List of possible projects

- Project/Programming Oriented Projects
  - Develop a pipelined RISC Simulator
  - Develop a pipelined and bypassed Simulator
  - Simulate cache performance for a set of codes
  - Simulate/compare various cache coherence protocols
  - Develop a superscalar RISC simulator using Tomasulo’s algorithm
  - Develop a superscalar RISC simulator using simultaneous multithreading

- Research Oriented Projects - Possible topics
  - Chip Multiprocessors
  - Simultaneous multithreading
  - Branch prediction using trace caches
  - VLIW Architectures
  - Things to do with a billion transistors
  - DSP Architectures
  - Evolution of the ARM/x86 architecture
  - Cellphone architectures
  - Embedded system architectures
  - Survey of cache configurations
  - Dataflow architectures
  - Fine-grained execution architectures
  - Cache coherency in multiprocessors
  - Dynamic compilation (Transmeta)
  - Multimedia Instruction Sets
  - Reconfigurable Computing
  - Formal methods verification of computer architectures
  - GPU Architectures
  - “Game Box” architectures
  - Hypertransport(AMD)/QPI(Intel) interconnect buses

Some Rules of the Game

For the programming-based projects, the main deliverable would be the code, along with a demonstration of the project operation. The focus should be on the application, rather than on extensive documentation or writeups. It might be possible to work in pairs (or small teams) to implement the project.

For the research-based projects, the main deliverable would be a paper on the given topic. The format of the paper should be one of the “standard” research formats, such as the IEEE or ACM journal formats. While the number of pages is not a good measure of the quality of the paper, nonetheless everyone asks the question about how long the paper should be. As a rough estimate, the paper should be 6-10 pages. Also, you must include references - a minimum of five references are required. These references must be academic references - papers that have been submitted to professional conferences or journals, and not advertising hype as developed by vendors. Industry “white papers” might be acceptable as references, but cannot be included in the 5 required references. Research projects should be individual rather than team efforts.

Once you make your decision on a topic, please submit a project request form from the class website.