

# "The Sleigh Trip"

Every year, Santa Claus has just finished his gift delivery tour to Italian children. This year, for the first time, he was helped by a Python program to plan his trip.

In particular, the file "bambini.csv" contains information on all the children who need to receive a gift, and each child is represented in the following format:

```
surname, first name, gift, province
```

The children in the file appear in an arbitrary order.

To optimize the trip, it is necessary to minimize the movements between the provinces of residence of the different children. In particular, the program will perform the following algorithm (which does not guarantee the absolute minimum, which would be much more complex to calculate):

select the first child as the one who lives furthest North of all (because closest to the North Pole) after delivering a gift to a child, select the next child by finding the one that is not yet visited and closest to the just-visited child. The program must print the list of children in the order of the calculated visit.

For the calculation of distances, the program uses a file "province.csv" that contains the data of the provinces in the following format:

```
id, region_id, metropolitan_city_code, name, car_sign, latitude, longitude
```

where the provinces are described by their car sign and the last two columns contain the coordinates (expressed in degrees).

To determine the distances between two points A and B, the following formulas are used:

```
h = sin^2(delta_lat/2) + cos(lat_A)*cos(lat_B)*sin^2(delta_long/2)
distance = 2 * R * arcsin( sqrt(h) )
```

where R is the radius of the earth (6371 km), the coordinates lat\_A, lat\_B, long\_A, long\_B must be expressed in radians, and finally delta\_lat and delta\_long are the differences between the coordinates of the two points.

It is assumed that the files are error-free.

## Example

### *File bambini.csv*

```
cognome,nome,regalo,provincia
Potter,Harry,Bacchetta,VE
Granger,Hermione,Libro,RM
Weasley,Ron,Cioccolato,TO
Malfoy,Draco,Serpente,ME
Lovegood,Luna,Gioiello,PA
Scamander,Newt,Animale,RM
Hagrid,Rubeus,Mantello,BA
```

### *File province.csv*

```
id,id_regione,codice_citta_metropolitana,nome,sigla_automobilistica,latitudine,longitudine
84,19,,Agrigento,AG,37.31109,13.576548
6,1,,Alessandria,AL,44.817559,8.704663
42,11,,Ancona,AN,43.549325,13.266348
51,9,,Arezzo,AR,43.466896,11.88236
44,11,,Ascoli Piceno,AP,42.863893,13.589973
5,1,,Asti,AT,44.900765,8.206432
64,15,,Avellino,AV,40.996451,15.125896
72,16,272,Bari,BA,41.117123,16.871976
110,16,,Barletta-Andria-Trani,BT,41.200454,16.205148
25,5,,Belluno,BL,46.249766,12.196957
62,15,,Benevento,BN,41.203509,14.752094
16,3,,Bergamo,BG,45.85783,9.881998
.....
```

### Example output

Consegnato Bacchetta a Harry Potter (VE)  
Viaggio di 639.5210019580376 km

Consegnato Cioccolato a Ron Weasley (TO)  
Viaggio di 914.7292650198566 km

Consegnato Libro a Hermione Granger (RM)  
Viaggio di 396.44941684588036 km

Consegnato Animale a Newt Scamander (RM)  
Viaggio di 396.44941684588036 km

Consegnato Mantello a Rubeus Hagrid (BA)  
Viaggio di 474.53863170537545 km

Consegnato Serpente a Draco Malfoy (ME)  
Viaggio di 150.3085087723676 km

Consegnato Gioiello a Luna Lovegood (PA)