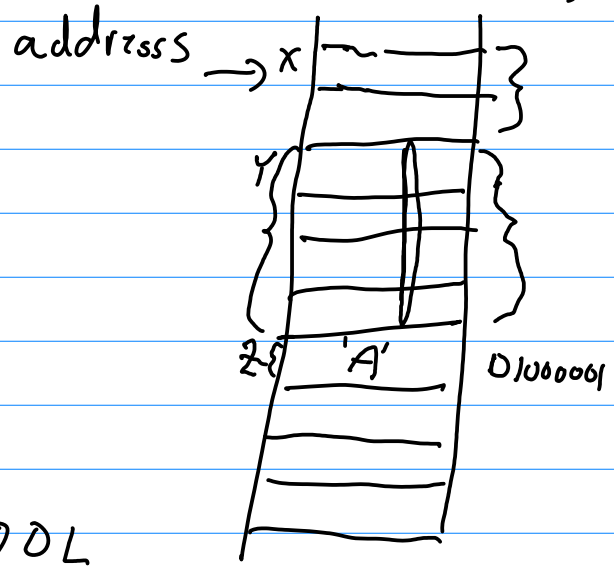
memory ↙ bytes 8-bits



Von Neuman architecture

program and data in same memory

Constants - don't change

integer 0, -3, 3L, 10000000L

0x3A, 0x0bdf hexadecimal

floating point 3.14159265

character constants 'A' 'a' '3' '!' '\n' '\''

variable name ↙ z = 'A'

string constants "This is a string" "" "0" "A"

↑ empty

named constant

const int maxval = 42;

All variables are given a type

name - letters, digits & underscores

case sensitive

Integer types

char → short → int → long int → long long int

(long) (long long)

↑ short int

8 bits 16 32 64 128 ?

usually

		Unsigned	Signed
int	1 byte	0 to 255	-128 to 127
	2 bytes	0 to 65,535	-32,768 to 32,767
	4 bytes	0 to 4 billion	-2 billion to +2 billion

char 'A' → 65 01000001

floats

Binary

There are 10 kinds of people in the world
those that understand binary and those who don't

Place value system

Base 10

$$182 = 1 \times 10^2 + 8 \times 10^1 + 2 \times 10^0$$

Base 2

$$10110110 \Rightarrow 1 \times 2^7 + 0 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$

(16, 8, 4 above the 2^4, 2^3, 2^2 terms)

128 64 32 2 1