Introduction to Computer Architecture

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1 Logic Circuits

Logic circuits are the building blocks of digital systems. They consist of interconnected logic gates that perform logical operations on binary inputs to produce a binary output.

There are two types:

1. **Combinational:** Adder, Subtractor, Decoder, Encoder, Comparator, Multiplexer, Demultiplexer.
2. **Sequential:** Register, Flip-Flop, Latches, Counters.

2 Microoperation

Operations will be performed on data stored in registers. **Example:** `SHIFT` – `LOAD` – `CLEAR` – `INCREMENT`

3 Register Transfer Language

Register Transfer Language (RTL) is a symbolic representation of the operations performed on registers in a computer system. It describes how data is transferred between registers and how operations are executed.

Example: `R2` $\rightarrow$ `R1`

We can also add a control function; the register cannot transfer without satisfying this condition:

`P: R2` $\rightarrow$ `R1`

4 Register Names

The register names can have specific meanings:

- **DR:** Data Register
- **IR:** Instruction Register

- **TR:** Temporary Register
- **AC:** Accumulator
- **PC:** Program Counter
- **MAR:** Memory Address Register

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