

Computer Science 405
Winter 2023
Third Programming Assignment
Friday, March 10

The problem to be solved is a variant of the Activity Selection Problem. Imagine that you have an all-day pass to an amusement park and that you want to maximize the *amount of time* spent on rides (rather than, as in the problem discussed in class, maximizing the *total number of rides* you can get in). Needless to say, rides cannot be interrupted and one cannot be on two rides at the same time.¹

The input to the problem is a collection of half-open intervals, closed on the left and open on the right, each representing the start-time, end-time and duration of a ride. Two rides, one of which ends at the same time as another starts can both be enjoyed.

The input of the program will be a sequence of ride durations, give as half-open interval, preceded by a name which will be a single string followed by a colon. Each such ride specification will be separated by one or more space. Here is an example:

Dumbo:[0,2) Minnie[0,1) Teacups:[2,3) Toad:[1,4) Tomorrow:[1,2) Pastland:[3,5) Happy:[2,4)²

The output should be (1) the names of the rides in the order in which they will be taken, and (2) the total amount of time spent on the rides.

Submitted with the code, you should also provide a brief description of your algorithm strategy, together with an analysis of its asymptotic complexity. This part of the assignment will be worth 20% of the total grade for this assignment.

¹ *Hint*: this looks like it might best be approached as a problem solvable by dynamic programming, but I think, it is best to conceptualize it as a problem in graph traversal.

² This is posted on the Canvas site under Files.