Digital communications

Information and Entropy

Course Syllabus

-Information and entropy
-Encodings
-Errors (detect, correct)
-LTI systems
-Bits to World
-World to Bits
-Combining it all

Today:
-
-What is information?
-How do we measure it?
-Why does it matter?

Independent Identically Distributed Systems

Event e_i happens with probability p_i.

Entropy of the source:

$$H=\sum p(x)I(x)$$

Huffman trees

iid source:

X	.4
Y	.2
Z	.3
W	.1

Huffman tree:

-Take the two lowest nodes and assemble them into a new node.

-While possible, repeat.

Problems of Huffman trees

-Probabilities are not always known

-They may change over time

-might not be iid

Lempel-Ziv-Welch encoding (LZW)

abcabcabcabcabcabc

Table:

a 0

b 1

c 2

Worked out on the board

LZW summary

-No prior knowledge

-Gets better over time

-Adaptive

-Lossless

How about not lossless?

For another time...