

CS152
Computer Architecture and Engineering
Lecture 19

Locality and Memory Technology

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lecture slides: <http://inst.eecs.berkeley.edu/~cs152/>

Review: Explicit Renaming/Limits to

ILP

- **Explicit Renaming: more physical registers than ISA.**
 - Separates *renaming* from *scheduling*
 - Opens up lots of options for resolving RAW hazards
 - Rename table: tracks current association between architectural registers and physical registers
 - Potentially complicated rename table management
- **Multi-issue: simple matter of accounting**
 - Must do dataflow analysis across multiple instructions simultaneously
 - Rename table updated as if instructions happened serially!
- **To sustain: need execution bandwidth+commit bandwidth**
 - To sustain ILP of X need at least
 - X -way issue, $> X$ execution bandwidth (for mix), X way commit
- **Limits to ILP**
 - Inherent parallelism of applications as high as 150 IPC
 - Realistic limits rapidly reduce this to < 4 IPC for most applications

Recall: Upper Limit to ILP: Ideal Machine

