Stanford University
Introduction to Cryptography

Dan Boneh
Professor of Computer Science

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Week 2 - Programming Assignment [optional: extra credit]

Question 1

In this project you will implement two encryption/decryption systems, one using AES in CBC mode and another using AES in counter mode (CTR). In both cases the 16-byte encryption IV is chosen at random and is *prepended* to the ciphertext. For CBC encryption we use the PKCS5 padding scheme discussed in class (13:50).

While we ask that you implement both encryption and decryption, we will only test the decryption function. In the following questions you are given an AES key and a ciphertext (both are hex encoded) and your goal is to recover the plaintext and enter it in the input boxes provided below.

For an implementation of AES you may use an existing crypto library such as PyCrypto (Python), Crypto++ (C++), or any other. While it is fine to use the built-in AES functions, we ask that as a learning experience you implement CBC and CTR modes yourself.

Question 1

- CBC key: 140b41b22a29beb4061bda66b6747e14

- CBC Ciphertext 1:
  4ca00ff4c898d61e1edbf1800618fb2828a226d160dad07883d04e008a7897ee\
  2e4b7465d5290d0c0e6c6822236e1daafb94ffe0c5da05d9476be028ad7c1d81

Question 2

- CBC key: 140b41b22a29beb4061bda66b6747e14
- CBC Ciphertext 2:
  5b68629feb8606f9a6667670b75b38a5b4832d0f26e1ab7da33249de7d4afc48\
  e713ac646ace36e872ad5fb8a512428a6e21364b0c374df45503473c5242a253

Question 3

- CTR key: 36f18357be4dbd77f050515c73fcf9f2
- CTR Ciphertext 1:
  69dda8455c7dd4254bf353b773304eec0ec7702330098ce7f7520d1cbbb20fc3\
  88d1b0adb5054dbd7370849dbf0b88d393f252e764f1f5f7ad97ef79d59ce29f5f51eeca32eabedd9afa9329

Question 4

- CTR key: 36f18357be4dbd77f050515c73fcf9f2

- CTR Ciphertext 2:
  770b80259ec33beb2561358a9f2dc617e46218c0a53cbeca695ae45faa8952aa\
  0e311bde9d4e01726d3184c34451

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