

Comments on the 2007 Information Theory Midterm
by Benjamin Smith, Midterm Grader

A few general comments:

- It was clear that some of you collaborated on the take-home portion; this is not acceptable, and should not be repeated on the final.
- The marking of the in-class component was more generous than that of the take-home component. Given three days to work on it, it was expected that your answers be more polished.
- Please do not give more than one solution to a given question...especially if the end result is a different answer! Even if they represent two distinct ways of arriving at the same answer, please present only the nicest of the two solutions.
- Avoid bad notation. For example, if x is a binary variable, do not let x represent the probability that $x = 1$; this leads to confusion.
- If you can relate a problem to a known solved problem (solved in the text, or the homeworks), then please do so. Don't re-invent the wheel. Specifically, for Q1, it would have been enough to say that the XOR gate is a BSC, the AND gate is exactly the Z-channel from the homework, and the OR gate is the same as the AND gate (but with zeros and ones interchanged).
- Be concise (more math, fewer words)! Your take-home should not look like an essay...

And some more specific comments:

- For Q2, it was OK to simply state that the Huffman tree is not necessarily unique. Of course, this isn't the best answer (see the solution for a more precise answer), but it was sufficient for our purposes.
- For Q3(a), there are many ways to express the correct answer, some of which lead to fewer cases than the solutions posted online (but also which are somewhat less explicit). Some of your answers were difficult to interpret, but I believe I succeeded in marking them appropriately.
- For Q4(c), our problem statement was not entirely precise. In particular, our intention was that you consider the case where $\epsilon > 0$ is fixed, while $n \rightarrow \infty$. However, some of you considered the case where ϵ simultaneously goes to 0, which results in a different answer. In any case, as long as your assumptions were clear, we accepted any valid answer. If you lost marks, it is likely that you did not clearly state your assumptions.