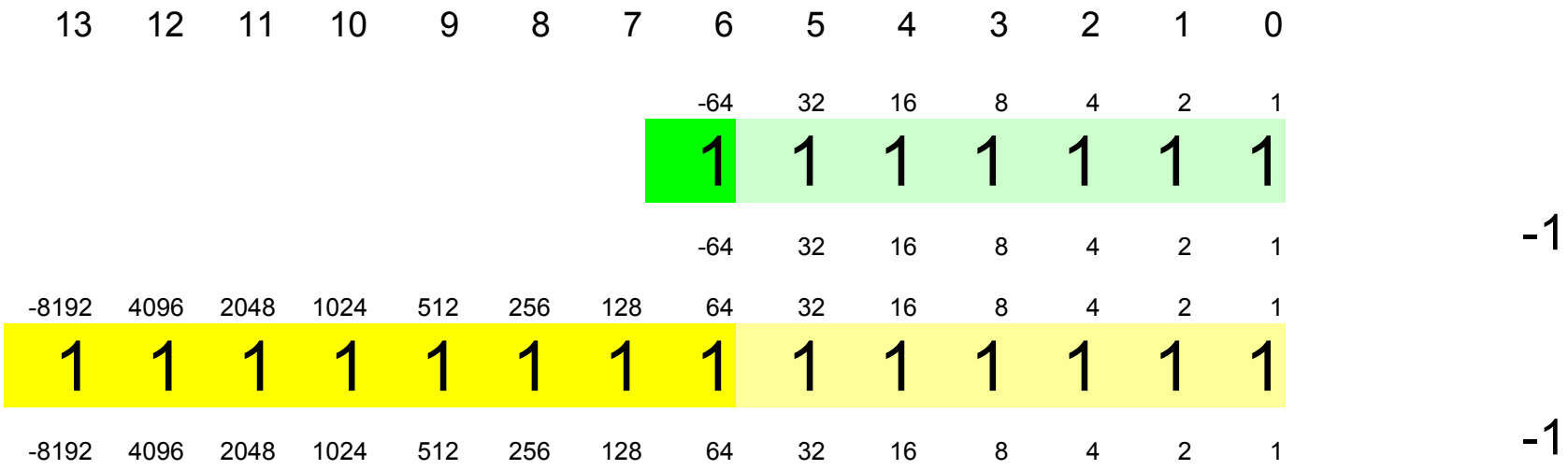
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	
-32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
32768	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32768
-32768	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32768

128	64	32	16	8	4	2	1	
-128	64	32	16	8	4	2	1	
1	0	0	0	0	0	0	0	
128	0	0	0	0	0	0	0	128
-128	0	0	0	0	0	0	0	-128

Range of unsigned numbers: 0 to 2^n-1

Range of twos complement numbers: -2^{n-1} to $2^{n-1}-1$



When extending twos-complement, copy the sign bit of the smaller to all the new bits of the larger

	11	10	9	8	7	6	5	4	3	2	1	0	
The carries	0	1	0	0	1	1	1	1	1	1	1	0	0	
Term 1		0	1	0	0	0	0	1	0	1	0	1	0	1066
Term 2		0	1	1	0	1	1	1	1	0	1	1	1	1783
The result		1	0	1	1	0	0	1	0	0	0	0	1	-1247

Overflow occurs when two numbers with the same sign are added and the result has a different sign

Overflow can be checked by seeing if the carry-in and carry-out of the msb differ