

8.4. HOW MANY COINS TO GET THE FIRST HEAD?

You have a coin that comes up heads with probability p . What is the expected number of times you have to flip the coin till you get a heads?

8.5. NUTS AND BOLTS.

Suppose we are given n nuts and n bolts of different sizes. Each nut matches exactly one bolt and vice versa. The nuts and bolts are all almost exactly the same size, so we can't tell whether one bolt is smaller than the other, or if one nut is bigger than the other. If we try to match a nut with a bolt, it would be either too big or too small for the bolt or it would be just right for the bolt. Find the correct matchings in worst case expected $O(n \log n)$ time.

[Hint: If a nut and bolt don't match how can you partition the nuts using the bolt and the bolts using the nut?]