East West University

Department of Computer Science and Engineering

Course: CSE246 Algorithm Topic: Greedy approach Lab: 02

1. Fractional knapsack: Given the weights and profits of N items, in the form of {profit, weight} put these items in a knapsack of capacity W to get the maximum total profit in the knapsack. In Fractional Knapsack, we can break items for maximizing the total value of the knapsack.

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| Sample input | Sample output |
| {60, 10}  {100, 20}  {120, 30}  W = 50 | 240 |

1. Activity selection problem: You are given n activities with their start and finish times. Select the maximum number of activities that can be performed by a single person, assuming that a person can only work on a single activity at a time.

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| Sample input | Sample output |
| start = {10, 12, 20}  finish = {20, 25, 30} | 2 |

1. Scheduling problem: Given a schedule containing arrival and departure time of trains in a station, find minimum number of platforms needed in the station so to avoid any delay in arrival of any train.

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| Sample input | Sample output |
| Number of schedules: 6  Arrival: 2.00 2.10 3.00 3.20 3.50 5.00  Departure: 2.30 3.40 3.20 4.30 4.00 5.20 | 2 |

1. Job sequencing Problem: Given an array of jobs where every job has a deadline and associated profit if the job is finished before the deadline. It is also given that every job takes a single unit of time, so the minimum possible deadline for any job is 1. Maximize the total profit if only one job can be scheduled at a time.

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| Sample input | Sample output |
| a 4 20  b 1 10  c 1 40  d 1 30 | c, a |

1. Job sequencing problem – Loss minimization: We are given N jobs numbered 1 to N. For each activity, let Ti denotes the number of days required to complete the job. For each day of delay before starting to work for job i, a loss of Li is incurred. You are required to find a sequence to complete the jobs so that overall loss is minimized. You can only work on one job at a time.

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| Sample input | Sample output |
| L = {3, 1, 2, 4}  T = {4, 1000, 2, 5} | 3, 4, 1, 2 |

1. Assign mice to hole: There are N Mice and N holes are placed in a straight line. Each hole can accommodate only 1 mouse. A mouse can stay at his position, move one step right from x to x + 1, or move one step left from x to x -1. Any of these moves consumes 1 minute. Assign mice to holes so that the time when the last mouse gets inside a hole is minimized.

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| Sample input | Sample output |
| positions of mice are:  4 -4 2  positions of holes are:  4 0 5 | 4 |