How are binary numbers used?

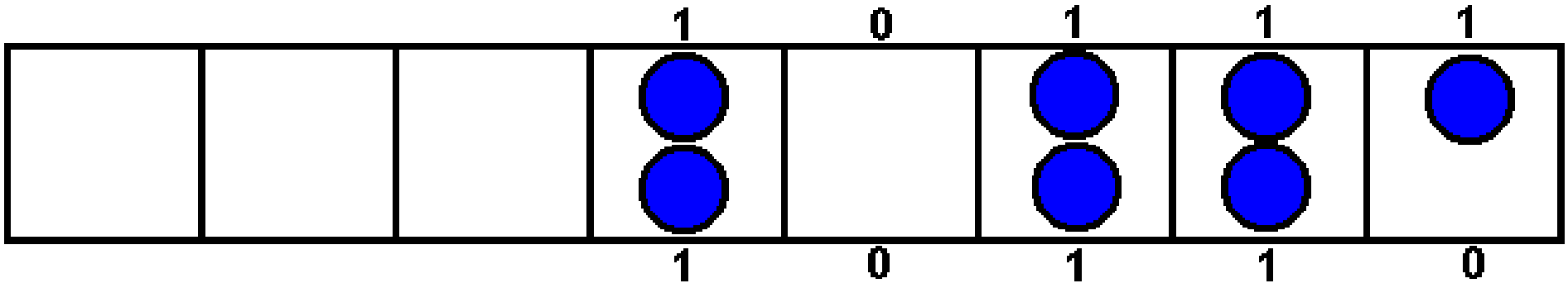
Computers are built from collections of switches which can be either on (1) or off (0). Decimal numbers are converted into binary and the computations are done by switches flipping from off to on or from on to off.

Adding binary numbers

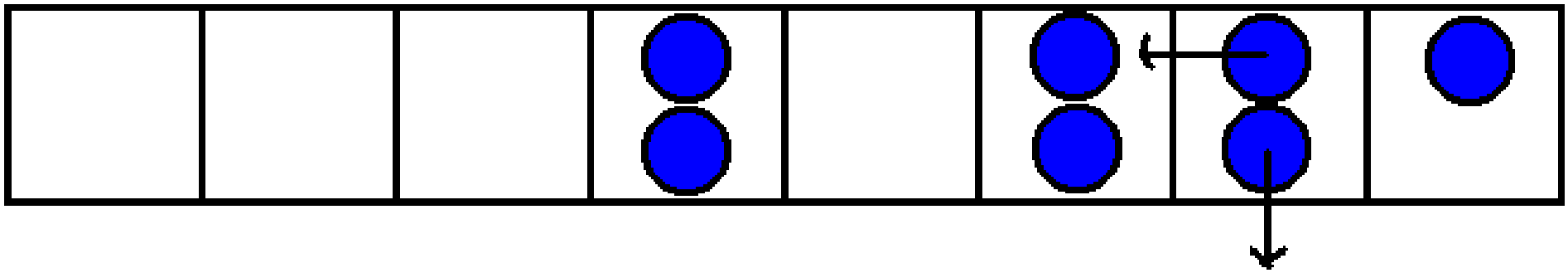
A computer adds numbers simply by flipping switches. You can simulate computer adding by using this adding board to add binary numbers.

Let's say you want to add 10110 and 10111.

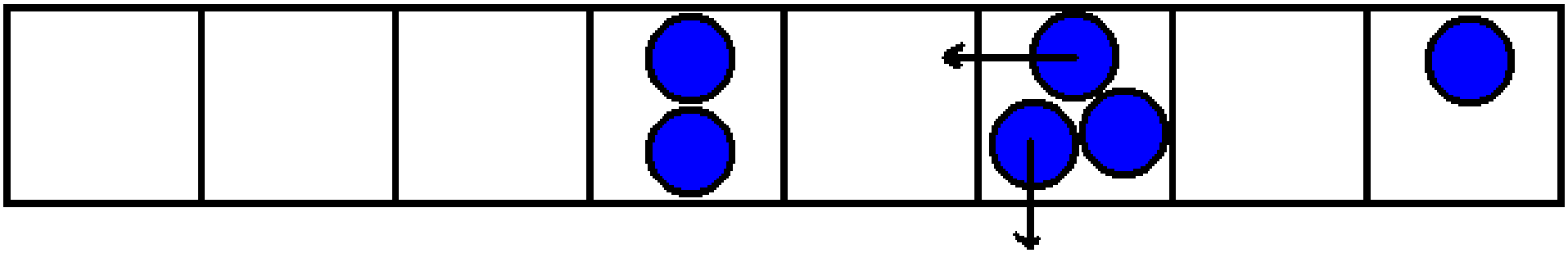
1. Place the number 10110 on the adding board using the counters. Place the number 10111 next to it.



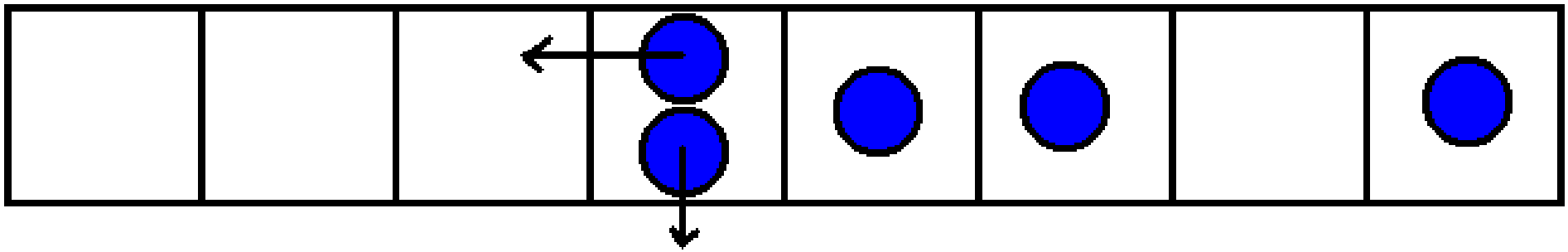
2. Begin at the right hand end of the board. If there is one counter on a square, leave it alone. If there are two counters on a square, take one off and move the other one space to the left. (In binary, 1 + 1 = 10, 10 + 10 = 100, et cetera. When you move a counter forward, you are "carrying a 1".)



3. If you have three counters on a square, take one off, move one forward, and leave one where it is. (1 + 1 + 1 = 1 + 10 = 11)



4.



5. When each square contains no more than one counter, read the answer: