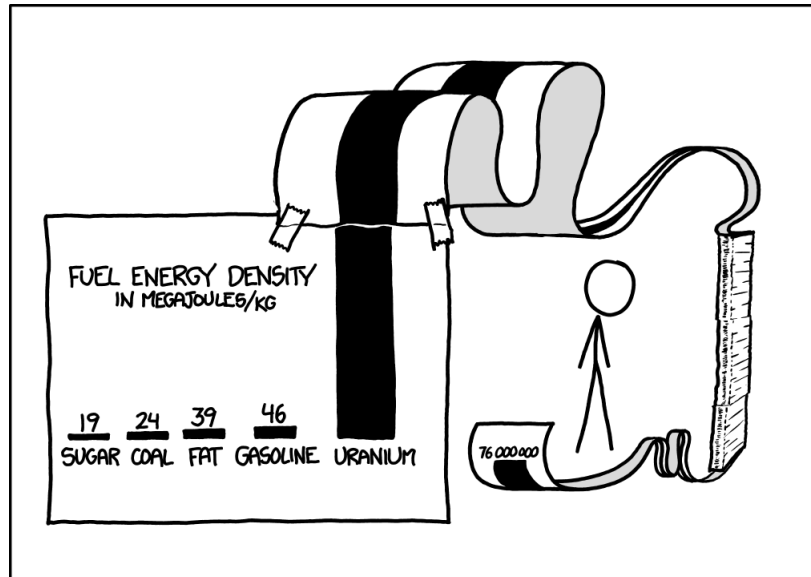


# CS140 - Assignment 0

Due: Sunday, Jan 22 at 8pm



SCIENCE TIP: LOG SCALES ARE FOR QUITTERS WHO CAN'T FIND ENOUGH PAPER TO MAKE THEIR POINT *PROPERLY!*

<http://xkcd.com/1162/>

- For this first assignment, please work individually. We'll start paired assignments next week.
- This assignment must be typeset using  $\text{\LaTeX}$ . You are encouraged to take the source file for the assignment and modify it by adding your solutions.
- An important part of being a computer scientist is the ability to express solutions clearly and thoroughly. Therefore, you are expected to explain each step of your solution and to present your solutions clearly and precisely. Part of the score on each problem will be for quality of presentation. Note that correct answers without justification are not worth very many points!

## 1. Learning communities

Starting next week, we'll have weekly learning communities. Please fill out the following form, so I can better allocate people into groups that will be helpful:

<https://forms.gle/L1dG3uRwYrUmQwwb6>

2. [14 points] Which is bigger?

For each of the two options below, state which one is larger (or if they're equal) and give a justification for your answer. If the base of the log is not specified, then the answer should apply to all bases. Your justification should be similar to those we looked at in class. Do **not** simply plug these answer into a calculator (though you're welcome to check your logic that way). For all variables (e.g.,  $x$  or  $n$ , assume they are positive).

- (a)  $\log 10$  vs.  $\log 20$
  - (b)  $\log_4 n$  vs  $\log_5 n$
  - (c)  $\log_5 75$  vs  $\log_2 12$
  - (d)  $\log_7 24.5$  vs  $\log_5 12.5$
  - (e)  $\log x^4$  vs  $\log x + \log x^3$
  - (f)  $((x^2)^2)^2$  vs  $x^7$
  - (g)  $a^b$  vs.  $b^a$  for constants  $a$  and  $b$ , where  $a > b$ .
3. [5 points] Write pseudocode for a function `dedup` that takes as input an array/list and returns a new array/list with all of the duplicates removed. You don't have to necessarily follow the conventions used in class, but use something reasonable and be consistent.
- (a) What is the big-O running time of your function? Give a brief (one sentence) justification.