Busses

January 29, 2025

First, Warning

The **Bus or System bus is an extinct creature**

Not to be seen in modern strong architectures

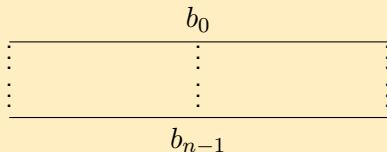It seems to be replaced by P2P **links**

Bus

Bus

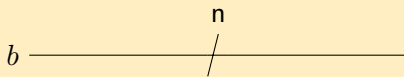A bunch of wires working in tandem in order to transfer data from one system to another system

$$b_0$$

$$b_{n-1}$$

Equivalent drawing

n

b

History

- Historically bus meant **many** lines working in tandem
- Of course 'many' is era dependent
- The reason for the many lines was to transfer lots of data
- There were serial communication methods (e.g., RS232). No one thought of them as a bus.
- The improved technology allows today huge transfer rates on serial lines
- Hence we got the oxymoron 'serial bus'

Simplistic view

- A simple operation on the bus can be view as read or write
- We can think of the bus as allowing us to do read and write operations
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Bus Traits

Trait	Anti-Trait
Synchronous	Asynchronous
Parallel	Serial
Single Transaction	Multiple Tansactions
Multi Point	Point to Point
Full duplex	Half duplex

A/Synchronous Bus

- In a synchronous bus, one of the bus lines is a clock
- State changes happen on the clock rising and/or falling edge
- The trend is towards synchronous buses

Parallel/Serial Sus

- The history slides speaks for itself
- Nowadays, the trend is towards serial buses (if it is releavant)
- Thus, as closer to the processor we are, the buses are parallel
- The farthest from the processor we get, more chances the bus is serial

Classical Computer System

From (user mode) programmring point of view, one can think that even nowadays, this is how the hardware looks like

Sub-buses
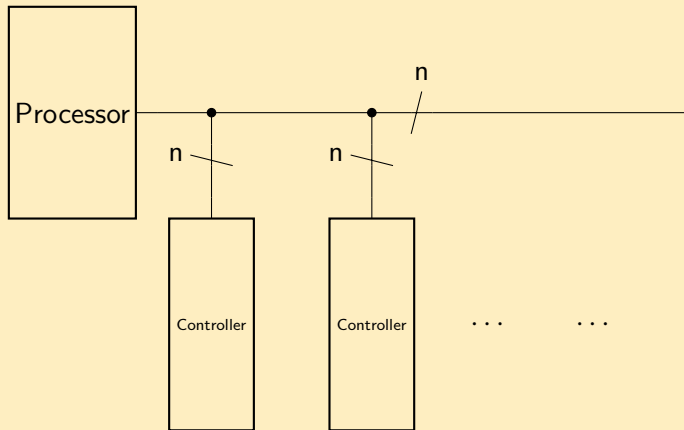
In most cases the n lines of the bus can be views as 3 busses: the address bus, the data bus and the control bus

$$n_a$$
$$a$$

$$n_d$$
$$d$$

$$n_c$$
$$c$$