California Institute of Technology
Department of Computer Science
Computer Architecture

CS184b, Spring 2003   Assignment 1: Estimates and ISA   Monday, March 31

Due: Monday, April 7, 9:00AM

Part A:

1. HP 1.2

2. HP 1.8

3. HP 1.17

Part B:

1. For a problem TBD. (I'm thinking we may use one program consistently through the term and want to talk w/ you about this before picking one.)

2. Build a simplescalar "PISA" executable using simplescalar's gcc cross compiler.

    - simplescalar support lives in `/cs/courses/cs184/software/simplescalar/`

    - binary executables live in the `bin/` subdirectory

    - you will be using `bin/sslittle-na-sstrix-gcc`, at least, and made need other binary utilities from that directory

    - I built and tested rijndael in `/cs/courses/cs184/spring2003/assign/Rijndael` and have left it there. `makefile.ss` is the makefile I modified for use with our installation of simple-scalar.

3. You probably want to read a bit about simplescalar:

    - Note that we are using simplesim-3.0 (the simplesim-2.0.broken subdirectory should be ignored)

    - Technical Report `/cs/courses/cs184/software/simplescalar/TR_1342.ps`

    - Slides on using `/cs/courses/cs184/software/simplescalar/simplesim-3.0/hack_guide.pdf`

4. Verify your program runs under simplescalar using `simplesim-3.0/simple-safe`.

5. Run your program under the profiler `simplesim-3.0/simple-profile`.

- you probably want to run it with the `-all` option to start with and begin getting familiar with all the things it can profile; later, you may want to focus which profiling results you request.

6. Compile your program at two different optimization levels (probably none and the highest which will work); Note the difference in dynamic instructions executed and distribution of operations.

Turnin

1. Summarize the compiler optimization effects (total instructions before and after optimization, breakdown by instruction class before and after optimization).

2. Identify the top 10 instructions by dynamic frequency for the before and after optimization cases and compare these with the data in the text (Figure 2.16) — use a table or tables comparable to 2.16. If appropriate, comment on the differences among the three cases.