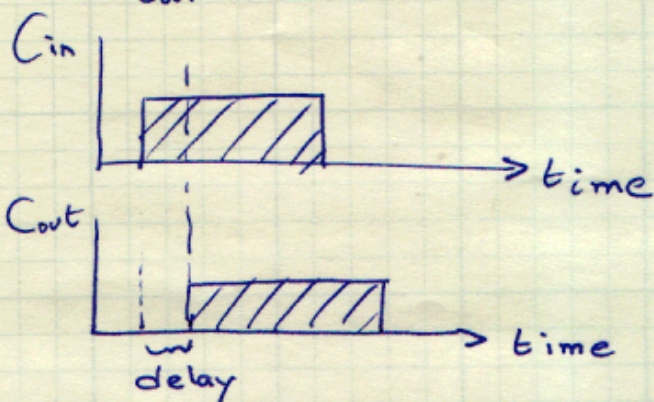


③

Eg

$$\begin{array}{r}
 A \quad a_3 a_2 a_1 a_0 \quad C=1 \\
 1101 \\
 + 1110 \\
 \hline
 11100
 \end{array}$$

} this will only test functionality (no delays)



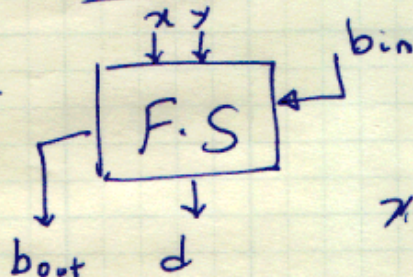
$\times$ C_{out} is not dependent on C_{in} for it to toggle ($\because a_3 = b_3 = 1$)

$\therefore$ Worst case $1010 \downarrow 1$

$$\begin{array}{r}
 1010 \downarrow 1 \\
 + 0101 \\
 \hline
 10000
 \end{array}$$

$\therefore$ for the worst case, the content of carryout should depend on carryin directly.

2. Subtractor



$x - y - bin = -2b_{out} + d$
 $x, y, bin, \text{ and } d$ are all positive.

x	y	bin	$bout$	d
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	0
1	0	0	0	1
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

$$b_{out} = x'bin + x'y + ybin$$

$\hookrightarrow$ from a K-map

$$d = x \oplus y \oplus bin$$

* you can chain subtractors like adders.

3. Mux



$$s=0 \quad z=a ; s=1, z=b$$