

Key Notions - Microarchitecture

* Balanced Design

* Bread & Butter Design

* Critical Path Design

* The Science of Tradeoffs

- Design Point (Cost, Performance, Area, Power)

- Performance

- Superscalar / Superscalar
- Branch Prediction
- Value, Address Prediction
- Fast execute, slow commit
- Trace cache
- Memory enhancements (latency, ³bandwidth)

- Cycle time vs. Parallelism in march

- Tailored vs. General parts

- Functionality

- Compile-time vs. Run-time.

The Microarchitecture (under the hood)

CPI vs. cycle time (or, IPC vs. frequency)

in-order vs. out-of-order execution

Speculate vs. stand around and wait

Issue-width

ASIC vs. programmed control

Use of chip real estate

Better branch predictor

Accelerators

Microcode

Pipeline depth

Cache structures