**Advanced Security 1 – Lab 2**

**Question 2:**

After checking I can confirm that my program is accurately encrypting and decrypting text.

**Question 3:**

ONE VARIATION TO THE STANDARD CAESAR CIPHER IS WHEN THE ALPHABET IS "KEYED" BY USING A WORD. IN THE TRADITIONAL VARIETY, ONE COULD WRITE THE ALPHABET ON TWO STRIPS AND JUST MATCH UP THE STRIPS AFTER SLIDING THE BOTTOM STRIP TO THE LEFT OR RIGHT. TO ENCODE, YOU WOULD FIND A LETTER IN THE TOP ROW AND SUBSTITUTE IT FOR THE LETTER IN THE BOTTOM ROW. FOR A KEYED VERSION, ONE WOULD NOT USE A STANDARD ALPHABET, BUT WOULD FIRST WRITE A WORD (OMITTING DUPLICATED LETTERS) AND THEN WRITE THE REMAINING LETTERS OF THE ALPHABET. FOR THE EXAMPLE BELOW, I USED A KEY OF "RUMKIN.COM" AND YOU WILL SEE THAT THE PERIOD IS REMOVED BECAUSE IT IS NOT A LETTER. YOU WILL ALSO NOTICE THE SECOND "M" IS NOT INCLUDED BECAUSE THERE WAS AN M ALREADY AND YOU CAN'T HAVE DUPLICATES.

**Question 4:**

Key = 17

**Question 5:**

NIST IS ABOUT TO ANNOUNCE THE NEW HASH ALGORITHM THAT WILL BECOME SHA-3. THIS IS THE RESULT OF A SIX-YEAR COMPETITION, AND MY OWN SKEIN IS ONE OF THE FIVE REMAINING FINALISTS (OUT OF AN INITIAL 64). IT'S PROBABLY TOO LATE FOR ME TO AFFECT THE FINAL DECISION, BUT I AM HOPING FOR "NO AWARD." IT'S NOT THAT THE NEW HASH FUNCTIONS AREN'T ANY GOOD, IT'S THAT WE DON'T REALLY NEED ONE. WHEN WE STARTED THIS PROCESS BACK IN 2006, IT LOOKED AS IF WE WOULD BE NEEDING A NEW HASH FUNCTION SOON. THE SHA FAMILY (WHICH IS REALLY PART OF THE MD4 AND MD5 FAMILY), WAS UNDER INCREASING PRESSURE FROM NEW TYPES OF CRYPTANALYSIS. WE DIDN'T KNOW HOW LONG THE VARIOUS SHA-2 VARIANTS WOULD REMAIN SECURE. BUT IT'S 2012, AND SHA-512 IS STILL LOOKING GOOD. EVEN WORSE, NONE OF THE SHA-3 CANDIDATES IS SIGNIFICANTLY BETTER. SOME ARE FASTER, BUT NOT ORDERS OF MAGNITUDE FASTER. SOME ARE SMALLER IN HARDWARE, BUT NOT ORDERS OF MAGNITUDE SMALLER. WHEN SHA-3 IS ANNOUNCED, I'M GOING TO RECOMMEND THAT, UNLESS THE IMPROVEMENTS ARE CRITICAL TO THEIR APPLICATION, PEOPLE STICK WITH THE TRIED AND TRUE SHA-512. AT LEAST FOR A WHILE. I DON'T THINK NIST IS GOING TO ANNOUNCE "NO AWARD"; I THINK IT'S GOING TO PICK ONE. AND OF THE FIVE REMAINING, I DON'T REALLY HAVE A FAVORITE. OF COURSE I WANT SKEIN TO WIN, BUT THAT'S OUT OF PERSONAL PRIDE, NOT FOR SOME OBJECTIVE REASON. AND WHILE I LIKE SOME MORE THAN OTHERS, I THINK ANY WOULD BE OKAY. WELL, MAYBE THERE'S ONE REASON NIST SHOULD CHOOSE SKEIN. SKEIN ISN'T JUST A HASH FUNCTION, IT'S THE LARGE-BLOCK CIPHER THREEFISH AND A MECHANISM TO TURN IT INTO A HASH FUNCTION. I THINK THE WORLD ACTUALLY NEEDS A LARGE-BLOCK CIPHER, AND IF NIST CHOOSES SKEIN, WE'LL GET ONE.

**Question 6:**

Swahili