

As a tour guide in Budapest, Hungary, you have been hired by a group of tourists to show them the best of what the city has to offer. The group consists of different age ranges and interests, and they have limited time in the city.

Your task is to create an itinerary for the group that will allow them to experience as much of Budapest as possible within the given timeframe. You have a map of the city, which shows all the tourist destinations and the streets that connect them.

Each tourist destination is rated on a scale of 1 to 10 based on its popularity and significance. The group has also specified their individual interests, such as historical landmarks, museums, parks, and entertainment venues. Some of them prefer to travel alone, while others prefer to travel in groups.

In addition to the above requirements, the competition organizers have specified the following constraints and objectives:

- **Group Size:** The size of the group can range from 1 to 20 people.
- **Timeframe:** The group has a limited amount of time to spend in the city, which can range from 1 to 7 days.
- **Interests:** The group members have specified their individual interests, which can be combined to create a set of shared interests. The set of shared interests must include at least one interest from each of the following categories:
 - History and Culture
 - Art and Architecture
 - Nature and Outdoors
 - Entertainment and Nightlife
- **Diversity:** The itinerary must be diverse and include a mix of destinations from each of the categories specified above.
- **Time Management:** The itinerary must be optimized to minimize the time spent traveling between destinations, while maximizing the time spent at each destination.
- **Rating and Popularity:** The itinerary must include destinations with a high rating and popularity, to ensure that the group has a memorable experience. Ratings should be given preference.
- **Accessibility:** The itinerary must take into account the accessibility needs of the group members, such as wheelchair accessibility or language barriers.

Your challenge is to create a program that will generate an optimized itinerary for the group based on the above requirements and constraints. The program should take as input the map of the city, the ratings of the tourist destinations, the interests of the group members, the group size, and the available time. The output should be an optimized itinerary that maximizes the group's experience in Budapest, while satisfying the above requirements and constraints. The program must also be able to handle changes in the group size, available time, or interests, and generate an updated itinerary accordingly. You should also handle different groups and generate output accordingly.

Input:

The program should take the following input in the form of CSV files:

1. **destinations.csv**: contains information about each destination, such as name, rating, and categories. It should have the following columns:
 - Name
 - Category
 - Rating
 - Duration
 - Price
2. **groups.csv**: contains a list of possible group sizes and respective available timeframes with group_identifier. It should have the following columns:
 - size
 - time
 - Group_identifier
3. **map.csv**: contains information about the connections between destinations, such as distance and time required to travel between them. It should have the following columns:
 - From
 - To
 - Distance
4. **interests.csv**: contains a list of interests and their corresponding categories with group identifier. It should have the following columns:
 - category
 - interest
 - Group_identifier

Output:

The program should generate an optimized itinerary in the form of a CSV file with the following columns:

- Name
- Destination Category
- Time Spent
- Group

Other contents of this ZIP file:

- *example* folder containing small example input set and the corresponding output file
- *production* folder containing the live input files you shall use to generate the output file

Submission:

Please submit a single CSV file your program generated as well as the raw source code used to generate the output. Please package the output zip and the uncompiled source code (and nothing else) as a ZIP file and submit it using the Judge System. The output file should be the only CSV file in the package and it may only be in the root folder of the ZIP file. If the submission does not conform to the specifications the submission is automatically rejected. Please direct any questions to codingcompetitions.support@kszk.bme.hu

Sample Input**Destinations.csv**

Name	Category	Rating	Duration	Price
Buda Castle	History and Culture	4.7	2	100
St. Stephen's Basilica	Nature and Outdoors	4.9	2.5	200
Szechenyi Thermal Bath	Nature and Outdoors	4.6	2.5	300
Szimpla Kert	Nature and Outdoors	4.6	5	220
Fisherman's Bastion	History and Culture	4.7	1.5	22
Heroes' Square	Nature and Outdoors	4.5	2.0	45
Hungarian National Museum	History and Culture	4.7	3	33
Museum of Fine Arts	Nature and Outdoors	4.5	2	545
Gellert Hill	Nature and Outdoors	4.5	2	454

Groups.csv

size	time	group_idenfier
5	6	group1
4	5	group2

Map.csv

From	To	Distance
Buda Castle	Fisherman's Bastion	1.2
Fisherman's Bastion	St. Stephen's Basilica	2.1
St. Stephen's Basilica	Szechenyi Thermal Bath	3.4

Szechenyi Thermal Bath	Szimpla Kert	4.5
Szimpla Kert	Heroes' Square	2.5
Heroes' Square	Hungarian National Museum	4.7
Hungarian National Museum	Museum of Fine Arts	3.6
Museum of Fine Arts	Gellert Hill	5.2
Gellert Hill	Great Market Hall	3.8

Intrests.csv

category	interest	group_identifier
History and Culture	Monuments	group1
History and Culture	Archaeology	group1
History and Culture	History	group1
Art and Architecture	Painting	group1
Art and Architecture	Sculpture	group1
Art and Architecture	Architecture	group2
Nature and Outdoors	Parks	group2
Nature and Outdoors	Zoos	group1
Nature and Outdoors	Beaches	group1
Entertainment and Nightlife	Music	group1

Output (itinerary.csv)

Name Destination	Category	Time Spent	Group
Fisherman's Bastion	History and Culture	1.5	group1
Buda Castle	History and Culture	2.0	group1
Buda Castle	History and Culture	2.0	group1
St. Stephen's Basilica	Nature and Outdoors	2.5	group2