Homework 3:

Improving Performance through Hardware Optimizations Due: March 9th, 2005

- 1. Compile your program that encrypts network packet (hw 2) in the Stretch-IDE environment. If it doesn't compile directly, make minor corrections (e.g. update the missing header files).
- 2. Profile the program and identify the software hotspots. Make sure you save the profiled result. Pay special attention to your encryption function. You **NEED TO** implement the encryption routine as a separate function. So that it can be easily replaced by the Instruction Extension (see step 3).
- 3. Rewrite the encryption portion of your program in Stretch-c. You should take the full advantage of multiple functional units, wide data and stream I/O to speed up the encryption process.
- 4. Profile the program after the hardware optimization has been made. Make sure you don't overwrite the profiled results from the non-optimized version.
- 5. Calculate the encryption speed up and overall speed up. If you don't remember how to do this part, please refer to your computer architecture book (Amdahl's Law).

Things to watch out for:

- 1. STRETCH_LICENSE_FILE=C:\Stretch\SCC\Xttools\tools\lic\license.dat.
- 2. Get the license file to unlock the compiler.
- 3. Profiler can take a long time so be patient.

What to submit:

- 1. The source file for the non-optimized version compiled in Stretch-IDE environment.
- 2. The profiling result of the non-optimized version.
- 3. The source file for the optimized version and the Stretch C source file.
- 4. The profiling result for the optimized version.
- 5. Your calculation of the encryption speed-up and the overall speed-up.