

Analysis of Algorithms

Assignment 6

Protik Dey

Ans: to the Ques: No: 1(a).

Possible toll both position = 2^n

Running time for calculating sum of money and regulation for all tolls is $O(n)$

So run time of brute force algorithm is $O(n2^n)$

Ans: to the Ques: No: 1(b)

~~defined~~ Recursive definition of $a[j]$:

We have to choose the optimal amount of toll between one previous optimal amount and one new optimal amount upto $l(j) + t$ (of the current location).

So Base case: $a[0] = 0$
otherwise: $a[j] = \max \{ a[\text{index of } l(j)] + t[j], a[j-1] \}$

Ans: to the Ques: No: 1(c)

~~for a given~~

Let $L[i]$ is the index of $l(i)$

find-index(a, L) {

$L[0] = 0$

for $i = 1$ to n

for $j = i-1$ to 1

if $(a[i] - a[j] > 10)$ {

$L[i] = j$

break;

}

tail-of-optimization(a, T, L) {

$a[0] = 0;$

for $i = 1$ to n

if $(a[L[i]] + T[i] > a[i-1])$

$a[i] = a[L[i]] + T[i]$

else

$a[i] = a[i-1]$

}

Ans: to the Ques: No. 1(d)

Here, find-index function has a nested loop, so run time of this function is $O(n^2)$. And toll-optimization has one loop, so run time is $O(n)$. So overall run time is $\boxed{O(n^2)}$

—