Ski Resort

1 Presentation

Mr. Touchousse Hubert, the director of a large ski resort of Savoie, seeks to optimize the business management to make the ski area more attractive for the tourists. Mr. Touchousse wants to install kiosks in the ski queues and various points of the station which allow the skiers to choose their routes. He wants to explain them how to travel to any other point of the resort as quickly as possible. You have a comprehensive plan, available at the web page (http ://www.lesarcs.com) synthesized in a text file (dataski.txt) containing the following information :

- <Number of points> then, for each point :
- <Point number>, <place name>, <altitude>
- <Number of routes> then, for each route :
- <Route number>,<route name>,<type >,<Starting point><Arrival point>

For routes, we distinguish the following types :

- TK for ski lift,
- TS for chair lift
- TSD for special chair lift
- TC for cabin, TPH for telepheric
- BUS for shuttle bus
- V for green piste
- B for blue piste
- R for red piste
- N for black piste
- KL for track skiing
- SURF to the area reserved for surfing.

Experimental study demonstrate the following measures to calculate the time spent on different pistes and ropeway :

- For piste, the time is proportional to the slope.
  - Green piste (V) 5mn for 100m of slope.
  - Blue piste (B) 4mn for 100m of slope.
  - Red piste (R) 3mn for 100m of slope.
  - Black piste (N) 2mn for 100m of slope.
  - Track skiing (KL) 10sec for 100m of slope.
  - Snowpark (SURF) 10mn pour 100m of slope.
- For ropeway, time is composed of a fixed part and a part proportional to the slope.
  - (TPH) 4mn + 2mn for 100m of slope.
  - (TC) 2mn + 3mn for 100m of slope.
  - (TSD) 1mn + 3mn for 100m of slope.
  - (TS) 1mn + 4mn for 100m of slope.
  - (TK) 1mn + 4mn for 100m of slope.
- For bus shuttle (BUS),by counting the waiting time, the journey takes an average of 40 minutes to go to Arc2000 to Arc1600 or Arc1600 to Arc2000 and 30 minutes to get from Arc1600 to Arc1800 or Arc1800 to Arc1600.

2 Questions

1. Which classical problem of graph theory the idea of Mr Touchousse corresponds ? Write a program that displays the fastest route between two points on the station kiosk.
2. Depending on its level of skiing, the skier can not use all the pistes of the station. He wants to know, from a given point of the station, the reachable points by a route using only the authorized pistes he mentioned. What a classical problem of graph theory do you recognize ? Write a program that provides points the skier can reach according to the selected color pistes from his starting point.