Test assignment (Junior position)

Alice's car shop

Alice owns a car shop but she is terrible in distinguishing cars. For Alice, all cars look the same. A couple of times she sold a Mercedes for a price of a Tata because of that. She decided that as she can not distinguish them visually, she is going to distinguish them geometrically. She captured 3D coordinates of $n \geq 5$ key points (e.g positions of wheels' centers, door handles) for each m car model she has and stored them in the database. Then when she sells a car she measures these key points again and wants to get all models from the database that matches her observation. Positions of the points may be different within different observations due to the change in Alice's location and orientation at the time of the capture. Assume that Alice has her own coordinate system attached to her face and she can observe the car from any view (even from top or upside down).

Your task is to write a C++ application that finds all matching cars for Alice.

The first line of the input file m and n Then there are m sections of n key points for each car in a database. Finally, there are n points of the queried car. Please note that i-th key point of each car correspond to the i-th key point of the model (i.e they are both left-front wheal position)

Print id's of the matching cars or -1 if no cars were found

Please keep in mind that your code's mathematical correctness is required but not sufficient to pass the assignment. You will be mostly evaluated based on the clarity of your code.

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Example of the input file	Example of result
2 5 0 0 1 0 1 0 0 1 1 0 0 0 0 0.5 0.5 0 0 2 0 2 0 0 2 2 0 0 0 0 0.5 0.5 1 0 0 0 0 1 1 0 1 0 0 0 0.5 0 0.5	0

Solution should:

- use cmake for configuration
- be compiled under c++17
- have a good code structure
- follow Google C++ Style Guide
- have time complexity of O(n * m)
- use the Eigen library for matrix computations

Please additionally briefly describe your algorithm in English language