CS 631-01 Binary Bases Bitwise 2026-02-17

Lab02 due tonight 11:59pm

GitHub IDs - see Google Sheet today

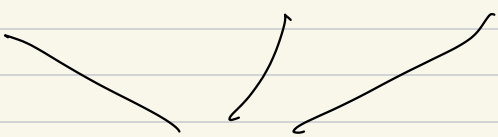
Project01 - NTLang

Spec

ntlang -e "1+2" -b 16

Binary Decimal Hexadecimal

"0b1100" "12" "0xC"



uint32_t v;

Decimal "735"

$7 \times 10^2 + 3 \times 10^1 + 5 \times 10^0$

Binary 1010

$1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

Two's Complement

3 bit binary values

Binary	Unsigned Dec	signed magnitude	Two's comp
000	0	0	0
001	1	1	1
010	2	2	2
011	3	3	3
100	4	-0	-4
101	5	-1 ✓	-3
110	6	-2	-2 ←
111	7	-3	-1

$2^3 = 8$

Two zeros

invert and add one

beq a0, zero

2
010
inv 101
add 1
110 -2

Signed mag

3 + (-1) = 2

```
  011
+ 101
-----
  000
```

3 + (-1)

```
  011
+ 111
-----
  010  (2)
```

$1 + (-3)$

$$
\begin{array}{r}
 \overset{1}{0}\,0\,1 \\
+\;1\,0\,1 \\
\hline
1\,1\,0
\end{array}
\quad (-2)
$$