2/1/19

<< shift left

>> shift right

expressions	result
01001 10 << 3 (Binary)	0100110 000
0100 110 >> 4	010
6B5 << 2 (hex)	0110 1011 0101 → 01 10 10 11 01 01 00 → 1 A D 4
6B5 >> 3	0110 1011 0101 → 0 110 1 011 0 → 0 D 6
ABCD >> 8	AB

Data Types

int integers

float real

double real (larger range & more precision)

char

---

int

any positive or negative integer without a decimal point (or other illegal symbol)

Legal: 6 -1001 +25

0 -0 +0 2000000000

storage size 4 bytes

32 bits

# bits	# possibilities
1	2
2	4
3	8
4	16
5	32
n	2^n
32	4 294 967 295

signed int -2147 483 648 to +214 7483647

unsigned int 0 to 4 294 967 295

Illegal int constants:

2,648 ↑

6. ↑

$65

7.2

+40 000 000 000 (Too big)

signed
unsigned
(nothing)

default is signed

short
long
(nothing)

default medium

int

	#bytes	#possibilities	
short int	2	2^{16}	~~65536~~ 65536
→ int	4	2^{32}	4 billion
long int	8	2^{64}	16×10^{18}

int8_t
uint8_t
int16_t
uint16_t
int32_t
uint32_t
int64_t
uint64_t

~~float~~

double - any real value with decimal pt

legal: 3.14159265 35

6.1 8. 0.0 .0

-1.683 6.023

size of double: 8 bytes

range $\pm 10^{308}$

Precision: 15-16 digits

Illegal

7 $1000.0 1,000.0

Allowed suffixes (e & int)

6.023e23 (6.023×10^{23})

-1.609e-19

floats - similar to doubles except suffix of f. after real part

legal 6.1f 8.f 0.0f .0f

-3.14159f

6.023fe+23

-1.609fe-19

Size of float: 4 bytes

range $\pm 10^{38}$

Precision 7-8 digits

Variables

- name on memory location

rules for naming a variable

- must start with A-Z a-z _ (under score)
- remaining chars must be A-Z, a-z, 0-9, _
- Upper case ≠ lowercase
  i.e ece, ECE, Ece are 3 different variables
- uniqness may be based on first 32 char