



binary — unsigned
 — signed in hex

Floating - point

+ STUFF

$$\begin{array}{r}
 - 10000000 \\
 01111111 \\
 + 1 \\
 \hline
 10000000
 \end{array}$$

- X

$$\begin{array}{r}
 01011010 \quad 90 \\
 + 10100101 \quad -91 \\
 \hline
 11111111 \quad -1
 \end{array}$$

$$10100110 \quad -90$$

bit-wise
operands

not ~
and &
or |
xor ^

$$\begin{array}{r} 00101101 \\ | 00111010 \\ \hline 00111111 \end{array}$$

→ bit vector

$$\begin{array}{r} 11001010 \\ ^ 01111001 \\ \hline 10110011 \end{array}$$

$$6 \wedge 3 \rightarrow$$

$$0 \dots 0000110 \quad 000 \dots 011$$

$$\begin{array}{r} 60110 \\ ^ 00011 \\ \hline 00101 \end{array} \rightarrow 5$$

shift
 $X \ll S$

-80 \downarrow 0110000 $\gg 5$
 -3 1111101

\gg
 \gg

$X \gg S$

\uparrow
 bit vector

\uparrow
 integer

22

00010110 $\ll 1$
 $X \checkmark \checkmark \downarrow \downarrow \downarrow \downarrow \downarrow ?$

44

00101100

00010110 $\ll 3$
 \times

10110000
 01010000

176
 -80

00010110 $\ll 5$

11000000

22 00010110 $\gg 1$

11 00001011

5 00000101

Sign - extension

-5 11111011 $\gg 1$

125 1111101

Set

of all letters in string

a ... z
0 ... 26

data
add

$x = 0 \dots 0000000001001$
 $00 \dots 0100^4$

if (c is x) {

...

}

if ((4 & x) != 0)

if ((1 << idx) & x) != 0

32
0001001
0000100
0000 00

add
remove

∩

∪

∈

dad

00001001

U deyy

101011000

01011001

addition 0.610000110000100001001

∩ added ∅

ad

0 ... 01001

bit - fiddle

>>
<<
~
|
&
^

sets

masks

434

0100 0011 0100

010000110100

& 000011110000 mask

000000110000 >>4

0011 → 3