



# Binary Lesson 2

## Bytes

# Base Ten

- Normal Numbers
- Each place has one of these values:
  - 0 1 2 3 4 5 6 7 8 9
- $147 = 1*100 + 4*10 + 7$
- Or  $1*10^2 + 4*10^1 + 7*10^0$

# Base Ten

1 4 7

Hundreds place  
Number of hundreds  
 $10^2$

Ones place  
Number of ones  
 $10^0$

Tens place  
Number of tens  
 $10^1$

# Base Two

- Binary Numbers
- Each place has one of these values:
  - 0 1
- $11 = 1 * 2 + 1 = 3$
- Or  $1 * 2^1 + 2^0$

# Base Two

1 0 1

Fours place  
Number of fours  
 $2^2$

Ones place  
Number of ones  
 $2^0$

Twos place  
Number of twos  
 $2^1$

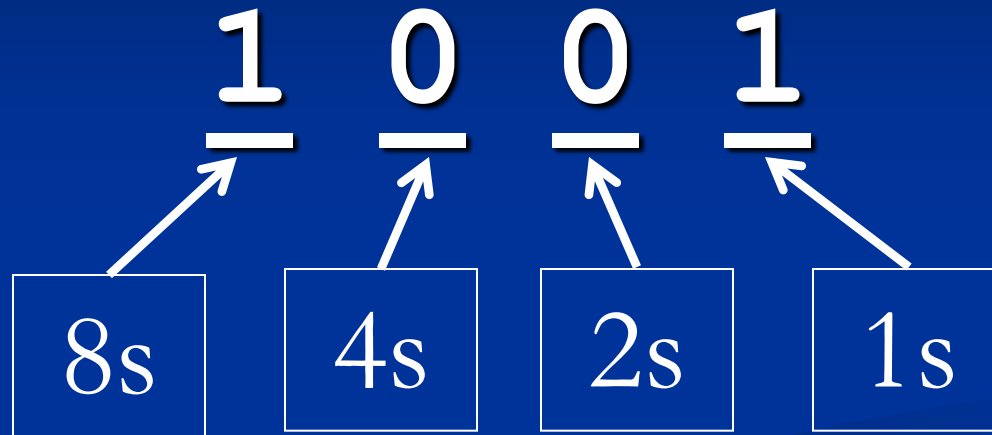
# Counting to 7

■ Base Two	Base Ten
■ 0	0
■ 1	1
■ 10	2
■ 11	3
■ 100	4
■ 101	5
■ 110	6
■ 111	7

# Counting to 15

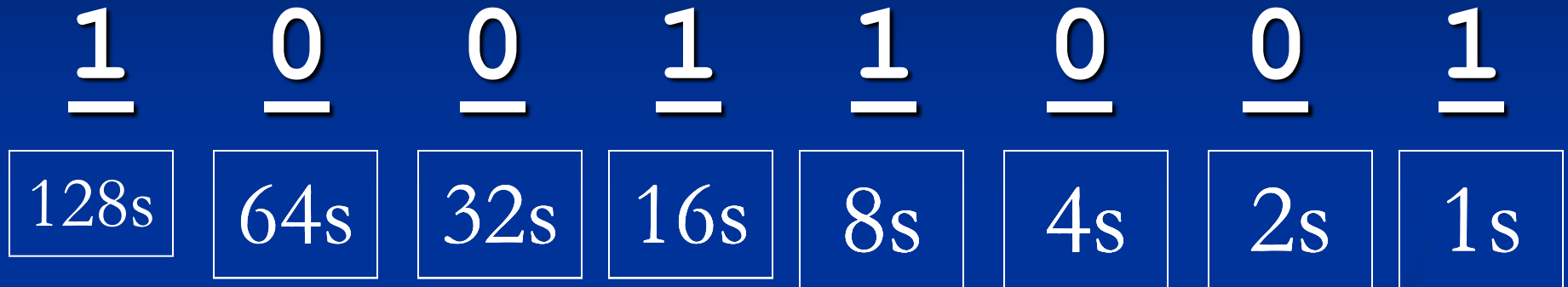
■ Base Two	Base Ten	Base Two	Base Ten
■ 0	0	1000	8
■ 1	1	1001	9
■ 10	2	1010	10
■ 11	3	1011	11
■ 100	4	1100	12
■ 101	5	1101	13
■ 110	6	1110	14
■ 111	7	1111	15

# Four Bits Make a Nybble





# Eight Bits Make a Byte



So this number is

$$128 + 16 + 8 + 1 = 153$$