Mobility Meeting Scheduler

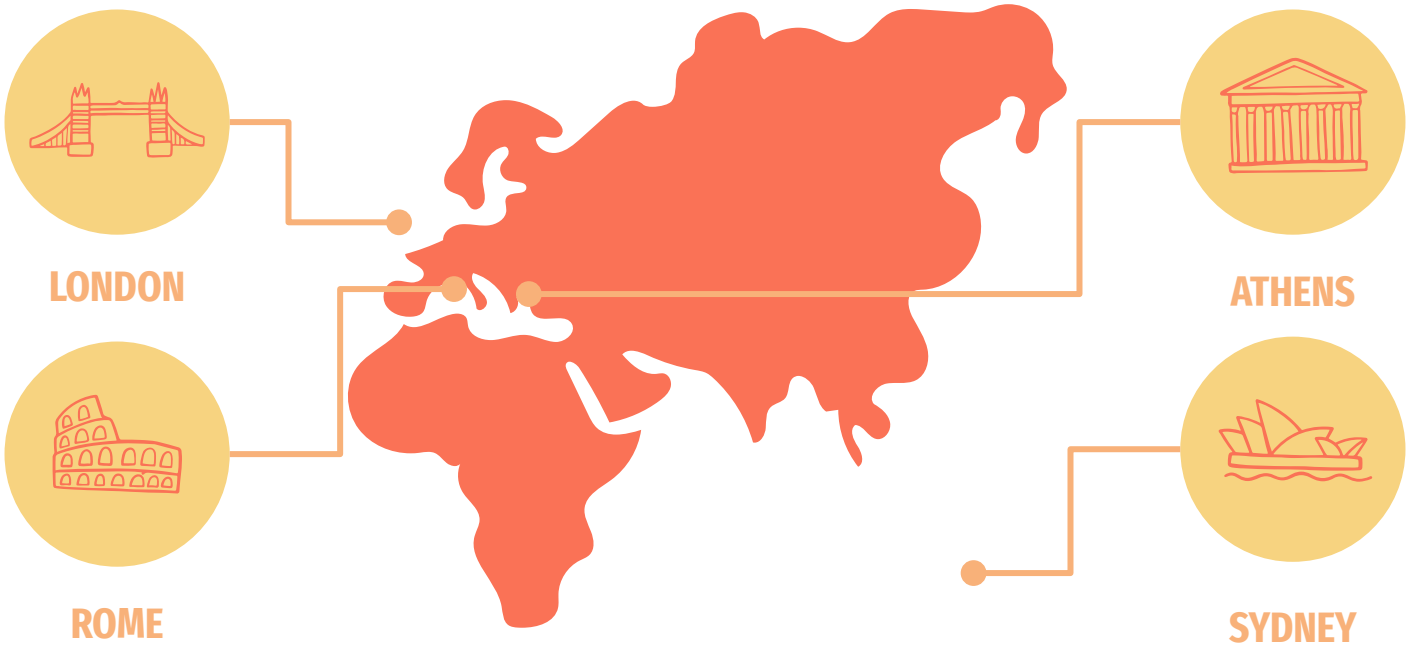
Motivation

Background

Initially, we thought about exchange students:

- Friends can go to different cities in the same semester
- But they encounter themselves in a time dedicated to visiting different places
- So, they can decide to make a trip together
- This implies some variables and constraints that will be discussed in the next slides

List of possible destinations



Individual constraints

TIME

Each person has different available days.

ORIGIN

Everyone needs to start and finish the trip in their city.

PREFERENCES

Each person has their own flight preferences.

The plan for each person

OUTGOING FLIGHT

Go to your destination

DESTINATION

The most important part of the plan

INCOMING FLIGHT

Get back home

Goals

TIME TOGETHER

Spend more time in the destination together.

COST

Spend less money, considering both the total and individual costs.

SEPARATED TIME

Spend less time in the destination waiting for others to arrive.

Formalization

Data models

FLIGHT

- Origin
- Destination
- Duration
- Connections
- Departure
- Arrival
- Price

STUDENT

- Current City
- Max connections
- Max duration
- Earliest flight
- Latest flight
- Availability

INPUT

- List of Flights
- List of Students
- Minimum useful time
- List of Destinations

SOLUTION

- List of pairs, having, for each student:
  - Outgoing trip
  - Incoming trip

Constraints

1

DESTINATION

Destination must be in the list of possible destinations

2

FLIGHT

Outgoing and incoming flights must obey to the following constraints

3

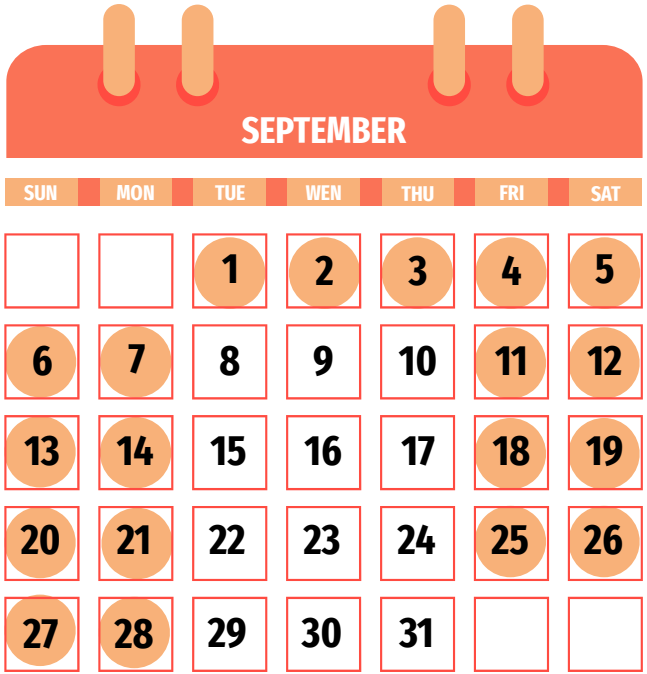
TIME

Group members must be together for a minimum useful time

Flight Constraints

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24

Flight Constraints



AVAILABILITY

Cost function

$$X * \text{COST} + Y * \text{TIME TOGETHER} + Z * \text{TIME WAITING}$$

$$\frac{X * \text{COST}}{Y * \text{TIME TOGETHER} + Z * \text{TIME WAITING}}$$

Next Steps

Implement the programs

Google OR-Tools

Use the python version of Google OR-Tools to solve the problem

IBM Cplex

Use the docplex implementation of the IBM Cplex

SICStus

Prolog-based solver

Questions