March 2002 update for GSRC

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Outline

👀 Recent work
- Bookshelf.exe (BX)
- Integration for Physical Design
- Calibrating Achievable Design via SAT

👀 Future work
- Bookshelf.exe (BX)
- Integration for Physical Design
- Calibrating Achievable Design via SAT
Recent Work: Bookshelf.exe

- Executable extensions of the bookshelf got off the ground
- Two undergrads working on the project
- Architecture mapped out (10-page doc)
- Parts of networking back-end implemented
- Front-end and first demo on the way
Recent Work: PD Integration

- Integration of floorplanning techniques into large-scale placement engines
- New flow:
  - shred macros $\rightarrow$ place cells $\rightarrow$ cluster cells
  $\rightarrow$ floorplan clusters + macros $\rightarrow$ place cells
- ISPD 2002 paper on consistent placement of macros and standard cells
  - uses results from our ICCD 2001 paper on fixed-outline floorplanning
Recent Work: C.A.D. via SAT

- SAT-based routing can give definitive negative answers
- DAC 2002 paper (w Sakallah) speeds up SAT solvers on routing-derived SAT instances
  - also improves standard routing formulations
  - idea: extract structure (symmetry) + use it explicitly
- SAT Symposium 2002 paper (w Sakallah)
  - extends classical Davis-Putnam techniques to 0-1 ILPs and demos routing applications
Future Work: Bookshelf.exe

- Front-end and first demo on the way
- First set of functionalities
  - load \( N \) solvers (some in source code, some in binaries) and \( K \) benchmarks
  - distribute all-pair runs over several workstations
  - automatically collect results
  - report on the Web and via email
  - add one more solver and/or one more benchmark
  - schedule additional runs; collect and report results

- Demo goals
  - quickly and automatically evaluate new solvers
  - show sharable infrastructure
Future Work: PD Integration

- Better comparisons of our flows with commercial tools
  - current comparisons encouraging but incomplete
  - need to consider routing congestion, not just half-perimeter wire-length
- Prepare journal versions of conf. papers
Future Work: C.A.D. via SAT

- Recall: SAT-based routing can give definitive negative answers
- Further studies of structure in PD-derived SAT instances
  - faster symmetry detection, possibly by missing some symmetries (i.e., opportunistic symmetry detection)
- When all constraints cannot be satisfied, satisfy as many as possible
  - MaxSAT: prelim results in our SAT 2002 paper
- Further studies of 0-1 ILPs
  - try beating CPLEX w pseudo-Boolean techniques