Nickolas Martinez **Homework 13** **Due 12-12-2014**

1. (a) What is the SHA256 hash value for the string "Nickolas Martinez" (in hexadecimal)?
   (b) (100 Bonus Points) Find another string that has this hash value.
   (c) If you were unable to answer the previous question, what is the name of the property of SHA256 that makes this hard?
   (d) Find the student in your class whose hash value for his/her name is 464b1943ead3 6b77aebc6c297a7eb331b558da2470d7be7aaea7e8c6a992afa8.

2. Suppose you recover the following message fragment: 232132973343191223899494648786 417037148014705221162088395755378842407803232150192545281732672097745608156669 from Alice to you.
   (a) Alice used your public enciphering key. Decipher it knowing your deciphering private key is $d = 832705072755468551009694090193402460708225506185055292477077688567213774945139161370075006695045409818444 89$ and $n = 3036383926052138699093480908509064737090203884897541481187244497525482089587746762361812280088160987635165 41$.
   (b) The following numbers are all in hexadecimal for your convenience. Alice also sends used SHA256 to hash the message and enciphered that with her priviate key and sends you the ciphered hash which is $c999d2fe589e9877c902435654108f589e1a3ebfd902ff6e1e039c7a20d3d1ac70a9c6a7abffe63ae592b5c565$. You look up her public decipher key it is $d = 11e65cc7db13aeb8d295279f1e66b83e4856dd733103e0324a823ab75274f36fbf3847a0a904d7dbdc7b4ebafc7$ and $n = 1846b955e8091a519722f1b503cac89821d8c124b47c8f4f7dbe93b3f890d21d46dc096853fd0ce395fbde5fee9$. Verify it came from her. (Remember she is hashing the original message which may have spaces in it).

3. (a) Express the number 894 in binary.
   (b) What number has the hexadecimal expression $1d515c$.

4. One day I find your credit card and look you up and call you to tell you I have it. You ask me to send it to you but then I realize maybe this is another Nickolas Martinez. So I ask you if you know your credit card number so that I can verify it is you. You say you do, but won't tell it to me since you don't know who I am or if I even have your credit card number. I won't read it to you for the same reason. What can we do? Hint: Think about what we have done recently in class.