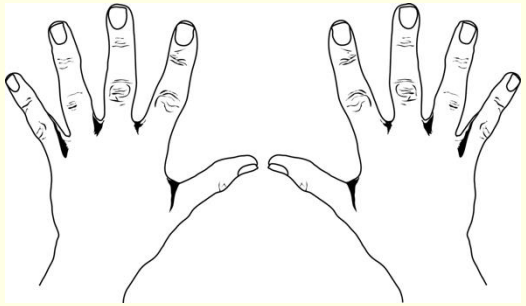
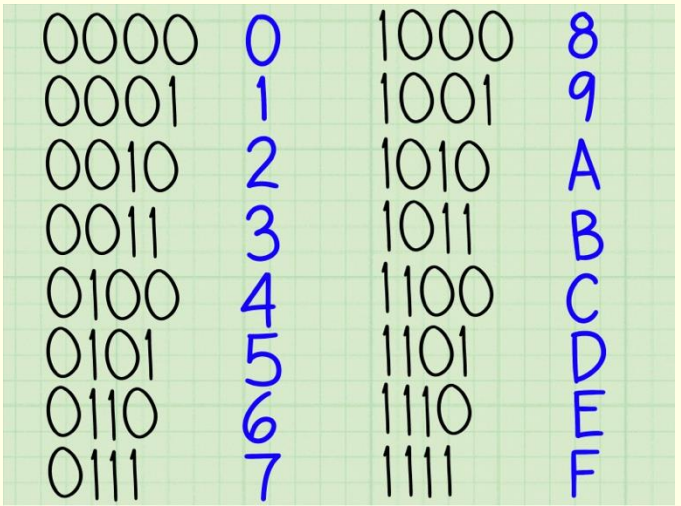
Learning Objectives

Learn about the HEX number system and how it is used in computing

Be able to convert HEX to binary/ HEX to Decimal and vice versa

Number Systems

BASE 2	Base 10	Base 16
Binary 0 1 	Decimal (Denary) 0 1 2 3 4 5 6 7 8 9 	HEXADECIMAL 0 1 2 3 4 5 6 7 8 9 A B C D E F 

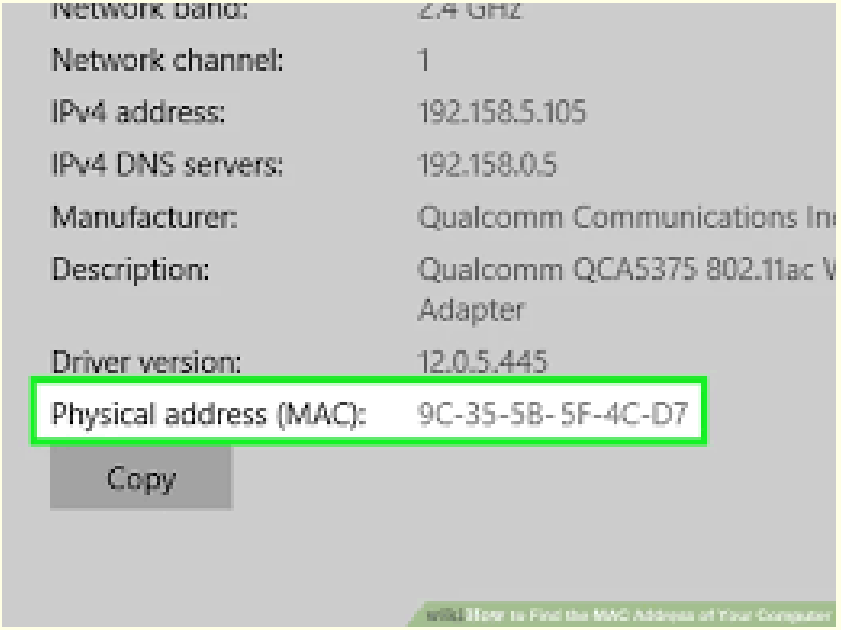
Why use Hexadecimal Numbers?

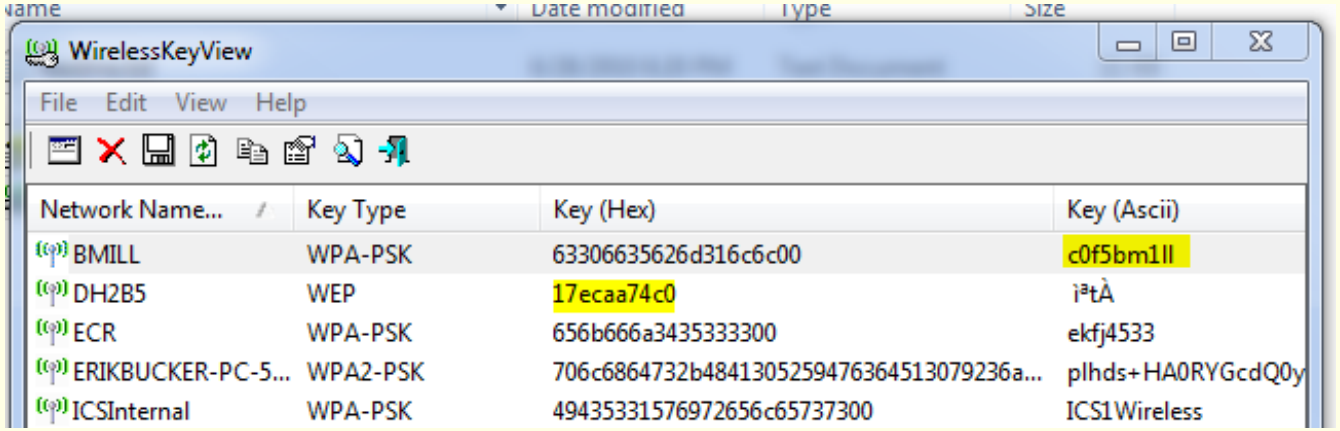
Hexadecimals are used by computer scientists for the following reasons:

Binary produces long strings and can be difficult to work with. Hex is shorter.

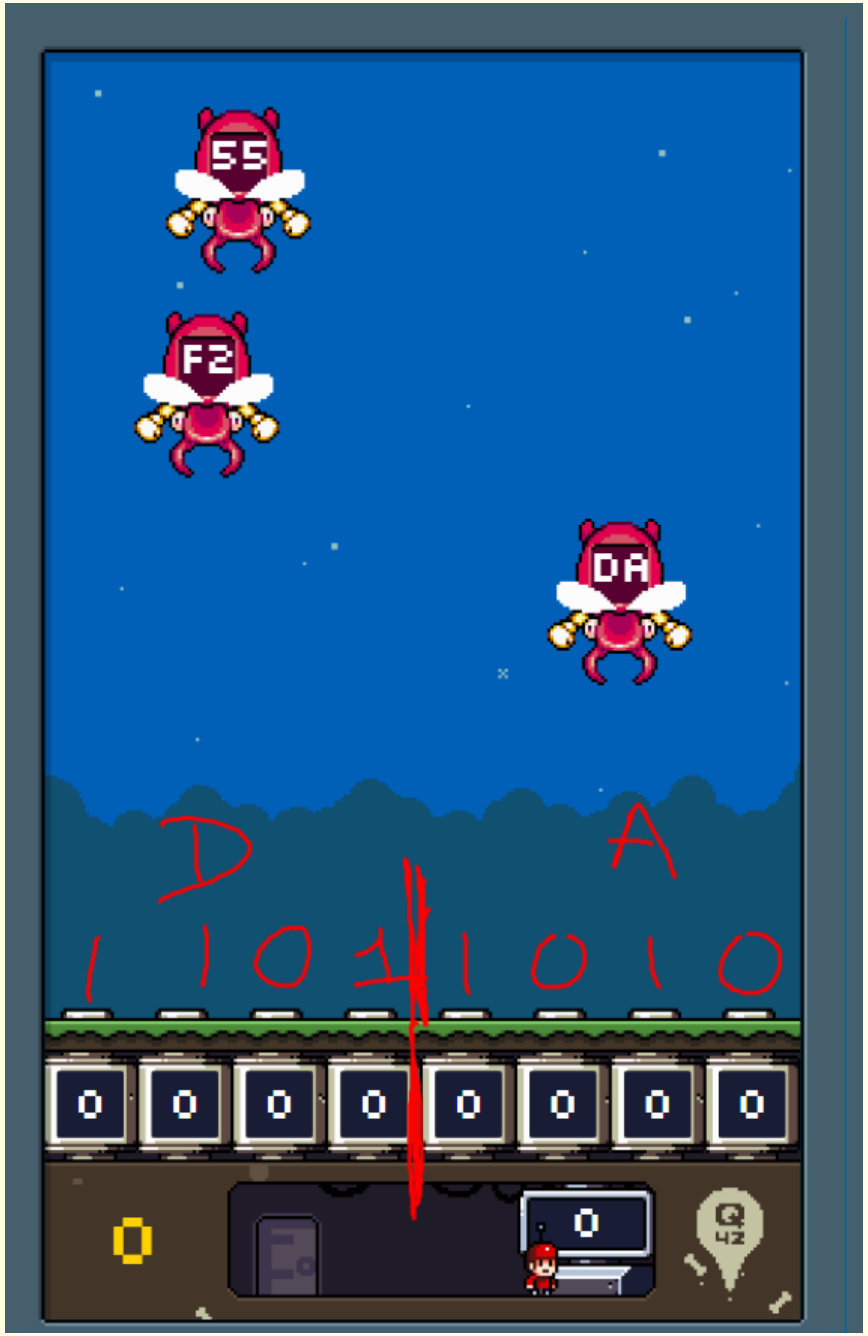
Hex can be easily converted to/from binary as there is 1 hex digit per nibble.

Hex is less susceptible to error.

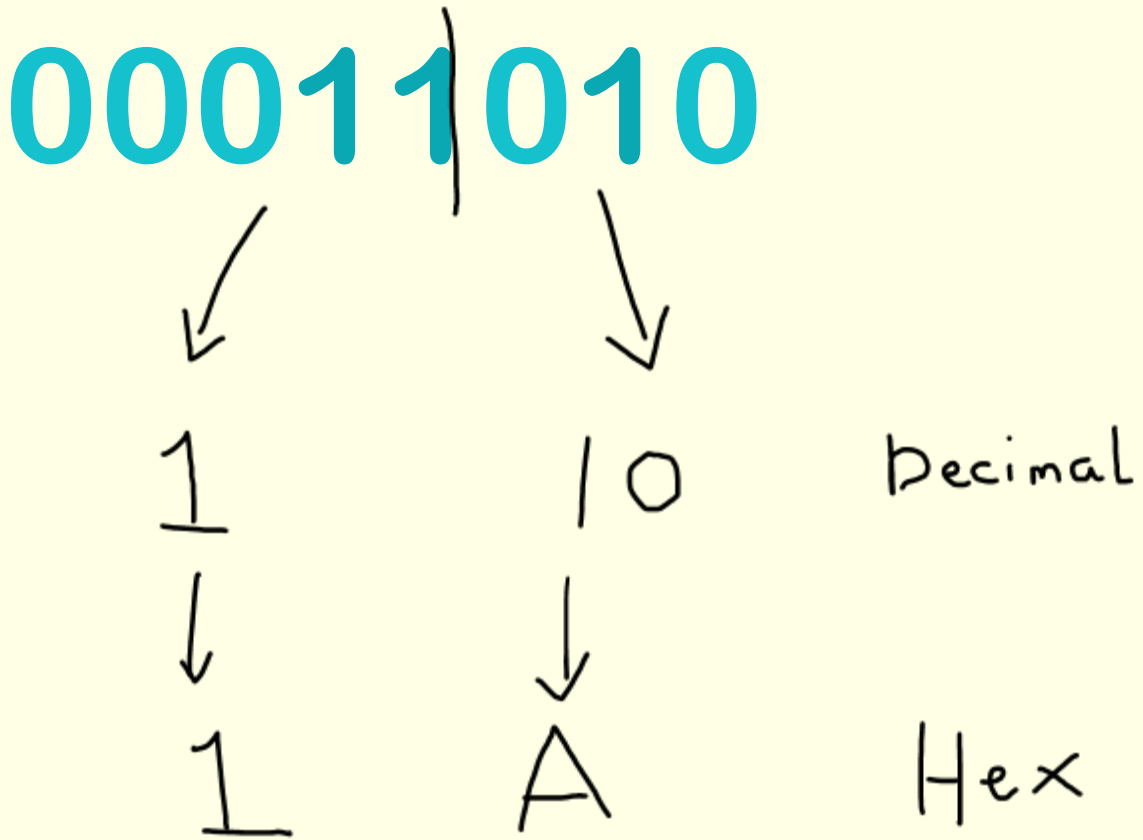




Decimal (Base 10)	Binary (Base 2)	Hexadecimal (Base 16)
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

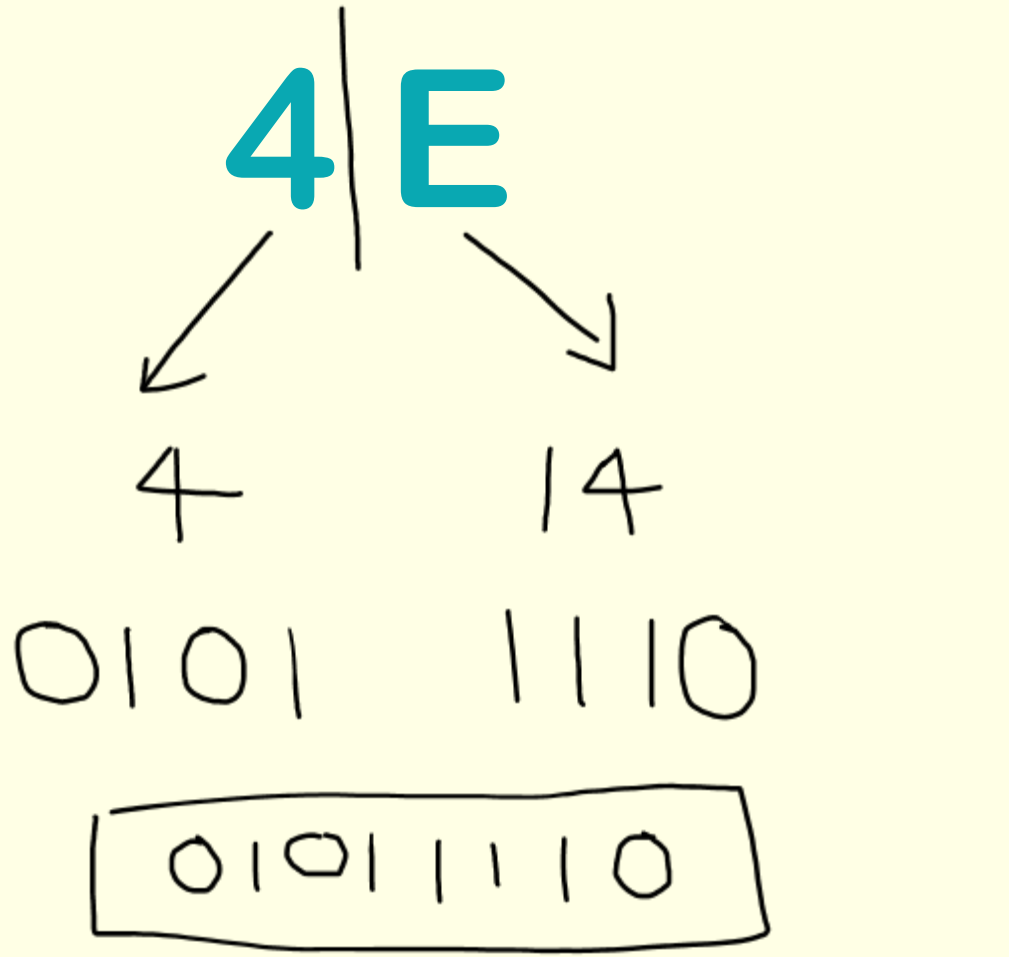


Working out the Hexadecimal



decimal	hexadecimal	binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

Working out the Denary



decimal	hexadecimal	binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

Working out the Hexadecimal

164

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

10 → A

4 → 4

A4

decimal	hexadecimal	binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111