

9/12/18

(1)

# Counting in other bases

## Base 8

65, 66, 67, 70, 71, 72, 73, 74,

75, 76, 77, 100, 101, 106, 107, 110

## Base 3

1, 2, ~~3~~, 10, 11, 12, 20

21, 22, 100,

---

## Base 16

F9, FA, FB, FC, FD, FE, FF, 100

## Base 16

99, 9A, 9B, 9C, 9D, 9E, 9F, A0, A1

# Bitwise operations

(2)

- Deal with individual bits in byte/word--
- Each bit evaluated separately

- Notation used:

& AND

| OR (sometimes prints as | )

^ XOR

~ bit wise compliment (NOT)



LED 0 0 0 0 0 0 0 0



Turn off this LED  
Don't change any others

LED pins & 11110111  
                  :

OR

A	B	A   B
0	0	0
0	1	1
1	0	1
1	1	1

OR

12 ~~1~~ 5

```

1100
0101
-----
1101    13

```

FC | SF - ?

```

1111 1100
0101 1111
-----
1111 1111    FF

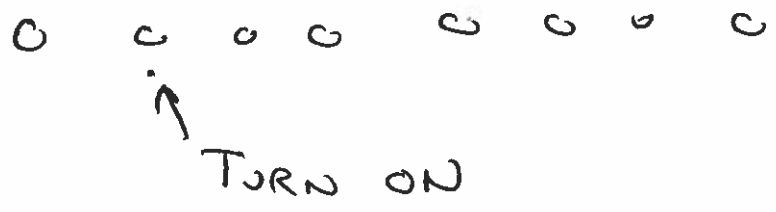
```

OR AS  
C 4

```

1010 0101
1100 0100
-----
1110 0101    E5

```



LEDs | 0100 0000

NOT (Compliment)

A	~A
0	1
1	0

~12      1100

~1100 = 0011 = 3

~12 (8 bit)

12 = 0000 1100

~12 = 1111 0011 = 243  
= F3 :

$$\begin{array}{r} 255 \\ - 12 \\ \hline 243 \end{array}$$



# XOR (EXCLUSIVE OR)

(7)

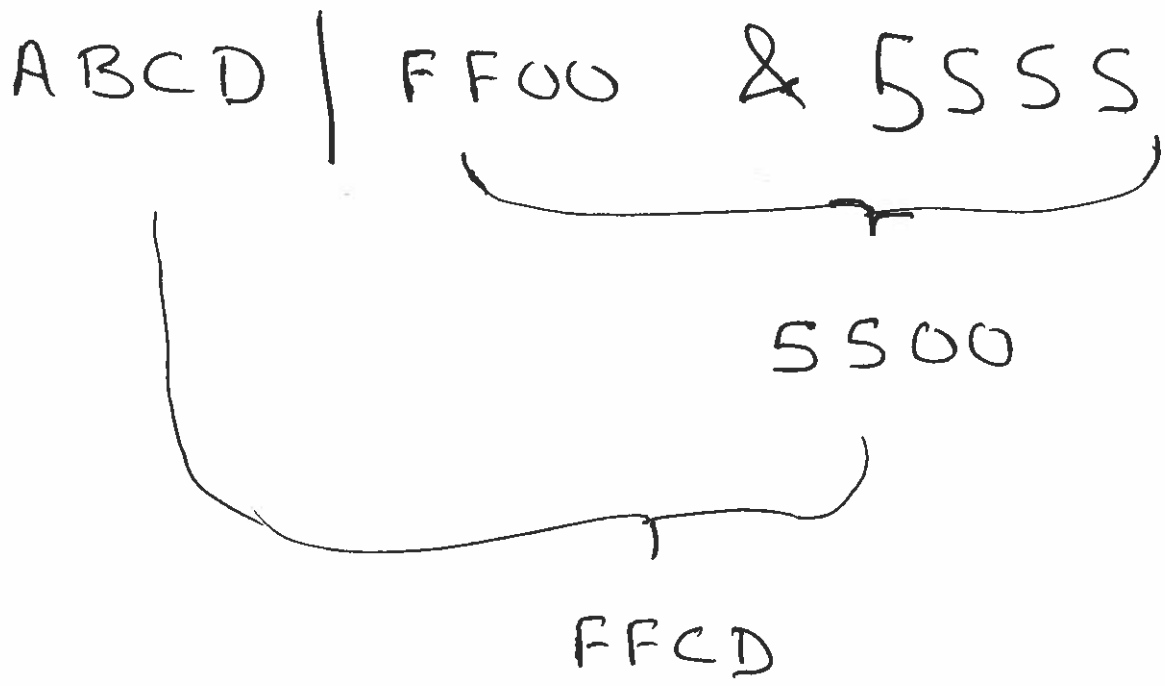
A	B	$A \wedge B$
0	0	0
0	1	1
1	0	1
1	1	0

$12 \wedge 5$

$$\begin{array}{r} 1100 \\ 0101 \\ \hline 1001 = 9 \end{array}$$

~~12~~  $\wedge$  5F = ?  
FC

$$\begin{array}{r} 11111100 \\ 01011111 \\ \hline 10100011 = A3 \end{array}$$



### OPERATOR HIERARCHY

