**Note on bash performance**  
  
You will notice that the bash version of the program is not nearly as fast as the C version. In part, that is due to the fact that it runs the 'word' and 'alu' scripts many times to perform operations.  
  
There are certain performance problems inherent in any interpretive language, and a number of strategies for improving things. One is to offer a compiled mode that eliminates the need for the interpreter to translate the script each time it is run. Java does this aggressively and automatically. Other languages like Python, Javascript, and php do it to a lesser degree.  
  
I thought that you might be interested in reading an article in Linux magazine about a Bash Script Compiler that translates a bash script into C, which can be compiled and linked with a special library. I have not tried it myself, but it looks interesting and it is available as source code that you can compile and run. Here is the link to the article:  
  
[http://www.linux-magazine.com/Online/Features/SHC-Shell-Compiler](http://www.linux-magazine.com/Online/Features/SHC-Shell-Compiler" \t "_blank)