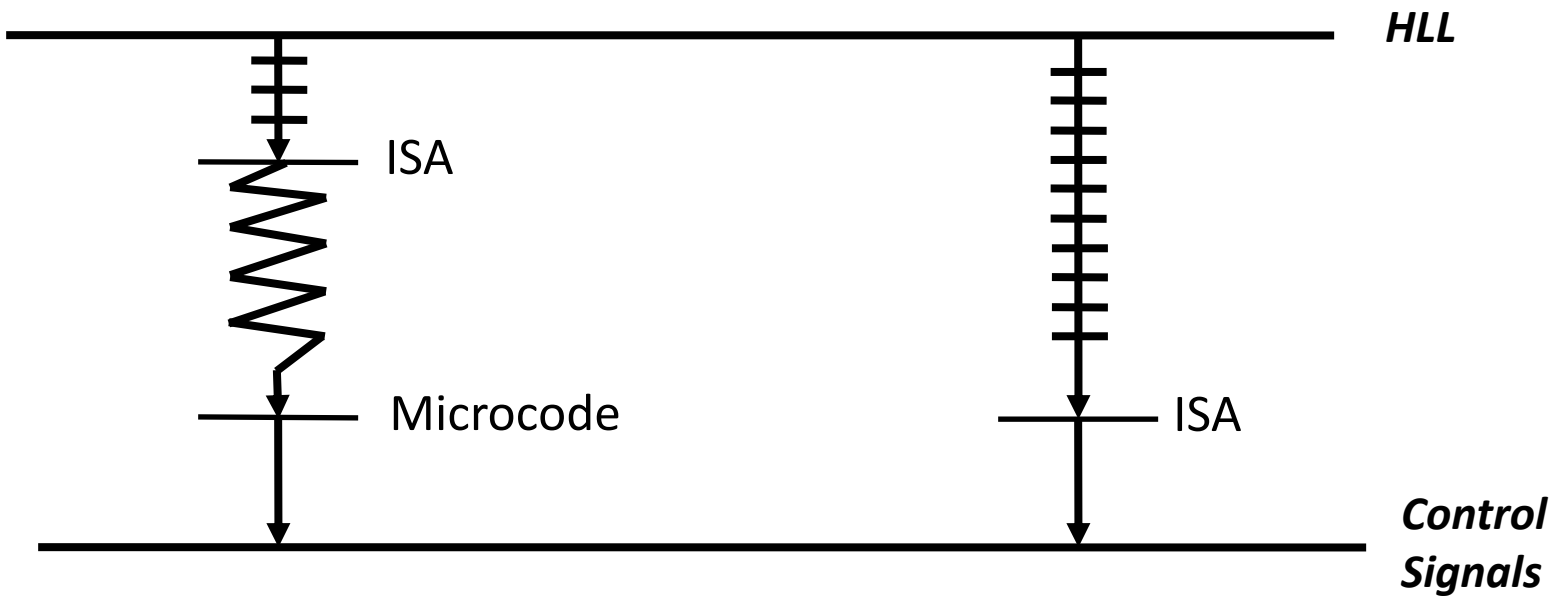
Short Retrospective on RISC

Open Microcode



- ***Compiler Generates Lowest Level of Interpretation***
  - ***No Microcode***
  - ***Single Cycle Execution***
- ***Complex Compiler vs. Complex Hardware***
- ***Issues:***
  - ***Bandwidth, Compiler Complexity, On Chip Tailoring***
  - ***Wasted Cycles***

What is it?

- ***Originally : Open Microcode***
  - ***John Cocke (1970's)***
- ***1980: Simple Set of Simple Instructions***
  - ***Sequin, Patterson (1980)***
- ***1989: Short, Tight Pipelines***
  - ***John Hennessy***
- ***1994: VLIW***
  - ***Wall Street Journal***

Characteristics

- ***Fixed Length, Uniform Decode Instructions***
- ***No Microcode***
- ***Load/Store***
- ***Larger Register Set***

- ***Delayed Branch***
- ***Register Windows***

What is it (Non-Technical)

- ***Everything Since 1983***
- ***"Good"***
  - ***Motorola 68010 Article***
  - ***Microcoded RISC Article***
  - ***MicroVAX – 2***
  - ***VAX 9000 Literature***
- ***SPARC System***
  - ***The "RISC" Core***

Why Did It Happen

- ***Masterful Marketing***
  - ***Published Berkeley Benchmarks***
  - ***RISC Chip in Weeks, VAX in Years***
  - ***Simple is Beatiful***
  - ***4-on-floor vs. Automatic***
- ***Time-to-Market Curve***
  - ***VAX 8600 Was Very Late***
  - ***Track Technology Curve***
- ***Why Was it Taken Seriously***
  - ***HP Bet the Family Store***

Comments on the Hype

- ***Simple is Beautiful***
  - ***Complex Instructions Provide Opportunity for Speed-Up***
    - ***1st add Fl.Pt.***
    - ***Graphics***
    - ***MMX***
  - ***Compilers Never Use It***
    - ***Some BAD Implementations***
    - ***One Compiler or All Compilers***
- ***Published Berkeley Benchmarks***
- ***Why did H-P jump in ?***

The Players

- ***The University Experiments***
  - ***RISC (Berkeley, 1980, Patterson, Emphasis on "Simple")***
  - ***MIPS (Stanford, 1981, Hennessy, Emphasis on Compiler)***

- ***Commercial Products***
  - ***HP-PA (The IBM Team, Emphasis on Compiler)***
  - ***SPARC (Berkeley RISC)***
  - ***MIPS (Simple)***
  - ***AMD 29000***
  - ***Motorola 88000***
  - ***IBM RISC System 6000 (Return to Past)***
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