tlink programname.obj
↝ extension changed (.obj ect file is created)

(F7 to execute the program in debugger

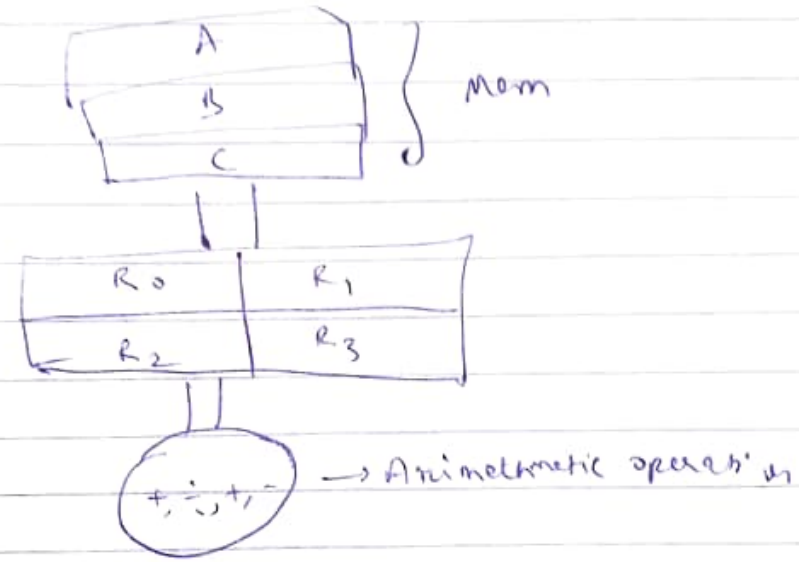
Lecture 2/Feb/2022

- If instruction can be present anywhere
  - ↳ Size of instruction varies
  - ↳ complicates instruction decoder

ISA :-

- ↳ CISC
  - Operands for Arithmetic / Logic operations can be in register / memory
- ↳ RISC
  - ↳ Operands for ~~~~~
    - only in registers

↳ Register → Register Architecture



CISC :-

```
MUL    A, B
```

RISC (only register (no memory))

```
LDA    R0, A
LDA    R1, B
MUL    R0, R1
STR    A, R0
```

- Basic Parallel Techniques (instead of 1 bus, 2 components) (to speed up the operation)

  Pipelining

  Replication

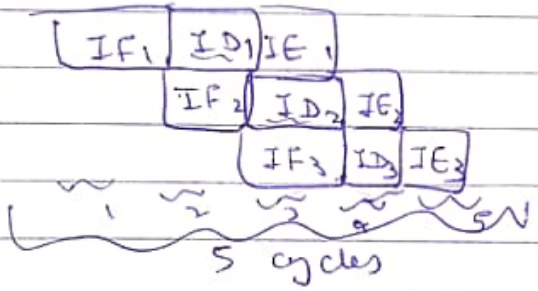
Instruction

~> Fetch

~> Decode

~ Execute

Pipeline Hazards



ADD R2, R1, R3

SBR R2, R3, R2

STR R2, b

Evolution of μp

Name	Date	Transistors	clock speed	Data width
8080	1974	6K	2MHz	8
8088	1978	29K	5MHz	16
80286	1982	134K	12	16
80386	1985	275K	16-33	32
80486	1989	1.2M	20-100	32
Pentium	1993	3.1M	60-200	32/64
Pentium II	1997	7.5M	233-450	32/64
Pentium III	1999	9.5M	450-933MHz	32/64
Pentium 4	2000	42M	1.5GHz	32/64