

Introduction to Algorithms

CS 430

Lecture 27

Outlines

- final review

Settings

- 24 hrs take-home exam
 - 5/1 (Mon) 12:00pm to 5/2(Tues) 11:59am
- open notes, open book
- no help from other intelligence, including human, digital and artificial intelligence
- No make up exam, no late submission
- Any similar answers will be viewed as cheating and result in zero for all parts (no matter you are plagiarist or plagiarized)

Topics Covered

- Optimization Programming
 - dynamic
 - greedy
 - ex:

Ex1: There are n programs that will be stored in a tape. The length of the entire tape is L . For program i , if it is stored in the tape, its length is l_i ($1 \leq i \leq n$). Design an algorithm to return the maximum number of programs that can be stored in the tape. Present your design in pseudo code.

E2: There are n clients waiting for a service. The service provider can serve one client at one time. Client i 's service costs time t_i . Design an algorithm to minimize the average wait time among n clients. (the average wait time = the sum of wait time from n clients / n)

Topics Covered

- BFS and DFS
 - demonstrate some algorithms on G
- Shortest Path
 - Bellman Ford--negative weighted edges
 - Dijkstra--non-negative weighted edges
 - ex:

Ex:

NASA wants to link n stations spread over the country using communication channels. Each pair of stations has a different bandwidth available, which is known a priori. NASA wants to select channels in such a way that all the stations are linked by the channels and the total bandwidth from NASA to each station in the system is maximum. Give an algorithm for this problem and determine its worst-case time complexity. (pseudo code is required to present your algorithm)

Topics Covered

- P, NP and NPC
 - proof one problem to be an NP.

Questions will be:

- proof
- algorithm design

Final Grade

- weights:
 - assignments: 5% each
 - midterms: 10% each part
 - final: 30%
 - project: 20%
 - extra credit: 3
 - attendance: 5%
- 70% or below will get an E if you are a graduate student.