Homework Project #02: Huffman Coding of Images

Due Date: 10/30/2014

Markov Model for Text Compression

- Download the Huffman coding source code, Huffman.zip from the class website.
- Trace the source code of huff_enc and huff_dec. Use them to encode/decode the grayscale image sena.raw, and compute the compression ratio.
- Design a prediction model to pre-process the image pixels, then use Huffman coder to compress the residual image again.
  - You should try the simple pixel difference predictor as described in the textbook first.
  - You should then design some better model by yourself.

Hand-in for the Homework

- Please write a short report (up to 4 pages) to:
  - Analyze the program flow of huffman_enc and huffman_dec.
  - Discuss your prediction model, and why it works better than the simple pixel-difference predictor.
- Grading is based on
  - Your understanding of the Huffman coding programs
  - Any bright ideas of your prediction model

Comments on the Source Code

- The programs can be compiled directly using gcc tools
  - A free gcc compiler package for Windows can be downloaded from MinGW (http://www.mingw.org/)
- It should also be easy to create Visual Studio project workspace for huff_enc and huff_dec
  - Create a "console" program
  - huff_enc.c needs idc.h, sub.c, imsub.c
  - huff_dec.c needs idc.h sub.c

Comments on the Image 'sena.raw'

- The image has 256×256 pixels, each pixel is an 8-bit unsigned number of grayscale from 0 ~ 255
  - 0 means pure black, 255 means pure white
- You can install the Windows program 'xnview' to view the image.
  - xnview can be downloaded from http://www.xnview.org
  - Make sure you set the read option for raw image files to "grayscale" (the default is RGB), as illustrated in the next slide.

XnView for Raw Image Viewing