
Converting Between Power-of-2 Bases

| | | | |
|--------|-------------|----|----|
| Hex | | 5C | |
| Binary | 01001101110 | | |
| Octal | | | 26 |

Binary Representations

What **values** (in decimal) do these numbers represent?

| Unsigned | 2's-complement | Unsigned | 2's-complement |
|----------|----------------|----------|----------------|
| | | 11111 | |
| 11 | | 11110 | |
| 10 | | ⋮ | |
| 01 | | 10001 | |
| 00 | | 10000 | |
| | | 01111 | |
| | | 01110 | |
| | | ⋮ | |
| | | 00001 | |
| | | 00000 | |

Binary Numbers – 3 Bits

Quantity of **unique values** represented with 3 bits in different formats:

| Unsigned | 2's-Complement | Signed-Magnitude |
|----------|----------------|------------------|
| | | |

Range of values expressible with 3 bits in different formats:

| Unsigned | 2's-Complement | Signed-Magnitude |
|----------|----------------|------------------|
| | | |

Overflow

$$\begin{array}{r} 011 \\ + 001 \\ \hline \end{array}$$

If unsigned...

If 2's-comp...

$$\begin{array}{r} 111 \\ + 111 \\ \hline \end{array}$$

If unsigned...

If 2's-comp...

$$\begin{array}{r} 100 \\ + 100 \\ \hline \end{array}$$

If unsigned...

If 2's-comp...