Information Theory
Practice Set 10

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Solutions are not to be returned

Practice Set

1. Exercise problems from Cover & Thomas, Chapter 5:
   5.4 (a, b), 5.5, 5.6, 5.7 (a, c), 5.9, 5.12, 5.13, 5.15, 5.28 (a, b), 5.29 (a, b), 5.30 (a–d), 5.32 (all), 5.41

2. Exercise problems from Cover & Thomas, Chapter 13:
   13.5, 13.6 (a, b), 13.9 (a, b, c)

3. (Based on question 13.4 from textbook) Suppose $X_1, X_2, ..$ is an iid random process, with $P[X_i = 1] = 2/3$. Suppose the first 5 bits of the input message are 01110.

   (a) Find the encoding of 01110 under arithmetic coding assuming that the message length is $n = 5$ only.

   (b) Suppose the message length $n > 5$, and the first 5 symbols of the message are 01110. How many bits of the overall encoded sequence can you identify at this point (given that you do not know what the future message bits are going to be)?
