Let's go to the concert!

Difficulty level: advanced

Keywords

- Graph theory
- Directed graphs
- Dijkstra's algorithm
- Heuristic algorithms

Problem description

On February 12, there will be the concert of our favorite singer in Bari (Italy). Thus, we must organize the trip that will take us to the city, by considering several options. For instance, we know that from Iseo we can reach the main airports in the area, at different ways of travel and prices, namely:

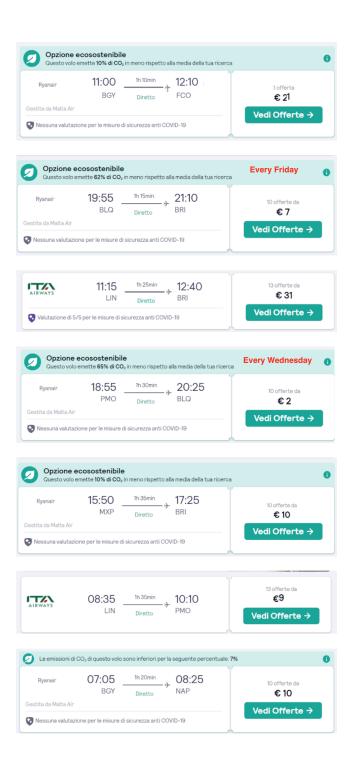
- Bergamo Orio Al Serio (BGY) airport by taking a bus which costs 7 €;
- Milan Linate airport (LIN) by taking a bus to Bergamo and then a train, for a total cost of 10 €;
- Milan Malpensa airport (MXP) by train, making 2 changes, at a cost of 10.5 €each way.

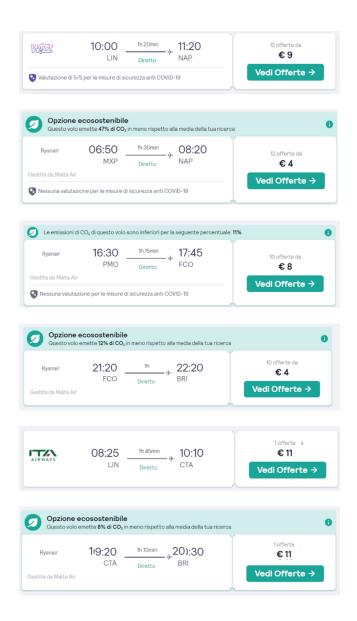
Several flights depart from these three airports: the possible routes are listed below (unless otherwise specified, flights are available every day).

If we want to use land transport for longer distances, we know that the most convenient regional train ticket to reach Milan Central Station from Iseo costs $9.20 \in$, while the Italo train from Milan to Rome costs $49.90 \in$. The Freccia Argento train from Naples to Bari has a cost of $13.30 \in$.

Knowing that every night spent in Bari costs $25 \in$, in Bologna $20 \in$, in Naples $15 \in$, and also that some of our friends from Catania would gladly pick us up at Palermo airport and host us for free for the night, how should we organize our trip to save as much as possible?







Tasks

- 1. Solve the problem by applying Dijkstra's algorithm.
- 2. Knowing that our friend Giovanni has to go to Rome, what would be the most convenient route for him, always starting from Iseo?