

CS375 Small Assignment 13

Due Dec 6th 10PM ET

(This question is from CLRS: 27-1) The Appalachian Trail (AT) is a marked hiking trail in the eastern United States extending between Springer Mountain in Georgia and Mount Katahdin in Maine. The trail is about 2,190 miles long. You decide that you are going to hike the AT from Georgia to Maine and back. You plan to learn more about algorithms while on the trail, and so you bring along your copy of Introduction to Algorithms in your backpack. You have already read through this chapter before starting out. Because the beauty of the trail distracts you, you forget about reading this book until you have reached Maine and hiked halfway back to Georgia. At that point, you decide that you have already seen the trail and want to continue reading the rest of the book, starting with Chapter 28. Unfortunately, you find that the book is no longer in your pack. You must have left it somewhere along the trail, but you don't know where. It could be anywhere between Georgia and Maine. You want to find the book, but now that you have learned something about online algorithms, you want your algorithm for finding it to have a good competitive ratio. That is, no matter where the book is, if its distance from you is x miles away, you would like to be sure that you do not walk more than cx miles to find it, for some constant c . You do not know x , though you may assume that $x \geq 1$.

What algorithm should you use, and what constant c can you prove bounds the total distance cx that you would have to walk? Your algorithm should work for a trail of any length, not just the 2,190-mile-long AT.