## Let's go to the concert!

Difficulty level: advanced

## **Keywords**

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

## Problem description

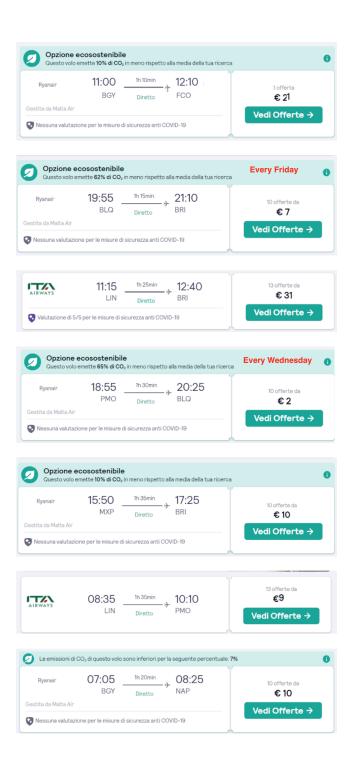
On February 12, there will be the concert of our favorite singer in Bari (Italy). Thus, we must organize the trip that will take us to the city, by considering several options. For instance, we know that, from Iseo we can reach the main airports in the area, at different prices and ways of travel, namely:

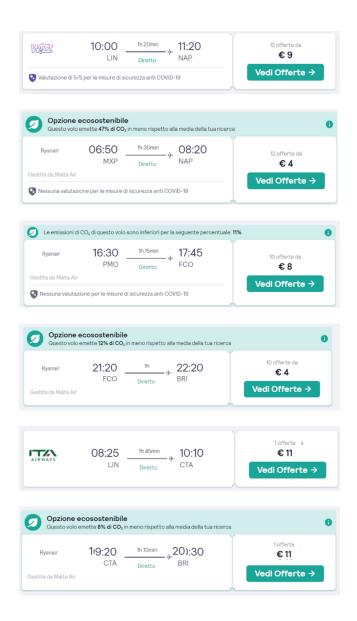
- Bergamo Orio Al Serio (BGY) airport by taking a bus which costs 7 €;
- Milan Linate airport (LIN) by taking a bus to Bergamo and then a train, for a total cost of € 10;
- Milan Malpensa airport (MXP) by train, making 2 changes, at a cost of  $\bigcirc$  10.5 each way.

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  $\mathfrak{C}$  9.20, while the Italo train from Milan to Rome costs  $\mathfrak{C}$  49.90. The Freccia Argento train from Naples to Bari has a cost of  $\mathfrak{C}$  13.30.







## **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?