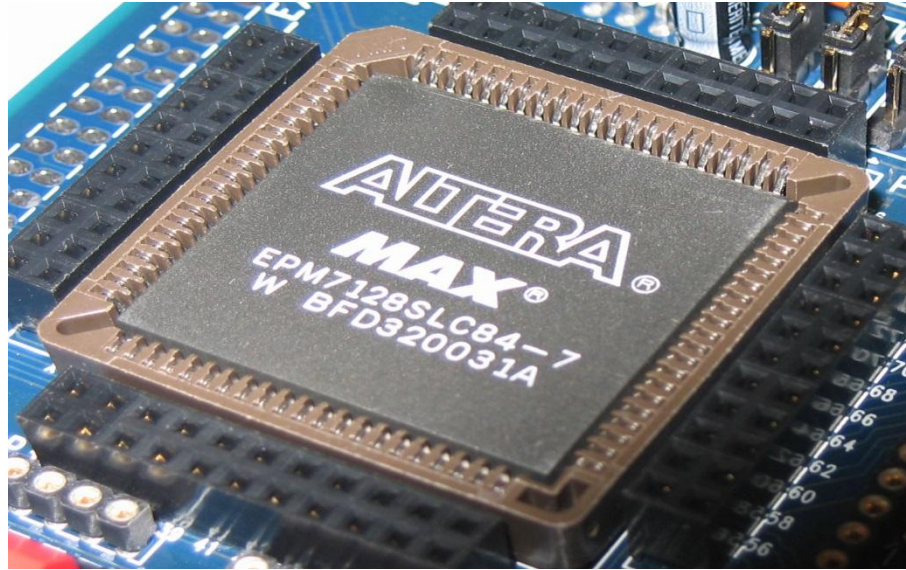# Programmable Logic. Types.

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Izhevsk 2017

Programmable Logic

- The maximum number of gates in an FPGA is currently around 500,000 and doubling every 18 months.

- What all of this means is that the price of an individual element is rapidly approaching zero
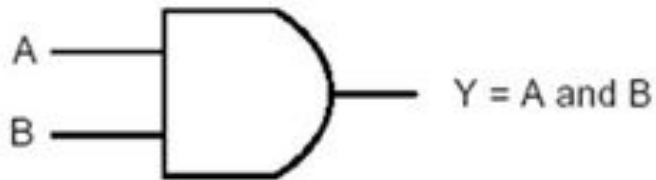
Types of programmable logic

- PLD - Programmable Logic Devices

- CPLD - Complex Programmable Logic Devices

- FPGA - Field Programmable Gate Arrays

PLD - Programmable Logic Devices

- These were the first chips that could be used to implement a flexible digital logic design in hardware.

- Other name:
- 1. Programmable Logic Array (PLA);
- 2. Programmable Array Logic (PAL);
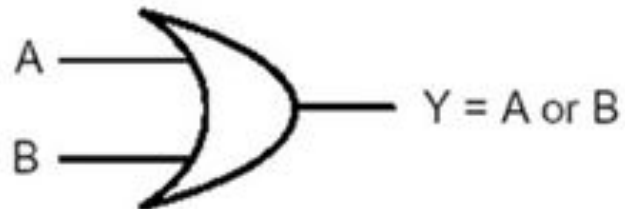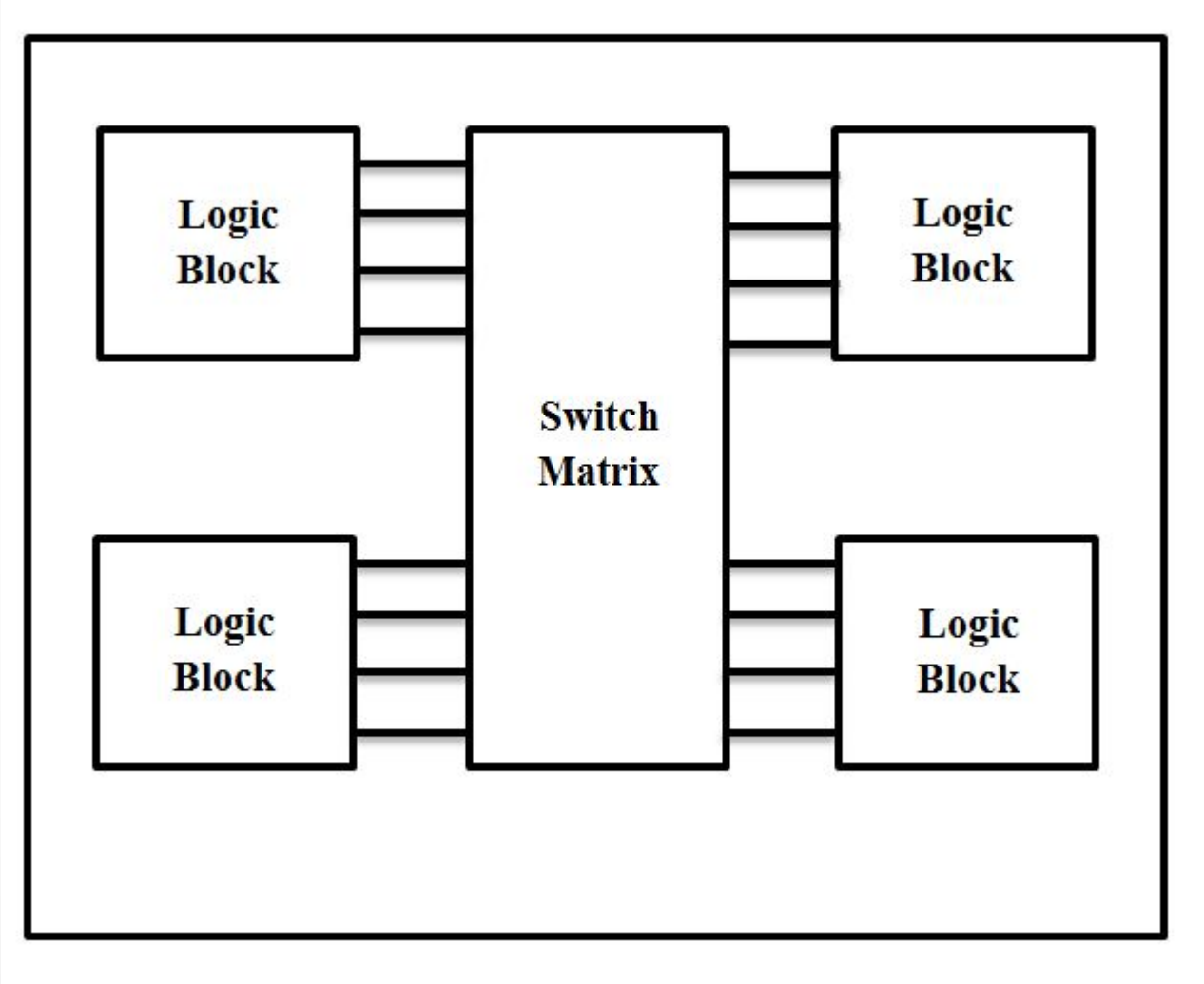- 3. Generic Array Logic (GAL).

Basic logic gates

And Gate

A ───┐
     │ Y = A and B
B ───┘

A	B	Y=AB
0	0	0
0	1	0
1	0	0
1	1	1

Or Gate

A ───┐
     │ Y = A or B
B ───┘

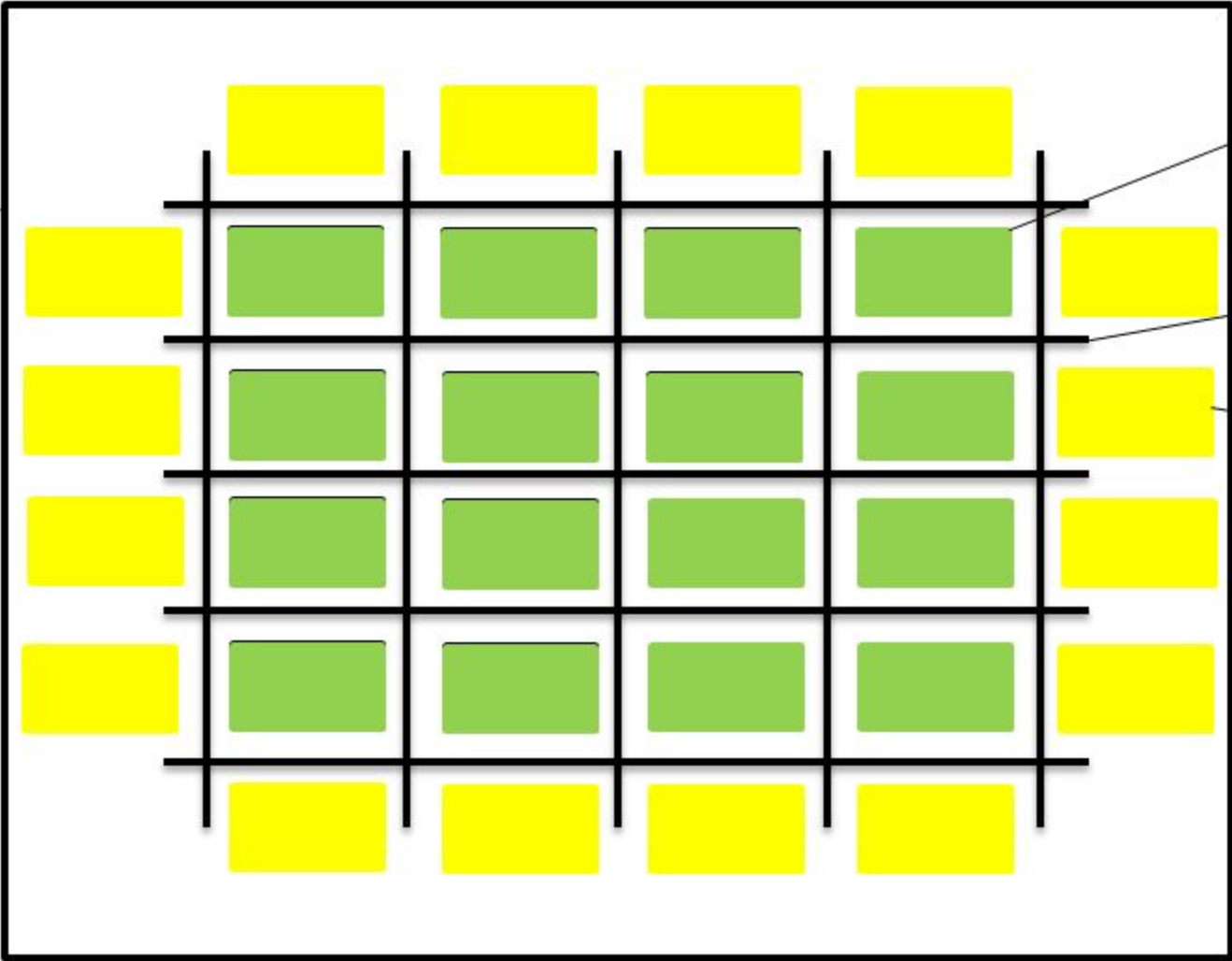| A	B	Y=A+B
0	0	0
0	1	1
1	0	1
1	1	1

CPLD - Complex Programmable Logic Devices

FPGA - Field Programmable Gate Arrays

Logic block

Programmable interconnect

I/O block

Conclusions

- CPLDs can hold larger designs than PLDs.
- CPLDs have been chosen over FPGAs whenever high-performance logic is required.
- Delay through a CPLD (measured in nanoseconds) is more predictable and usually shorter.
- The architecture of an FPGA is much more flexible than that of a CPLD.
- FPGAs are usually denser (more gates in a given area) and cost less than their.