Shiraz University
School of Electrical and Computer Engineering

Algorithm Design and Analysis

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Final project

Deadline: Winter 2023, Semester II Max mark: 100

Introduction

The Orienteering Problem is a type of optimization problem that involves finding the shortest possible route between a set of locations (often referred to as "control points") while visiting each location only once. The goal is to maximize the total score obtained by visiting these locations, where each location has a different score associated with it.

The problem is often encountered in the field of operations research, and has many real-world applications, such as in logistics, transportation planning, and even in recreational activities like hiking and orienteering.

Project outlines

In this project your goal is to solve Orienteering Problem (OP). In order to attempt that you should suggest **at least three** algorithms based on your course topics that you think they can lead you to the optimal solution.

A number of standard instances will be provided to you so that you can test your methods on them.

Instance format

The first line contains the following data:

Tmax P

where:

Tmax = available time budget per path
P = number of paths (=1)

The remaining lines contain the data of each point. For each point, the line contains the following data:

x y s

where:

x = x coordinate
y = y coordinate
s = score

REMARKS

- The first point is the starting point.
- The second point is the ending point.
- The Euclidean distance is used.

Solution

Solution can be represented in an array where first element is the starting point and the last element is the last point from instance.
Total profit of each solution is the sum of each visible node's profit in solution respecting Tmax.

Grading

Hence there are many approaches to attack this problem and many instances with different shapes and structures, your results will be different.

Regarding this the top 5 results will get the maximum grade and the grades of the rest are given based on them.

- Upload your project in Quera .
- **Do not Cheat and Feel free to ask any question**.

Best wishes