UBS Global Coding Challenge – Singapore Edition, 2024

Entry Challenge

Input

A json file with input containing two attributes: schools and students.

Each school will contain the following attributes:

Field	Type	Representation	Optional
name	String	Uniquely identifies a school	No
location	List of Integer	Coordinate of school location	No
maxAllocation	Integer	Number of vacancies	No

Each student will contain the following attributes:

Field	Type	Representation	Optional
id	Integer	Uniquely identifies a student	No
homeLocation	List of Integer	Coordinate of home location	No
alumni	String	School Alumni	Yes
volunteer	String	School Volunteer	Yes

As there are limited number of school vacancies, students will be assigned weightage score based on the following criteria and weightage:

Criteria	Weightage /%
Distance of home to school*	50
School Alumni	30
School Volunteer	20

School allocation will be prioritized based on the student's weightage score.

Each student can only be allocated to one school.

*Distance of home to school is based off the Euclidean distance between 2 points.

Output

A json file containing a list of maps.

Each map will have the following attributes
- key: school name referring to the unique school name
- value: a list of student ids referring to the unique student id.

Sample

Input will be given as a json file in a folder with the name: input.json

```json
{
  "schools": [
    {
      "name": "School A",
      "location": [1, 3],
      "maxAllocation": 1
    },
    {
      "name": "School B",
      "location": [2, 4],
      "maxAllocation": 1
    }
  ],
  "students": [
    {
      "id": 1,
      "homeLocation": [0, 0],
      "alumni": "School B",
      "volunteer": "School B"
    },
    {
      "id": 2,
      "homeLocation": [5, 5],
      "alumni": "School A",
      "volunteer": "School B"
    },
    {
      "id": 3,
      "homeLocation": [2, 5],
      "alumni": "School A"
    }
  ]
}
```

Expected output as a json file with the name: output.json

```json
[
  {
    "School A": [3]
  },
  {
    "School B": [1]
  }
]
```

Explanation

- Each student will have a weightage score for each school.
- Allocation to the schools will be prioritized based on weightage scores.

- Student with id 3 has the highest weightage across all students for School A and is given priority allocation.
- Student with id 1 has the next highest weightage and is thus given allocation for School B.
- Student with id 2 is not allocated to any school as there are no more available slots.

In a scenario where 2 students have the same weightage score, student with a smaller numerical id value will be selected.

Note

We will be testing your implementation against the exact file name input.json and expecting an output file of output.json. These files will be located in the same folder as your code.

We currently only accept implementation in python, java, and javascript. Any other languages will not be accepted.

Do note that we also prefer for your code to be in one file and do state any assumptions if there are.

Python

We expect a single file main.py that is able to run the command python main.py input.json and saving a file output.json in the same directory.

Java

We expect a single file Main.java that we can compile and run the command java Main input.json, saving another file output.json in the same directory.

Javascript

We expect a single file main.js that we can run the command node main.js input.json, saving another file output.json in the same directory

Submission

Send your code file as zip to global-coding-challenge-singapore@ubs.com.