# COMPUTER SYSTEMS FUNDAMENTALS
# ( 4COSC004W )

Week 1. Part 1 of 2

# Contact details

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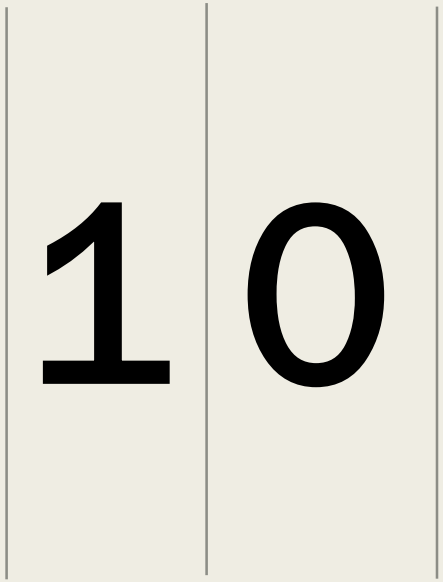
# THE NATURE OF NUMBERS

Positional number systems

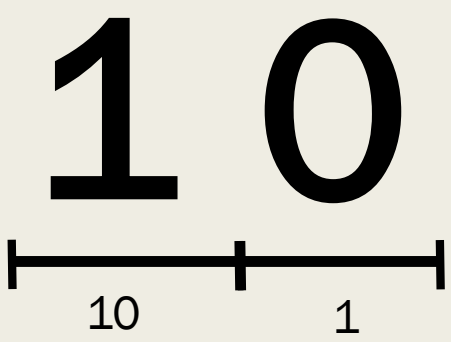
# By the end of this video, you will:

- Understand the concept of Positional Number Systems
- Be able to count and interpret natural numbers
  - *Positive (unsigned) Integers*
- Understand the following number systems:
  - *Decimal / Denary – Base 10*
  - *Binary - Base 2*
- Be able to count in Binary

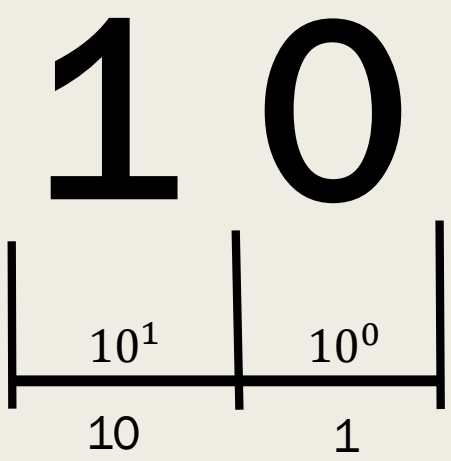
# Decimal / Denary – Base 10



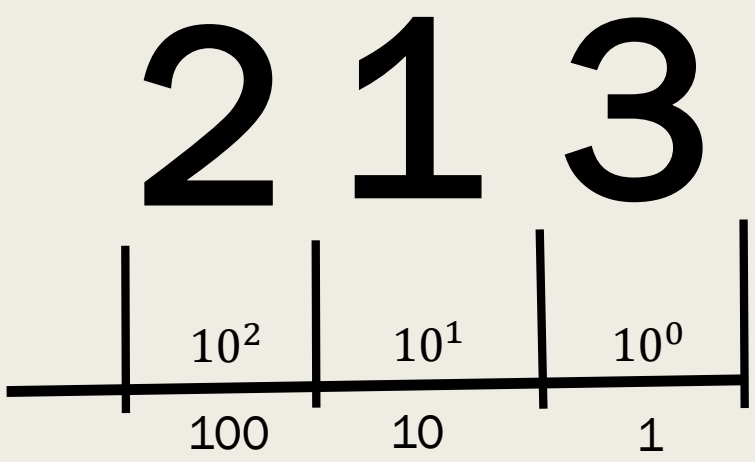
# Decimal / Denary – Base 10



# Decimal / Denary – Base 10



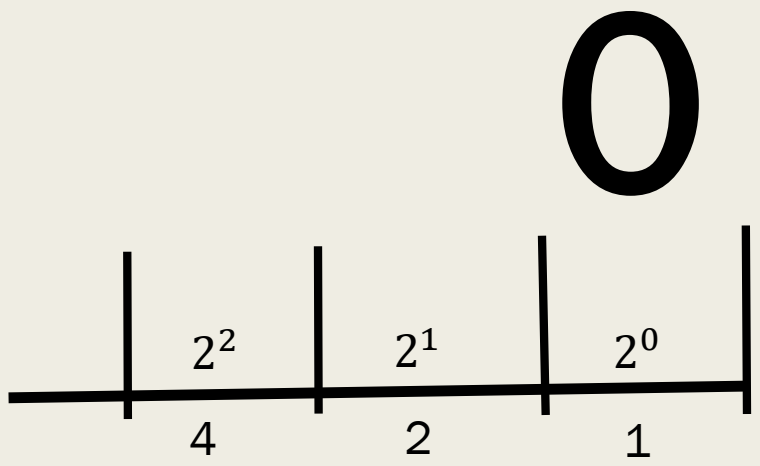
# Decimal / Denary – Base 10



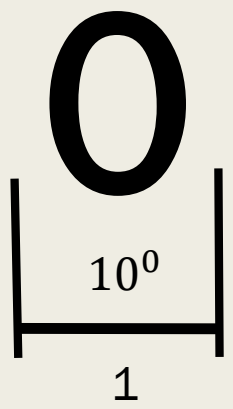
# Binary : Why use Binary?

- Base 10 is convenient for humans.
- Binary is used for Digital systems
  - *On/Off*
- We will revisit this

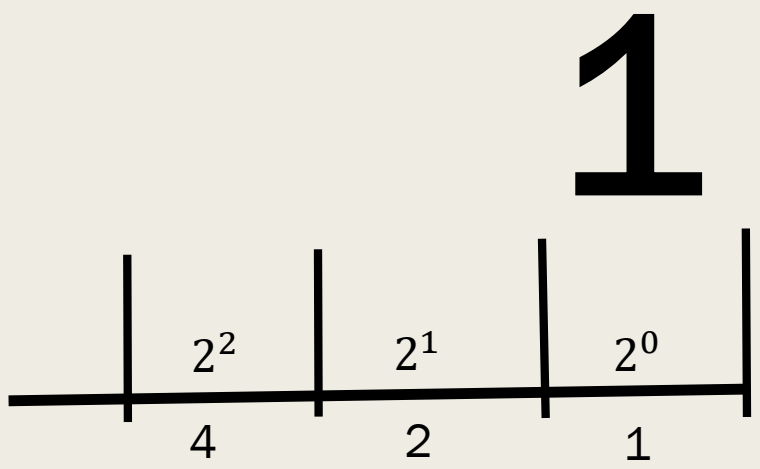
# Base 2
# Binary



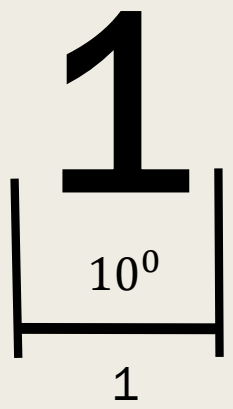

# Base 10
# Denary



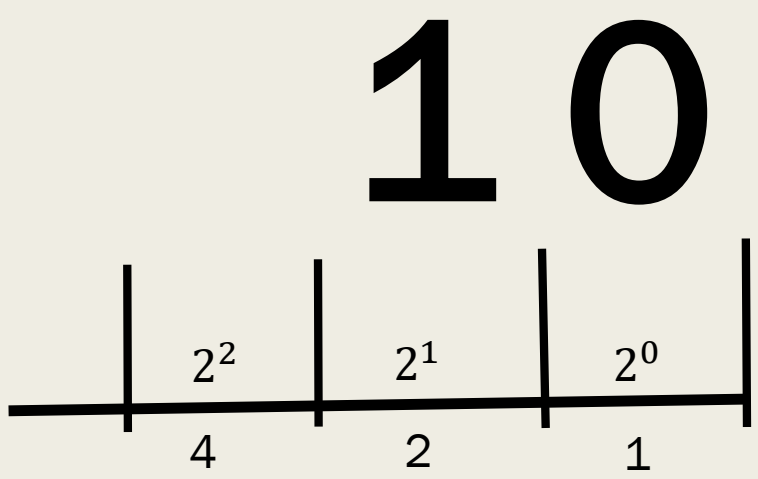
# Base 2
# Binary



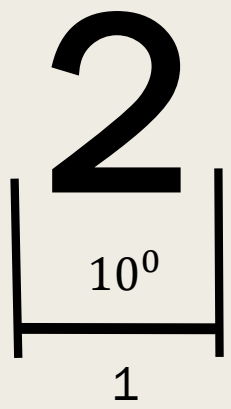

# Base 10
# Denary



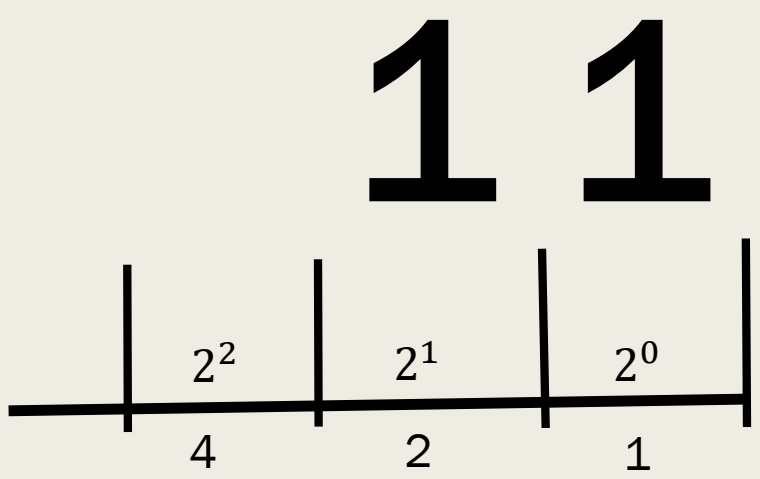
Base 2
Binary



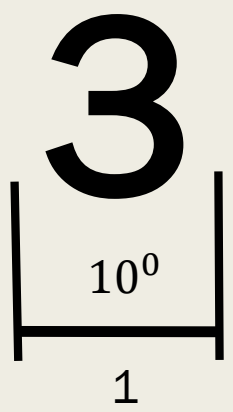

Base 10
Denary



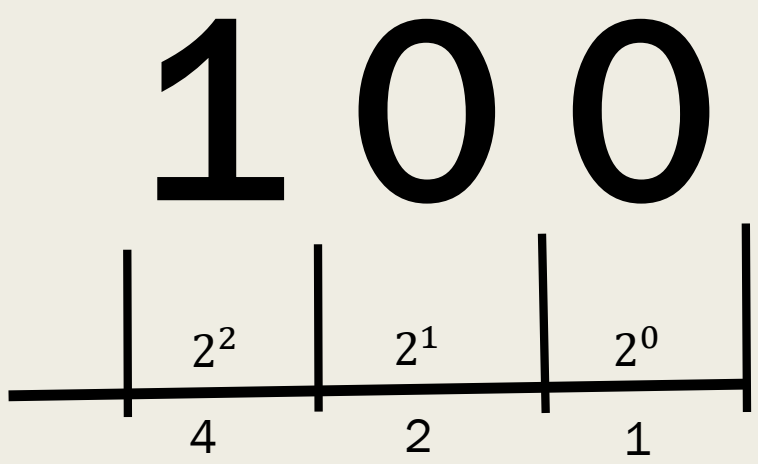
Base 2
Binary



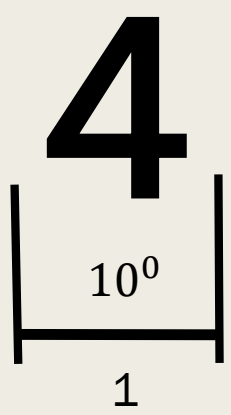

Base 10
Denary



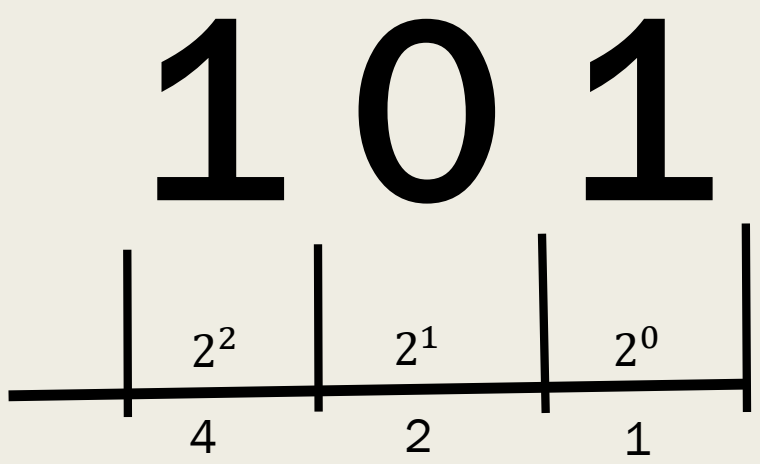
Base 2
Binary



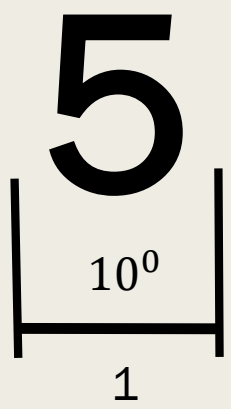

Base 10
Denary



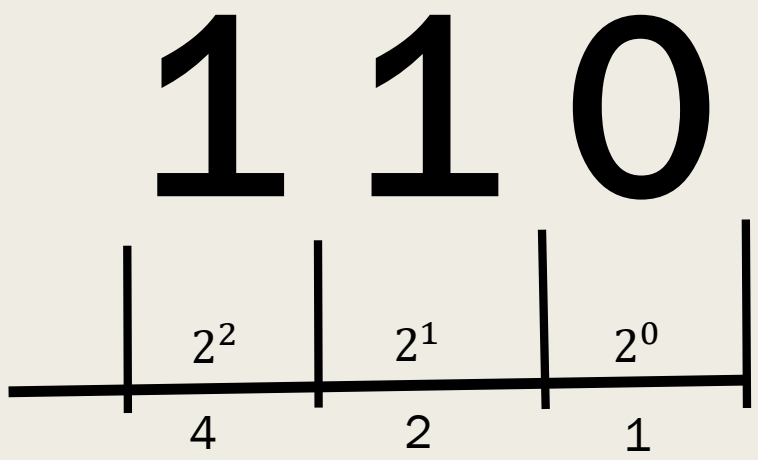
Base 2
Binary



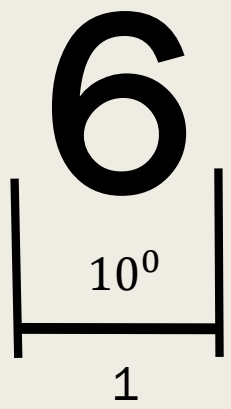

Base 10
Denary



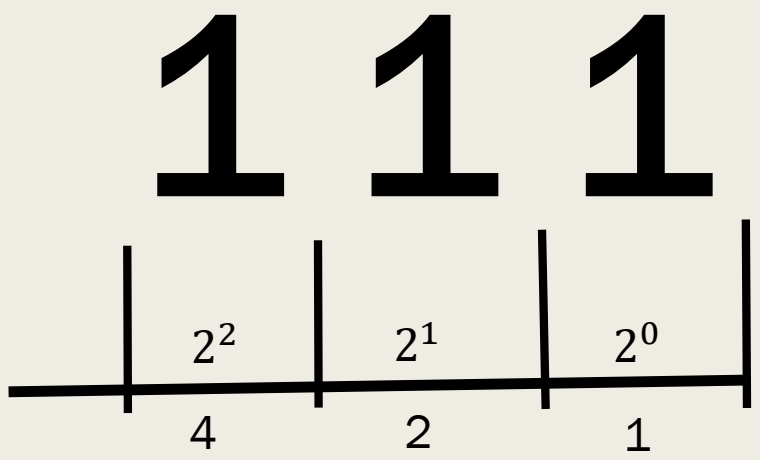
Base 2
Binary



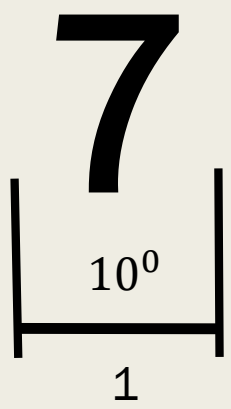

Base 10
Denary



Base 2
Binary

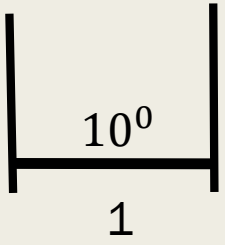



Base 10
Denary



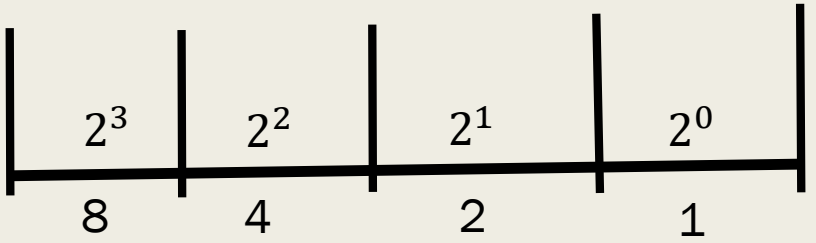
Base 10
Denary

8




Base 2
Binary

1 0 0 0

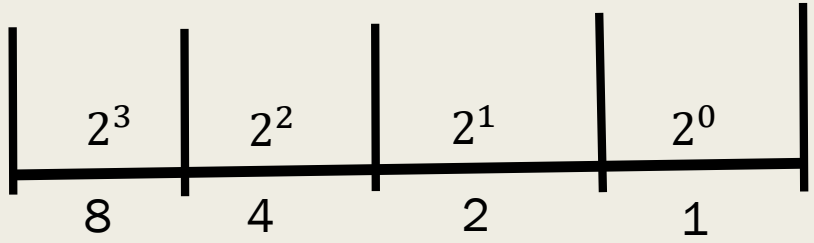


# An exercise for you:

Convert the 4-bit **Binary** value **1100** into **Denary**:

Base 2
Binary

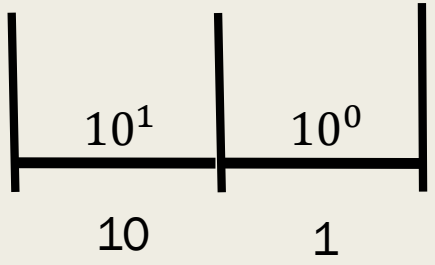
1 1 0 0




Base 10
Denary

8 + 4 = 12

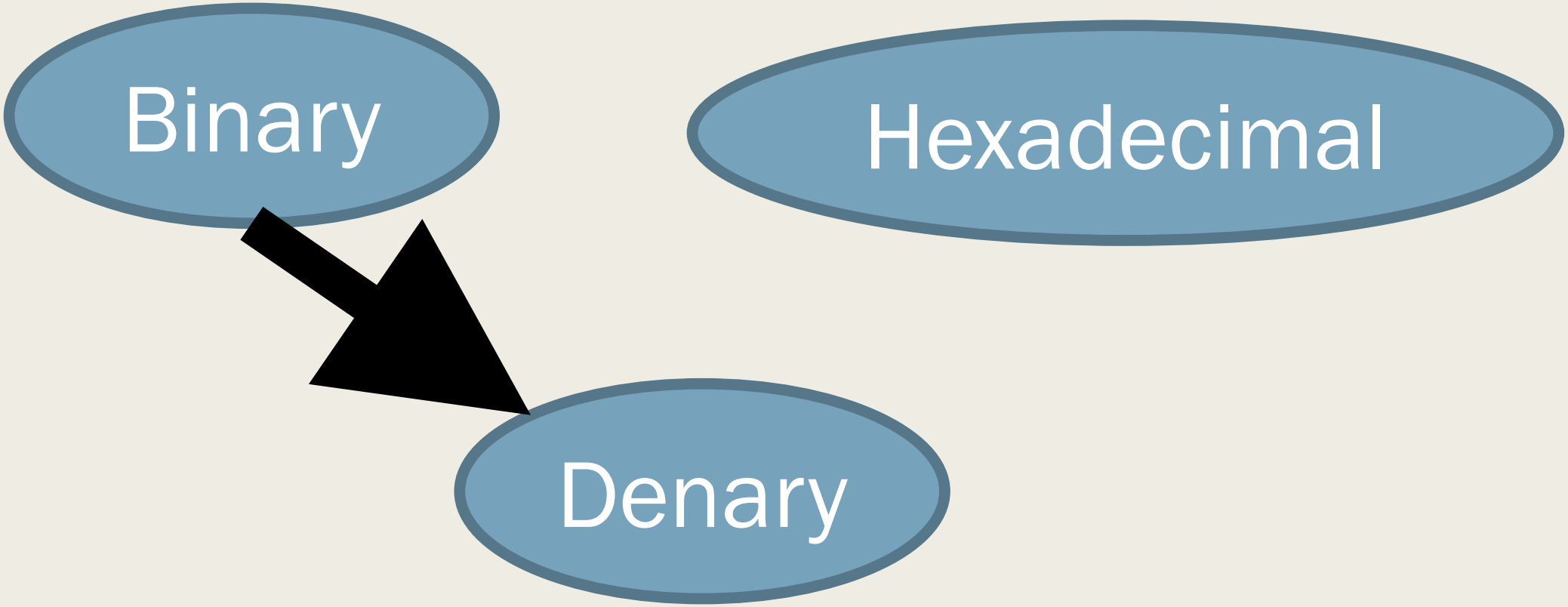
1 2



# Tutorial exercise:

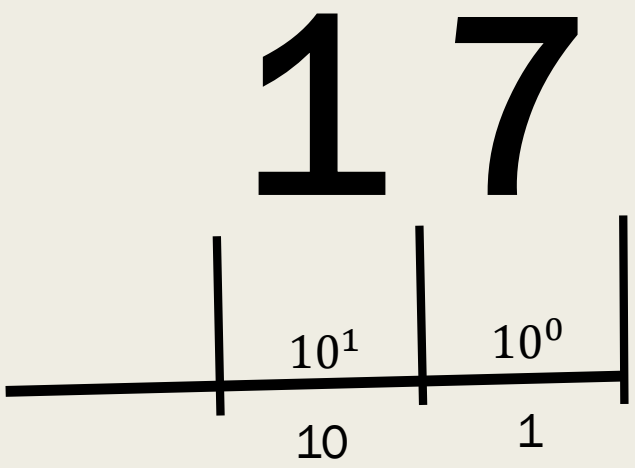
- This will provide you with more 4-bit Binary Nibbles to convert to Denary

# Number System Triangle

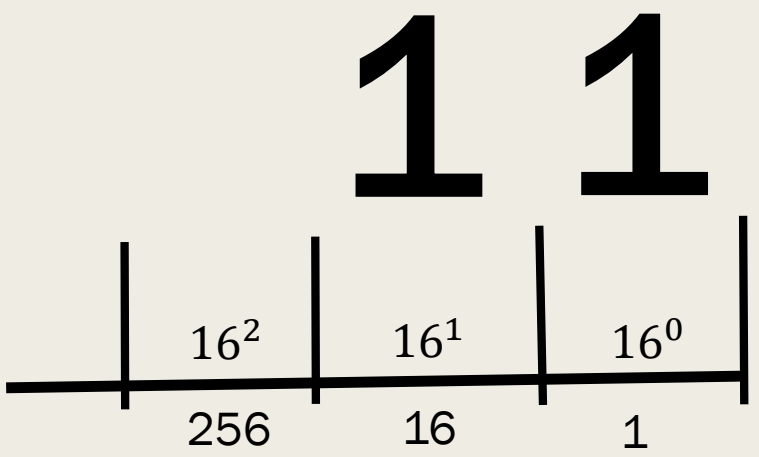


| Denary | Binary | Hexadecimal |
|---|---|---|
| 0 | 0 0 0 0 | 0 |
| 1 | 0 0 0 1 | 1 |
| 2 | 0 0 1 0 | 2 |
| 3 | 0 0 1 1 | 3 |
| 4 | 0 1 0 0 | 4 |
| 5 | 0 1 0 1 | 5 |
| 6 | 0 1 1 0 | 6 |
| 7 | 0 1 1 1 | 7 |
| 8 | 1 0 0 0 | 8 |
| 9 | 1 0 0 1 | 9 |
| 10 | 1 0 1 0 | A |
| 11 | 1 0 1 1 | B |
| 12 | 1 1 0 0 | C |
| 13 | 1 1 0 1 | D |
| 14 | 1 1 1 0 | E |
| 15 | 1 1 1 1 | F |

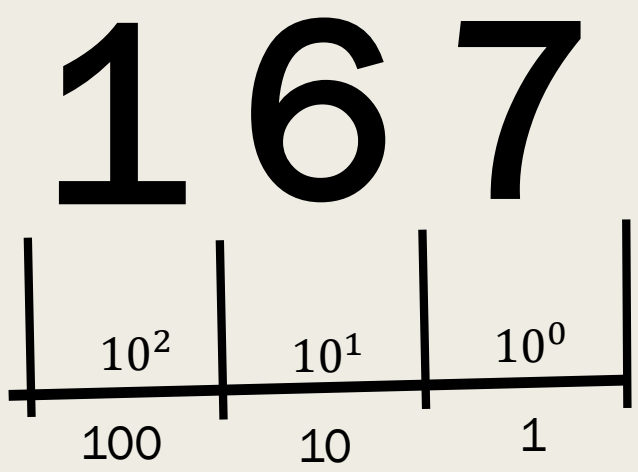
## Base 10
## Denary



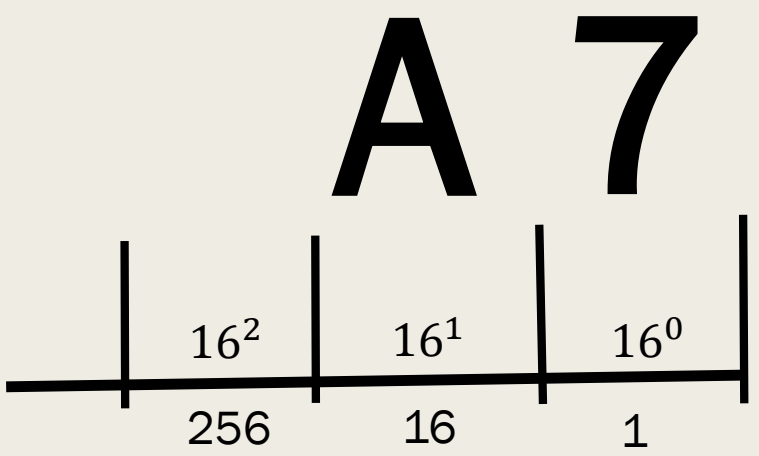

## Base 16
## Hexadecimal



Base 10
Denary




Base 16
Hexadecimal



# In this video we have covered:

- Positional Number Systems
- Positive (unsigned) Integers
  - *Decimal / Denary – Base 10*
  - *Binary  - Base 2*
  - *Hexadecimal – Base 16*

# In the next video we will cover:

- Converting Denary to Binary