21BDS0340

Abhinav Dinesh Srivatsa

Design and Analysis of Algorithms Lab

Digital Assignment 4

Question 1

Algorithm:

Given a string S and Pattern

1. Create a prefix table for the string Pattern as Pi
2. Keep track of letters in S as I
3. Set J as 0
4. If I equals Pattern[J + 1], then increment J
5. If the letters do not match, then set J as Pattern[J]'s Pi and set I as the next letter in S
6. If J is equal to the length of the Pattern, sequence is found, set J to Pattern[J]'s Pi

Time Complexity:

The time complexity if the algorithm depends on the length of the string S and Pattern with lengths m and n. The order is of **O(m + n)**

Question 2

Algorithm

Given an array of activities, with start and end times

1. Sort the array of activities by end times
2. Create a new array called the Solution
3. Add first activity of the sorted array to the Solution
4. Add the next activity which has start time greater than or equal to the last activity's end time in the Solution
5. Repeat step 4 until all the activities are visited
6. Display the Solution

Time Complexity

The time complexity of the selection sort = O(n^2)

The time complexity of adding elements to the solution = O(n)

Total time complexity **with sorting** = O(n^2 + n) = **O(n^2)**

Total time complexity **without sorting** = **O(n)**