

Questions from Lecture 1

CD example

Music CDs hold about 700 MB but we estimated it to be 5 GB.

I was a bit unclear on the derivation of

$$\text{spacing} \sim \left(\frac{\text{area}}{N} \right)^{1/2}.$$

How does the method work:

$$N \sim t \times f_{\text{sample}} \times n_{\text{bits/sample}}?$$

If I didn't know about analog devices, how would I get 32 bits/sample?

What is $n_{\text{bits/sample}}$?

How do you estimate $n_{\text{bits/sample}}$?

How was the 1.4 obtained in the spacing estimate?

How did I get 10^{-4} cm for the spacing? That flew by.

I don't understand some of the assumptions that were made.

The adjusting of the initial estimate to make corrections was a little muddy.

The 1 or 'few' method

The math method was confusing (but I really liked it).

Confused by how to use the 'few'.

General

How precise should I be with my final estimation?

How do we gain intuition about back-of-the-envelope numbers, e.g. water pressure, thermal diffusivity of copper, viscosity of air, ...?

When is it appropriate to round and how do you keep track of the factors to adjust by later?

Syllabus/class requirements?

Will we need CS/EE knowledge?

What if we don't actually know the numbers to start off with, like the sample rate or bits on a CD, etc.?

Would help to know the actual spacing.

Why haven't I heard about this class before?

I'm worried that I'm not good enough at guessing things to approximate, e.g. the CD data, for example.

How do you know the facts to use in divide and conquer (like sampling rate, etc.)?

What if I didn't know enough info to make the approximation?

If I didn't know the maximum hearing frequency or $n_{\text{bits/sample}}$ I couldn't have solved the problem. How much background is needed?

I'm lost with all the computer talk.

Is abstraction the same as making simple models?

How much leeway should we give ourselves with estimating versus looking up figures (e.g. wavelengths)?

I'd like to see direct dimensional analysis where there's no known equation, just dimensions. I take it you'll get to this later.