

- [Courseware \(/courses/UTAustinX/UT.6.01x/1T2014/courseware\)](/courses/UTAustinX/UT.6.01x/1T2014/courseware)
- [Course Info \(/courses/UTAustinX/UT.6.01x/1T2014/info\)](/courses/UTAustinX/UT.6.01x/1T2014/info)
- [Discussion \(/courses/UTAustinX/UT.6.01x/1T2014/discussion/forum\)](/courses/UTAustinX/UT.6.01x/1T2014/discussion/forum)
- [Progress \(/courses/UTAustinX/UT.6.01x/1T2014/progress\)](/courses/UTAustinX/UT.6.01x/1T2014/progress)
- [Questions \(/courses/UTAustinX/UT.6.01x/1T2014/a3da417940af4ec49a9c02b3eae3460b/\)](/courses/UTAustinX/UT.6.01x/1T2014/a3da417940af4ec49a9c02b3eae3460b/)
- [Syllabus \(/courses/UTAustinX/UT.6.01x/1T2014/a827a8b3cc204927b6efaa49580170d1/\)](/courses/UTAustinX/UT.6.01x/1T2014/a827a8b3cc204927b6efaa49580170d1/)

The computer performs many arithmetic and logic operations. We will show one of them to illustrate some of the computation possible in the computer. We begin the design of an adder circuit with a simple subcircuit called a binary full adder, as shown in Figure 4.10. There are two binary data inputs  $A$ ,  $B$ , and a carry input,  $C_{in}$ . There is one data output,  $S_{out}$  and one carry output,  $C_{out}$ . As shown in Table 4.5,  $C_{in}$ ,  $A$ , and  $B$  are three independent binary inputs each of which could be 0 or 1. These three inputs are added together (the sum could be 0, 1, 2, or 3), and the result is encoded in the two-bit binary result with  $C_{out}$  as the most significant bit and  $S_{out}$  as the least significant bit.  $C_{out}$  is true if the sum is 2 or 3, and  $S_{out}$  is true if the sum is 1 or 3.

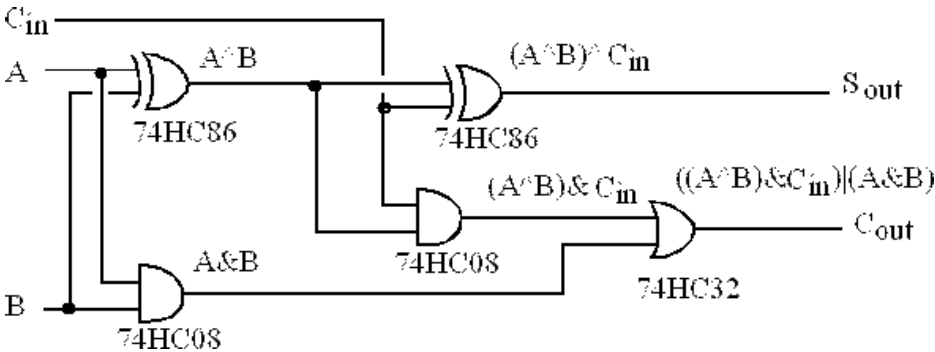


Figure 4.10. A binary full adder.

$A$	$B$	$C_{in}$	$A+B+C_{in}$	$C_{out}$	$S_{out}$
0	0	0	0	0	0
0	0	1	1	0	1
0	1	0	1	0	1
0	1	1	2	1	0
1	0	0	1	0	1
1	0	1	2	1	0
1	1	0	2	1	0

UT.6.01x Courseware					https://courses.edx.org/courses/UTAustinX/UT...
1	1	1	3	1	1

Table 4.5. Input/output response of a binary full adder.



About (<https://www.edx.org/about-us>) Jobs (<https://www.edx.org/jobs>)  
Press (<https://www.edx.org/press>) FAQ (<https://www.edx.org/student-faq>)  
Contact (<https://www.edx.org/contact>)



EdX is a non-profit created by founding partners Harvard and MIT whose mission is to bring the best of higher education to students of all ages anywhere in the world, wherever there is Internet access. EdX's free online MOOCs are interactive and subjects include computer science, public health, and artificial intelligence.

Help



(<http://www.meetup.com/edX-Global-Community/>)



(<http://www.facebook.com/EdxOnline>)



(<https://twitter.com/edXOnline>)



(<https://plus.google.com/108235383044095082735/posts>)



(<http://youtube.com/user/edxonline>)

© 2014 edX, some rights reserved.

Terms of Service and Honor Code -  
Privacy Policy (<https://www.edx.org/edx-privacy-policy>)