

Assignment on Greedy Algorithms

1. Suppose you are a space-ship driver giving a trip to an intergalactic alien species. You do this for money and you are generous enough to ask for the same amount of money **M**, irrespective of the distance you need to carry your passengers. Your Customers will send you **N** trip requests tomorrow. Each of your request for trip comes through your space app on your space phone that contains the following information: [10]

- Customer ID (**C_i**)
- Start Time of Trip (**S_i**)
- Duration of journey (**D_i**)

Note that you need an **X** hour of break between two consecutive trips. Write a code to maximize your income for tomorrow. Note that you can only write code for one customer at a time.

Sample Input	Sample Output
M N X C ₁ , s ₁ , d ₁ C ₂ , s ₂ , d ₂ C _n , s _n , d _n	
10 1 4 a 2 8 b 3 4 d 8 1 c 7 1	Profit: 2 x 10 = 20 Chosen Tasks: b d

2. Determine the smallest set of unit-length closed intervals

Given a set of points on the real line, give an algorithm to determine the smallest set of unit-length closed intervals that contains all of the points. A closed interval includes both its endpoints. Your program should take the points as input, sort them in an ascending order and then find the required set of unit-length closed intervals

[10]

Sample Input	Sample Output
1 1.5 1.5 2.1 2.2 3.4 4.5 5.6 5.9	5
2.1 10.3 11.2	2

For Test Case 1, the 5 intervals are: [(1.0, 2.0),(2.1, 3.1), (3.4, 4.4), (4.5, 5.5), (5.6, 6.6)]

For Test Case 2, the 2 intervals are: [(2.1,3.1),(10.3, 11.3)]