EES 151: Quantitative Foundations
Homework 1

Read the Two-Minute Entreaty by Anthony Doerr.

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Tattoo Earth's 4.5-billion-year timeline onto your arm, shoulder to fingertip, and your upper arm will get nothing but geologic mayhem: meteorites, magma, acid rain. Life won't begin until your bicep, and from there to your wrist it's all single-celled, oceangoing stuff. Reproductive sex won't show up until your wristwatch, and creatures that are finally big enough to see—tubes and fronds and weird Precambrian plant-animals—will crisscross the back of your hand.

Trilobites paddle across your palm; ancient forests grow from your knuckles; dinosaurs wind around the joints at the ends of your fingers. Mammals burrow into your cuticles.

Orangutans, arrowheads, Cleopatra, the names of the stars—they all have to fit on the sliver of fingernail at the end of your longest finger.

And you? Your grandma's toffee bars, your CD collection, your treehouse, your best-ever Halloween costume, every regret you'll ever have, every dream you'll ever dream, every mouth you'll ever kiss (or wish you had)—they'll all ride the microscopic edge of your fingernail, a tattoo so thin you'd need an electron microscope to glimpse it.

File your nail and you'll wipe out your entire family tree, and Shakespeare and ancient Greece with it.

We are each no more than a spark, a mote illuminated for a split-second as it passes through a beam of light.

Pascal said, "When I consider the short duration of my life, swallowed up in the eternity before and after…I am frightened."

People say, "Who wants to feel so small? Let me eat my burrito."

I say, Be big. Big-hearted, big-witted, big-eyed. See, try, love, read, make, paint, and taste everything you can while you can.

You still have some hours left. Go.

Go to the website: http://htwins.net/scale2/?

Play around with this site that shows the different sizes of things in the universe.
Pick at least 10 objects from the site that give a representative sample of the full scale of
sizes in the universe. Now you are going to write your own two-minute entreaty on the
size of things in the universe. Choose your largest length to correspond to the length of
some common object of your choice, either your arm or a table or a room or a street
block, etc. Describe where along this common object the website objects you chose are
located when you scale everything appropriately.

Steps:
1. List your 10 objects and their size in meters, written in scientific notation.
2. Show your work for how you convert the scale to correspond to your common object
length for each website object.
3. Write a short paragraph describing where the objects would be located on your new
scale.

Hints:
Be sure to pick objects with the same number of significant figures as our full length
scale. That is, the size of the observable universe is 9.34×10^{26} m which has 3 significant
figures. Pick 9 other objects that also have 3 significant figures.

Example: We choose our common object scale to be our arm. Imagine your arm length is
1.00 m. Our largest object is the size of the observable universe, 9.34×10^{26} m. When you
scale the size of universe to your arm you need to take the original scale and divide it by
the new scale. ie. Take the size of the universe divided by the arm length. This tells us
1.00 meter represents 9.34×10^{26} m. Now you need to take each size of your other objects
and scale it relative to the full arm scale.