CS160 ARM Programming Assignment 2

WORD PARSING

Problem description

In this lab you will write several ARM assembly language subroutines for parsing a file and sorting and use a C program to tie them all together. See your textbook and ARM lab manuals for details of ARM assembly language techniques.

Getting more specific

Run the shell script `~cs160/arm2/copy` to create the directory `~/cs160/arm2` and copy the files: `Makefile` and `wordmain.c`. Your job is to do the following:

- Write an ARM subroutine `genwords` which takes two arguments. Thefirst argument is a source array of bytes representing words terminated by spaces. The second is a pointer to an array which will hold the result: an array of pointers to the first characters of each word in the source array. The terminating space of each byte should be replaced with a zero byte. A zero pointer follows the last valid entry in the result array.
- Write an ARM subroutine `wordgt` that takes as arguments pointers to two words A and B and returns 1 if $A > B$, 0 otherwise. The comparison should be in lexicographical order (long words come after short words, ie "catch" $>$ "cat"). Write another ARM subroutine `sortwords` that takes a single argument that is an array of pointers to words and sorts it using `wordgt` to compare them. Use `wordmain.c` to apply `sortwords` to sort the array generated by `genwords`, and print out the resulting sorted array, one word per line.

Subtle and not-so-subtle hints

- You can write your ARM code based on the C version in `wordmain.c`. You can adapt the ARM implementation of a routine that sorts *bytes* rather than *words* found on page 128 of Hamacher.
- Be careful how you pass arguments from your C code to the ARM subroutines. Even more importantly, pay close attention to how you pass the result back again.
- See `http://www.cs.utk.edu/~cs160/materials/arm prog techniques.pdf` for a detailed description of ARM assembly language programming techniques.

  Do not print this document as it is 250+ pages long. Use `acroread` to view it. Chapters 2-5 and 7 are probably those of most interest to you.

Due date and submission policy

Submit `wordmain.c` and `asmword.s` to your lab GTA no later than 5pm on Sunday, November 20, 2005.