Hi, I'm Kyle!

https://personal.utdallas.edu/~kyle.fox/courses/cs6363.003.21s/

eLearning: email
homework submit
grades

"required book" Cormen et al.
CLRS

"highly recommended": Erickson

homework: 30% (~5 assignments)

two midterms: 20% each

final exam: 30%

↑
cumulative

homework groups of 1 or 2

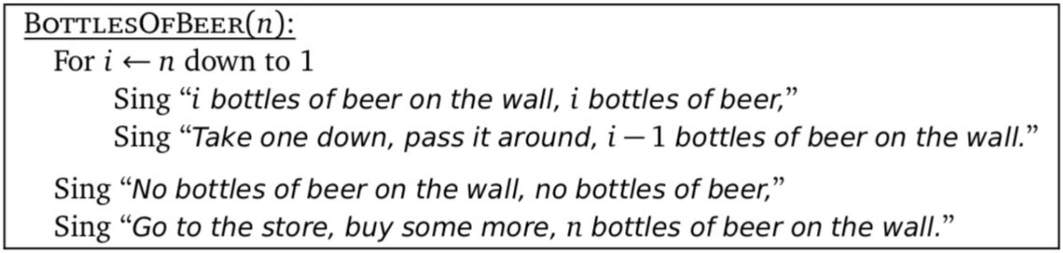
one submission per group

ask for free 48 hour

homework extensions

Can use outside sources if needed, but cite them and write solutions in your own words.

algorithm: an explicit,
precise,
unambiguous,
mechanically-executable
sequence of elementary instructions



```
BottlesOfBeer($n$):
  For $i \leftarrow n$ down to 1
      Sing "i bottles of beer on the wall, i bottles of beer,"
      Sing "Take one down, pass it around, $i-1$ bottles of beer on the wall."

  Sing "No bottles of beer on the wall, no bottles of beer,"
  Sing "Go to the store, buy some more, n bottles of beer on the wall."
```

lattice multiplication

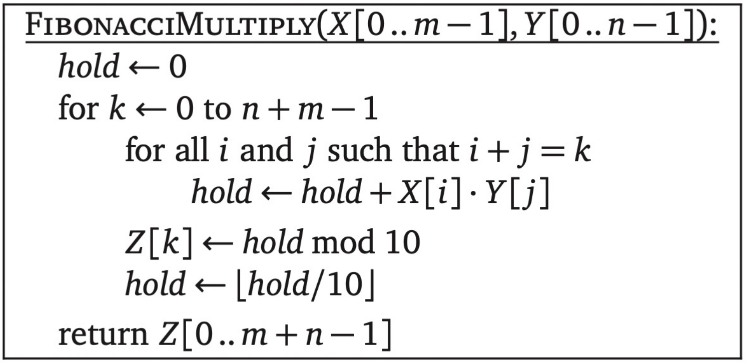
input: two arrays $X[0..m-1]$
$Y[0..n-1]$

$$x = \sum_{i=0}^{m-1} X[i] \cdot 10^{i}$$

$$y = \sum_{j=0}^{n-1} Y[j] \cdot 10^{j}$$

output: $Z[0..m+n-1]$

$$z = x \cdot y = \sum_{k=0}^{m+n-1} Z[k] \cdot 10^{k}$$



```
FibonacciMultiply($X[0\,..\,m-1], Y[0\,..\,n-1]$):
    $hold \leftarrow 0$
    for $k \leftarrow 0$ to $n+m-1$
        for all $i$ and $j$ such that $i+j=k$
            $hold \leftarrow hold + X[i] \cdot Y[j]$
        $Z[k] \leftarrow hold \bmod 10$
        $hold \leftarrow \lfloor hold/10 \rfloor$
    return $Z[0\,..\,m+n-1]$
```

any CS student should be able to run any line without further explanation

Describing an algorithm:

1) What
   - what precisely does it solve?

2) How
   - describe the algo itself

3) Why
   - prove the algo solves the what

4) How fast: asymptotic run time

remember your audience

(me or a TA)

(<u>not</u> a computer)

(skeptical novice)

nobody should have to read code to know "what"

highly recommend using pseadocode.

use English + math for individual instructions

a proof ≠ restating how in English