# Lab 1

| Hex | Decimal | Octal | Binary |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 10 |
| 3 | 3 | 3 | 11 |
| 4 | 4 | 4 | 100 |
| 5 | 5 | 5 | 101 |
| 6 | 6 | 6 | 110 |
| 7 | 7 | 7 | 111 |
| 8 | 8 | 10 | 1000 |
| 9 | 9 | 11 | 1001 |
| A | 10 | 12 | 1010 |
| B | 11 | 13 | 1011 |
| C | 12 | 14 | 1100 |
| D | 13 | 15 | 1101 |
| E | 14 | 16 | 1110 |
| F | 15 | 17 | 1111 |

# Decimal to Hexadecimal

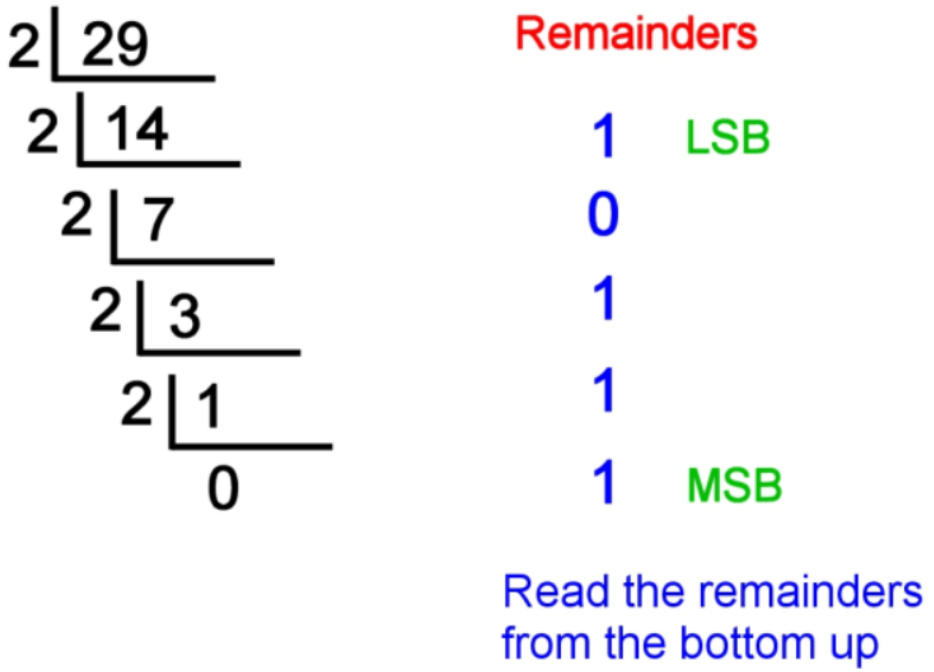
| DIVISION | RESULT | REMAINDER (in HEX) |
|---|---|---|
| 921 / 16 | 57 | 9 |
| 57 / 16 | 3 | 9 |
| 3 / 16 | 0 | 3 |
| | | |
| ANSWER | | 399 |

| DIVISION | RESULT | REMAINDER (HEX) |
|---|---|---|
| 590 / 16 | 36 | E (14 decimal) |
| 36 / 16 | 2 | 4 (4 decimal) |
| 2 / 16 | 0 | 2 (2 decimal) |
| | | |
| ANSWER | | 24E |

https://www.permadi.com/tutorial/numDecToHex/

# Decimal to Binary

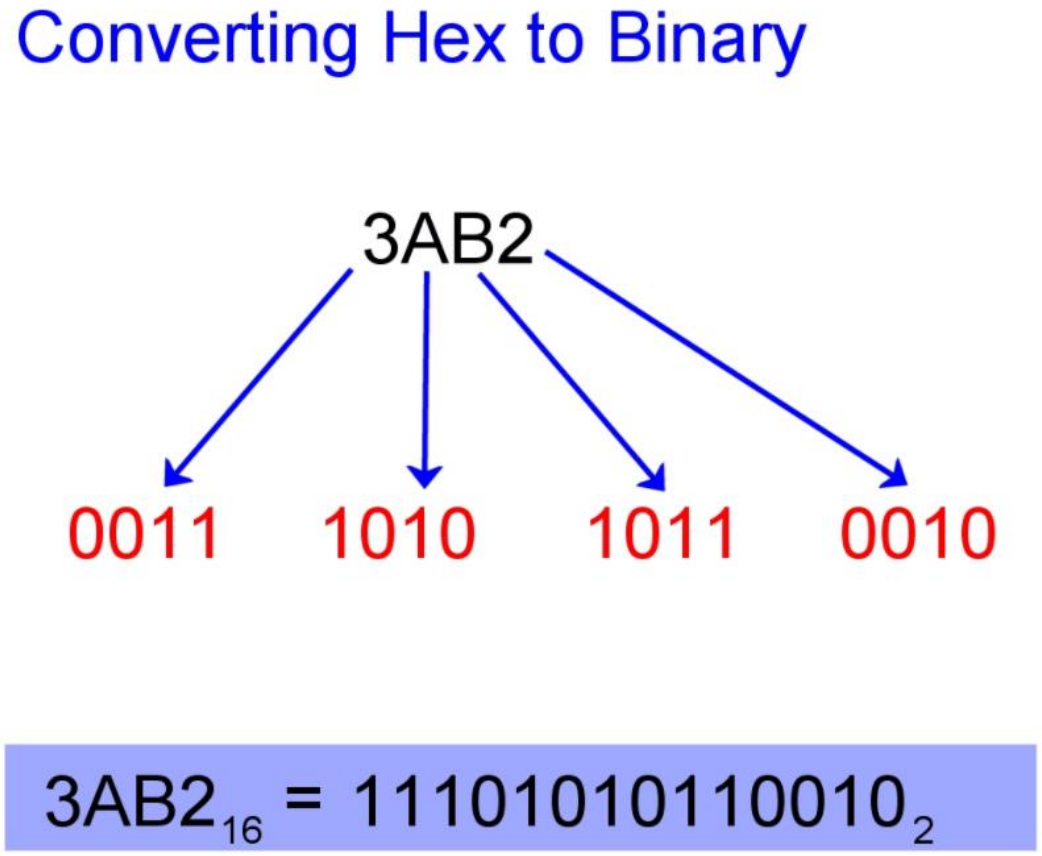
Successive Division by 2




29 decimal = 11101 binary

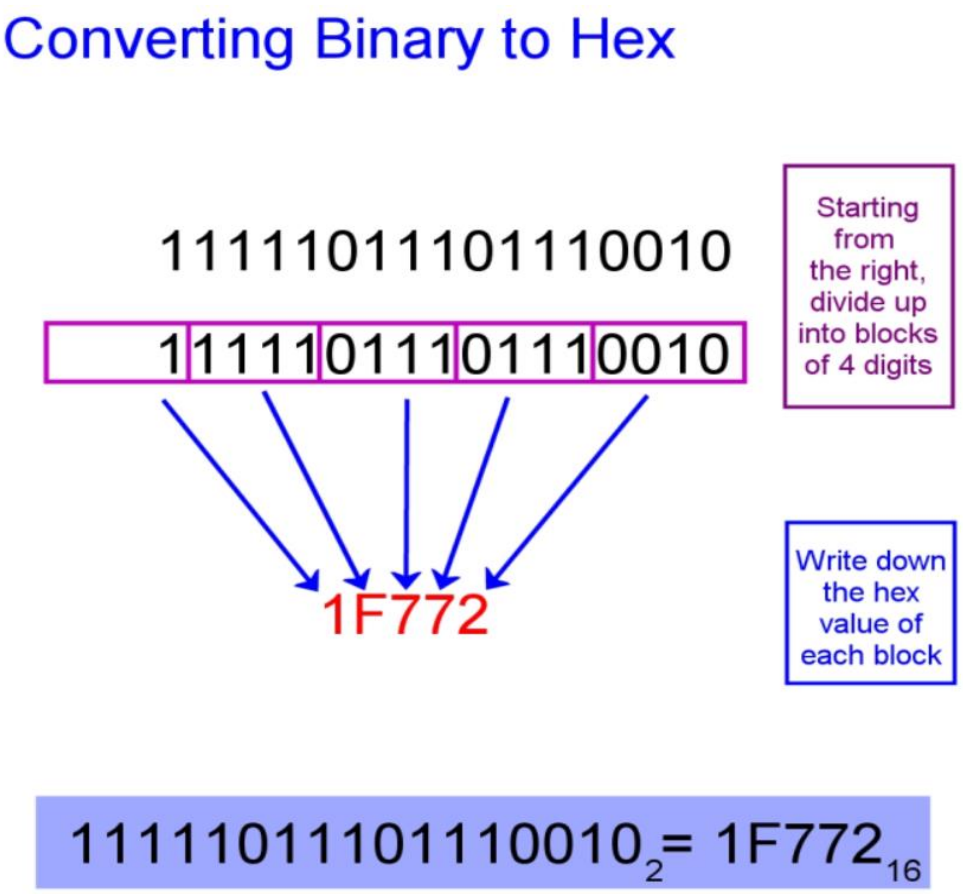
https://owlcation.com/stem/How-to-Convert-Decimal-to-Binary-and-Binary-to-Decimal

# Hexadecimal to Binary



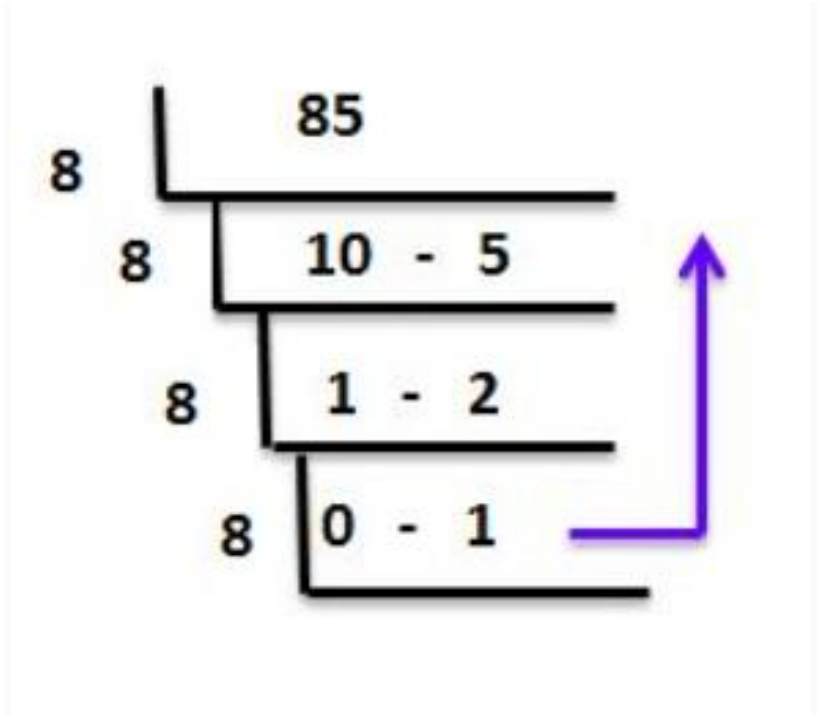

https://owlcation.com/stem/How-to-Convert-Hex-to-Binary-and-Binary-to-Hexadecimal

# Binary to Hexadecimal




https://owlcation.com/stem/How-to-Convert-Hex-to-Binary-and-Binary-to-Hexadecimal

# Decimal to Octal




$85_{10} = 125_8$

https://byjus.com/maths/binary-to-octal-conversion/

# Exercise

- Convert the following from hexadecimal to octal:
  - 0x1AF6C -> _____ in octal

# Exercise

- Convert the following from hexadecimal to octal:
  - 0x1AF6C -> 110444 in decimal -> 327554 in octal

# Signed Conversions

- For the binary sequence 10010101, what are following in decimal?
  - Unsigned
  - Signed magnitude
  - 1’s complement
  - 2’s complement

# Signed Conversions

- For the binary sequence 10010101, what are following in decimal?
  - Unsigned = 149
  - Signed magnitude = 1 0010101 = -21
  - 1's complement $\xrightarrow{flipped}$ 01101010 = -106 (keep the original sign)
  - 2's complement $\xrightarrow{flipped}$ 01101010 $\xrightarrow{+1}$ 01101011 = -107 (keep the original sign)

# QUIZ

- Solve the Numbers Quiz in Gradescope.

# MIPS and MARS