

## Assignment 7 - The Great Firewall of Santa Cruz

Description: This program will implement a firewall that will filter out certain words that are in text files and replace them with new words using hash tables. The words that will be replaced will be taken in from another text file and stored in a hashtable and then implemented into the Bloom filter that will parse through a given text file.

banhammer.c: This contains main() and may contain the other functions necessary to complete the assignment.

messages.h: Defines the mixspeak, badspeak, and goodspeak messages that are used in banhammer.c.

salts.h: Defines the primary, secondary, and tertiary salts to be used in your Bloom filter implementation. Also defines the salt used by the hash table in your hash table implementation.

speck.h: Defines the interface for the hash function using the SPECK cipher. Do not modify this.

speck.c: Contains the implementation of the hash function using the SPECK cipher. Do not modify this.

ht.h: Defines the interface for the hash table ADT. Do not modify this.

ht.c: Contains the implementation of the hash table ADT.

bst.h: Defines the interface for the binary search tree ADT. Do not modify this.

bst.c: Contains the implementation of the binary search tree ADT.

node.h: Defines the interface for the node ADT. Do not modify this.

node.c: Contains the implementation of the node ADT.

bf.h: Defines the interface for the Bloom filter ADT. Do not modify this.

bf.c: Contains the implementation of the Bloom filter ADT.

bv.h: Defines the interface for the bit vector ADT. Do not modify this.

bv.c: Contains the implementation of the bit vector ADT.

parser.h: Defines the interface for the regex parsing module. Do not modify this.

parser.c: Contains the implementation of the regex parsing module.

Makefile: This is a file that will allow the grader to type make to compile your program.

- CC = clang must be specified.
- CFLAGS = -Wall -Wextra -Werror -Wpedantic must be included.
- make should build the banhammer executable, as should make all and make banhammer.
- make clean must remove all files that are compiler generated.
- make format should format all your source code, including the header files.

README.md: This must be in Markdown. This must describe how to use your program and Makefile. This includes listing and explaining the command-line options that your program accepts. Any false positives reported by scan-build should go here as well. 4.

DESIGN.pdf: This must be a PDF. The design document should describe your design for your program with enough detail that a sufficiently knowledgeable programmer would be able to replicate your implementation.

WRITEUP.pdf: This document must be a PDF. The writeup must include at least the following:

- Graphs comparing the total number of lookups and average binary search tree branches traversed as you vary the hash table and Bloom filter size.
- Analysis of the graphs you produce

Pseudocode

bf.c

BloomFilter \*bf\_create(uint32\_t size)

Utilizes 3 salts to construct a bloom filter