

>>> Assignment #6 for Simulation (CIS 4930) <<< Due on 07/07/11 in class

This assignment covers material that may be helpful for the project.

Problem #1 (100 points)

Your task is to come-up with a scheme that predicts the next bit in the series of bits in `bits.txt` (download as <http://www.csee.usf.edu/~christen/class3/bits.zip>) with the lowest possible prediction error. A prediction error occurs when your program predicts a “1” and the next bit is a “0”, or visa versa. Starting with bit 0 you are to predict bit 1, then with bit 1 you are to predict bit 2, and so on for all the bits (1 millions of them) in `bits.txt`. The scaffold program `predictBit.c` (download as <http://www.csee.usf.edu/~christen/class3/predictBit.c>) should be your starting point.

You can imagine that `bits.txt` is the trace of some unknown process that generates bits. Your goal is to be able to predict the next bit that this process generates given only knowledge of previous bits generated.

What is the best possible prediction scheme that you can come-up with? That is, the scheme with the lowest possible prediction error. Can you argue why your scheme is best possible? You are to deliver:

- a) A description (pseudocode or similar) of your prediction method.
- b) A screenshot of the execution of your modified `predictBit.c` that implements your method.
- c) The source code of your modified `predictBit.c`
- d) An argument or proof of why your method is the best possible for `bits.txt`.

Hint: Don't forget that there may be useful tools here: <http://www.csee.usf.edu/~christen/tools/toolpage.html>.
