

# CS344: HW2

September 26, 2017

- Out Sept 28, Due week of Oct 9. Hand it to your TAs at the beginning of the recitation. No late homeworks please.
- Design and analyze an algorithm to multiply 2 numbers  $A$  and  $B$ , each  $n$  bits long by partitioning them into 3 equal sized pieces each. What is the best running time you can get?
- Given  $n$  points on the plane  $(x_i, y_i)$ , find a *nearest pair*, that is,  $i, j$  such that  $d((x_i, y_i), (x_j, y_j))$  is smallest for any  $(i, j)$ . Here,  $d((x_i, y_i), (x_j, y_j))$  is the Euclidean distance between the points, that is,

$$d((x_i, y_i), (x_j, y_j)) = \sqrt{(x_j - x_i)^2 + (y_j - y_i)^2}$$

Use divide and solve. What is the best running time you can get?

- Pick your favorite example of a dynamic programming problem from CLRS pages 358–413, and describe the solution in your own way (notation to define the problem, algorithm description, proof of correctness if any, running time analysis etc).