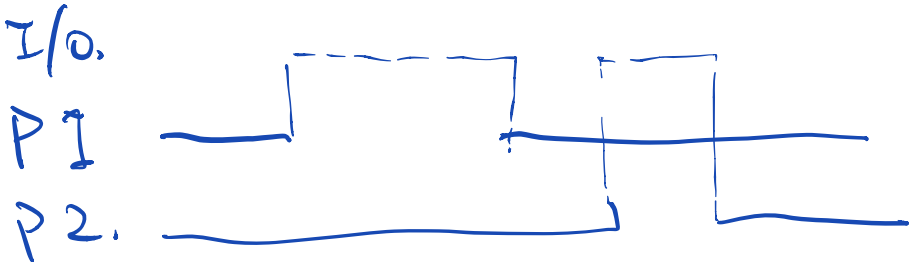
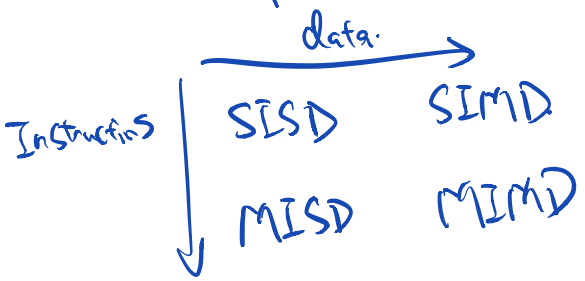
COMP0008 Revision Notes.

Multi-tasking Os (first is CTSS).



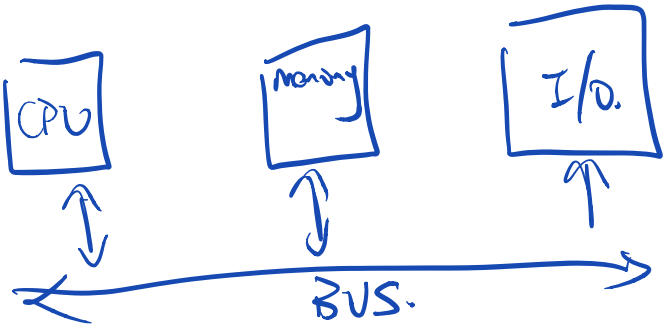
Exaples of interleaved. concurrency. (since only 1 executin. engine). The processor switch between different process

True parallelism involves >1 processors.



Concurrency - key abstraction in CS.
relevant to HW, OS, processors, distributed computing.
- run multiple activities in parallel and reason correctly

Von Neuman Arch.



MIPS Processor. (elegant design)

Understand in abstraction layers.

Lvl 5 Problem Oriented PL. i = i+1.

4 ASM Lvl.

3 OS Lvl. add $s3, $s3, 1 Arch

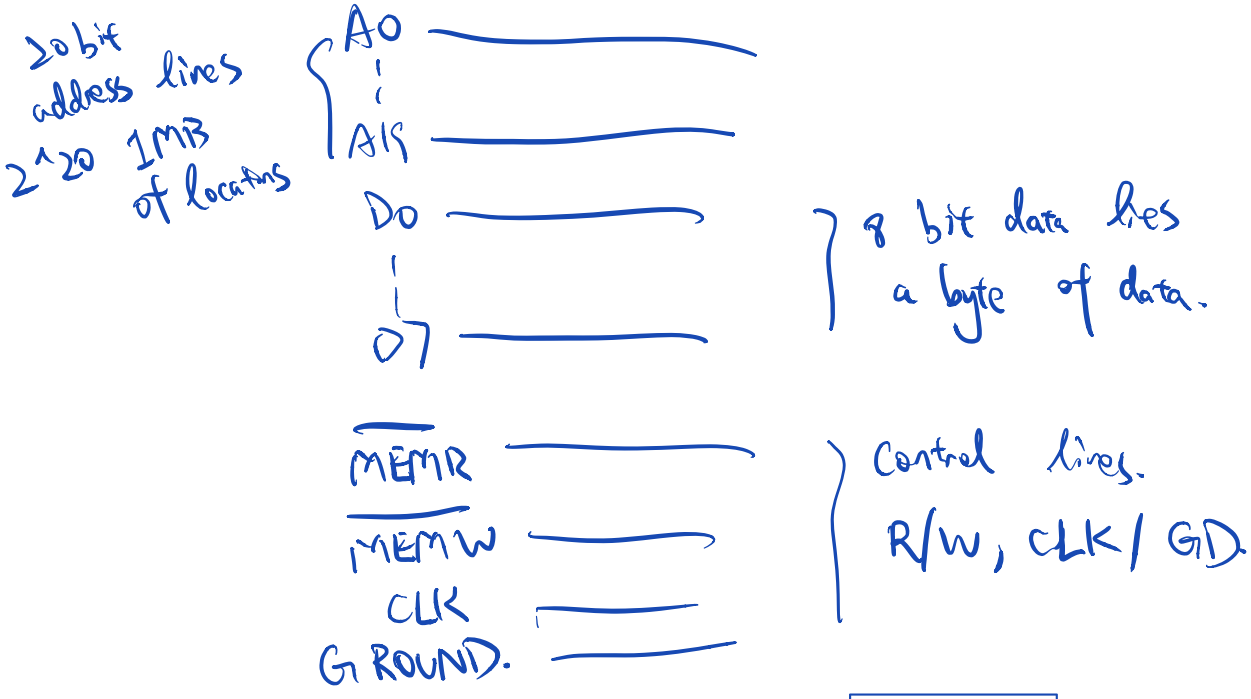
2 Instruction Set Lvl. ISA level. 001000 0110

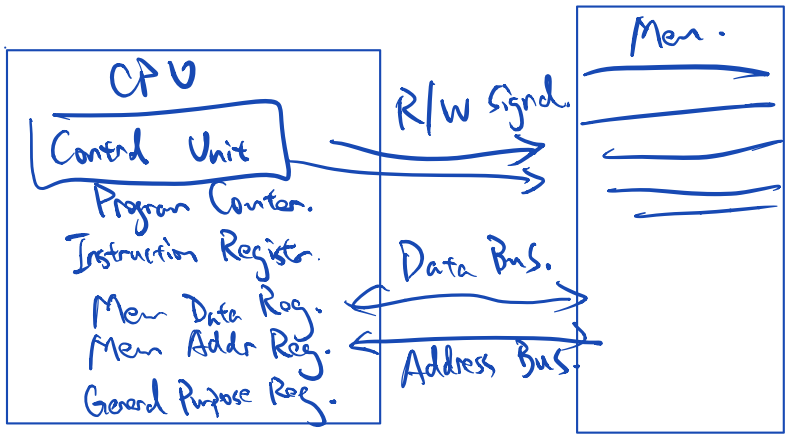
1 Microprograming lvl.

0.5 Modular view (datapath)

0 Digital logic Level

Original IBM PC Bus.





2s Complement form.

001011 ⟷ negatives of each other.

↓

110100 +1 → 110101.

↓ really

11---1 110101$_2$.

```
  110101
  001011
1 000000
```

Hexadecimal 16's complement

5FAB1034

A054EFCB. +1 → A054EFCC.$_{16}$

↑ it's really.

FFF---F A054EFCC$_{16}$.

Unsigned and signed numbers of fixed bit length.

```
  1111111  ~ 255₁₀  or  -1
+ 0000001
---------
  0000000     -1+1=0
```

11111000 = -(11110111)

= -(00001000)

= -8. signed

overflow. for unsigned or 248 unsigned.

```
  11111000
+ 00001111
----------
 (00000111
```

for signed

-ve + +ve or +ve + -ve cannot overflow.

-ve + -ve should be -ve otherwise overflow

+ve + +ve ——— -ve ———

binary digit bit 1 0/1.

byte B. 8 0/1

1 KiB = 1024 B.

1 MiB = 1024 KiB.

No. of Bytes	Bits	Unsigned range.
1	8.	$0 - 2^8 - 1$ (0 - 255)
2	16	$0 - 2^{16} - 1$ (0 - 65535)
4	32.	$0 - 2^{32} - 1$ (0 - 4,294,967,295)

Pentium 32-bit / 4 Byte words

Pentium 4 64-bit / 8 Byte words

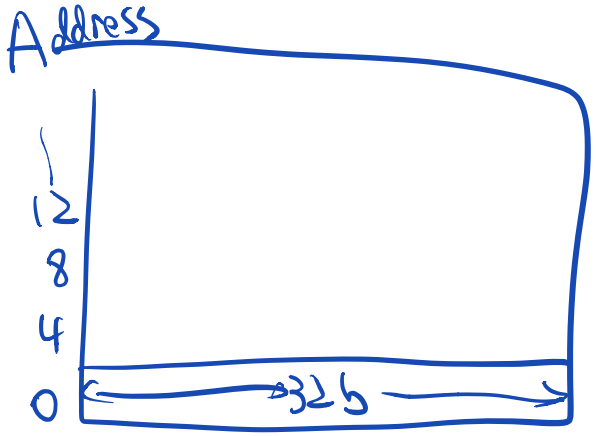
MIPS 32.

Byte 8 b

Halfword 16 b.

Word 32 b.

DoubleWord 64 b.



Example. $185 = 1 \times 2^{10} + 1 \times 2^9 + 1 \times 2^5 + 1 \times 2^4 + 1$

00000 | 10 | 00 | 11 | 00 | 01

most significant byte — least significant.

Big Endian.

0000 0000 | 0--- | 00--110 | 00110001.

n n+1 n+2 n+3.

MSB one the smallest address

Little Endian.

00110001 | 0--110 | 0---0 | 0---0

n n+1 n+2 n+3.

0---0---0.0--110001000 1 = 185 10

Sign extension when placing 8 bit number in 32bit word.

MIPS addresses are 32 bits long