

For this code I mainly copied the SHA256 to make the SHA512 format.  
The main things I changed are listed below

Changed h0-h7 values based on lecture notes

Changed k values based on lecture notes

Changed "howmanyzeros" variable based on the padding length from 64 to 128 bits for length

Changed word length to 80

Changed step 2 shifting algo based on lecture notes

Changed step 3 algo based on lecture notes

For every bitvector block changed the size from 32 to 64 as described in the lecture notes

I also changed the main file to allow the input to always be a file, and to also write to a file.