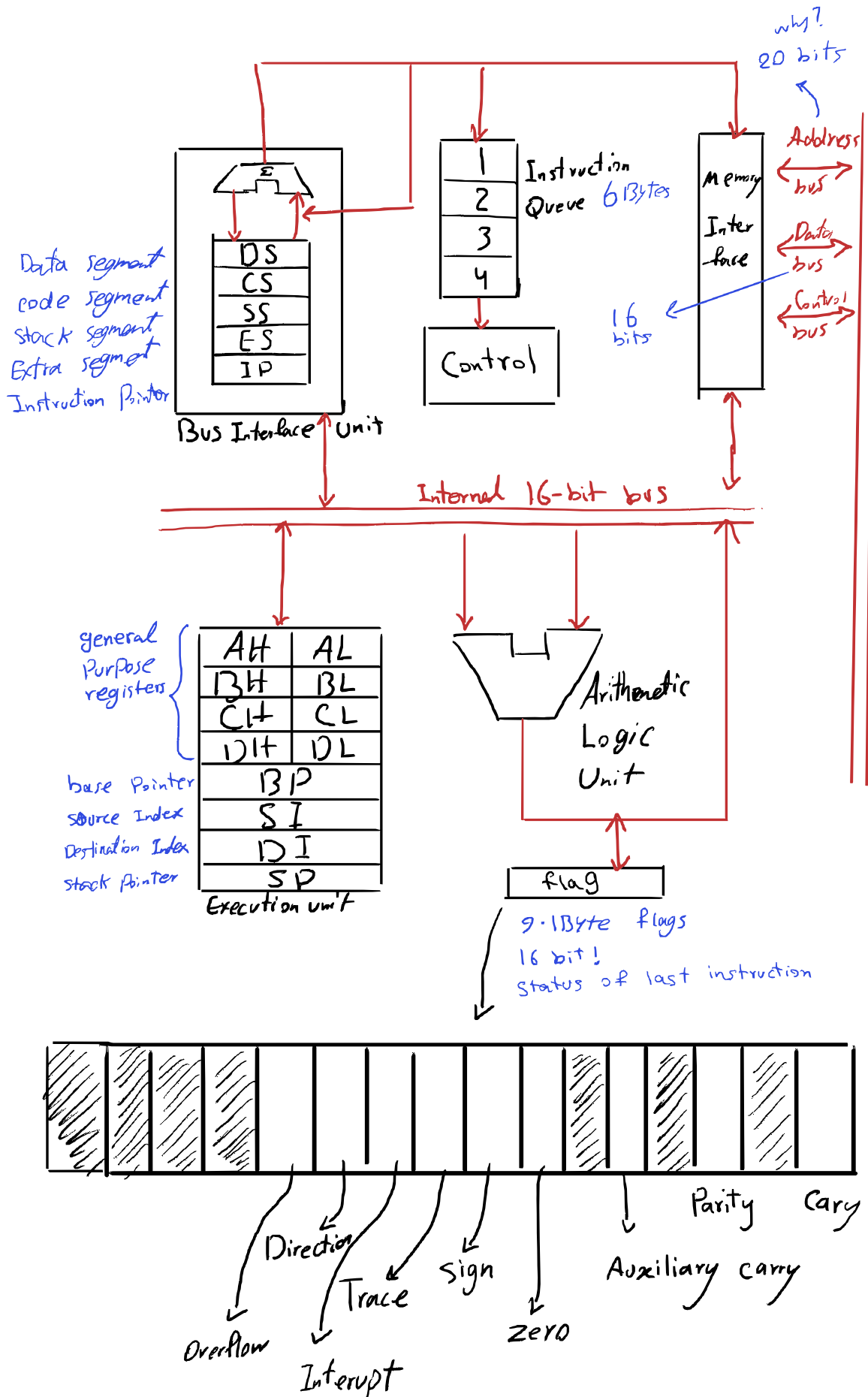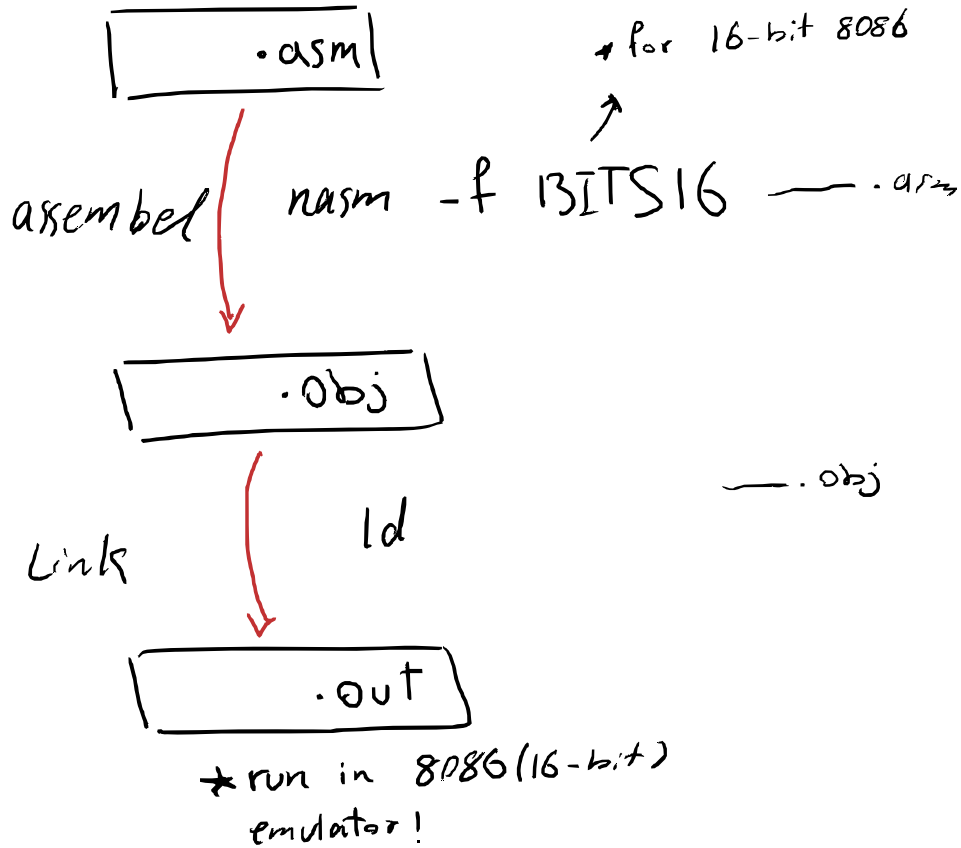# Instruction set V.S architecture

8086/8088 first CPUs in X86 series.

why?
20 bits

Address
bus

Instruction
Queue 6 Bytes

Memory
Inter
face

Data
bus

Control
bus

16 bits

Σ

DS
CS
SS
ES
IP

Data segment
code segment
stack segment
Extra segment
Instruction Pointer

Bus Interface Unit

1
2
3
4

Control

Internal 16-bit bus

general
purpose
registers

AH	AL
BH	BL
CH	CL
DH	DL
BP	
SI	
DI	
SP	

base pointer
source Index
Destination Index
stack pointer

Execution unit

Arithmetic
Logic
Unit

flag

9·1Byte flags
16 bit!
status of last instruction

Parity   Cary

Direction

Sign

Auxiliary carry

Trace

Zero

Overflow

Interrupt

? why some bits are not used?

```
┌─────────────────────┐
│      .asm           │                    ← for 16-bit 8086
└─────────────────────┘                         ↗
         │
asembel  │   nasm  -f BITS16  ─── .asm
         ↓
┌─────────────────────┐
│      .obj           │
└─────────────────────┘
         │                                      ─── .obj
Link     │   ld
         ↓
┌─────────────────────┐
│      .out           │
└─────────────────────┘
   ★ run in 8086(16-bit)
     emulator!


        dosbox).
```