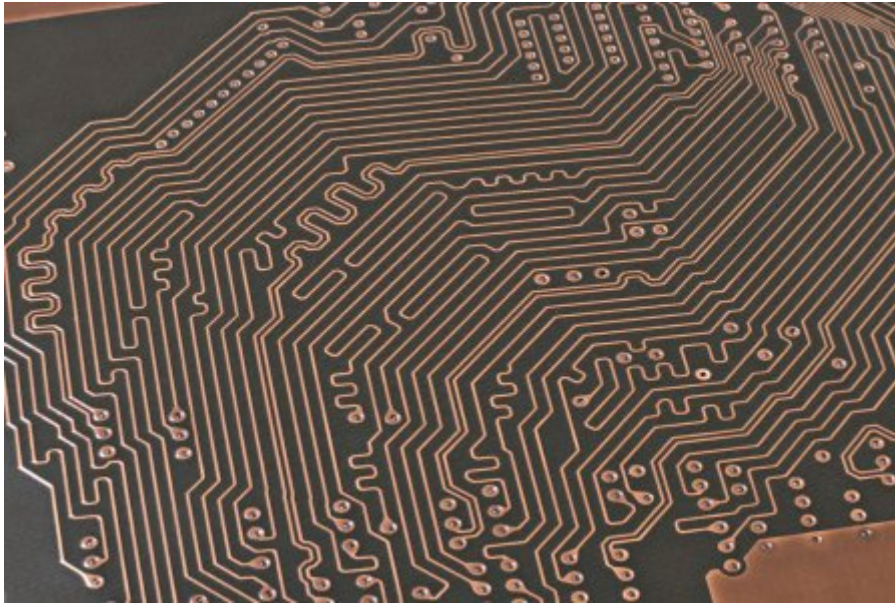


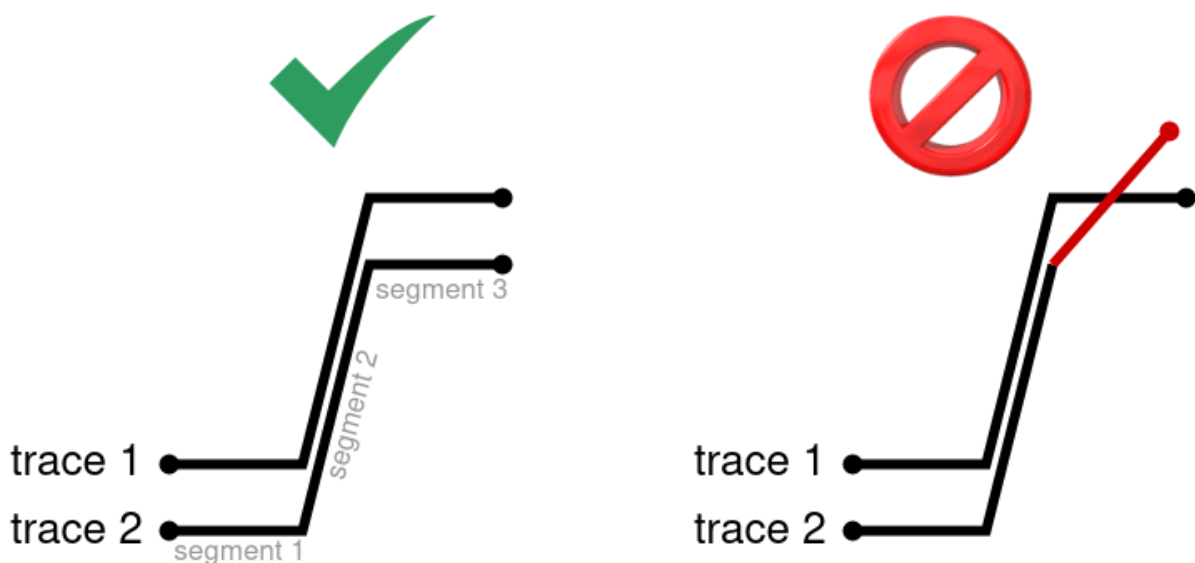
Story



You are employed as a software engineer at Silicon Digital Solutions AB: a market leader in semiconductor product design. Many innovative products share C++ libraries you develop to provide their advanced functionality. Currently the company is hard-working on a new product: a software for printed circuit board (PCB) design.

The product team has already developed a sleek and intuitive GUI that helps the users to trace the PCBs of their dreams. Surely, this product is going to disrupt the market and make the world a better place. However, one critical feature is still missing: traces on the PCB are not allowed to cross. If the user tries to add a new line segment that is crossing any of the existing traces the application should reject such input with a warning. Most of the underlying calculations are provided by your libraries. So the feature request lands on your table ...

Task



Design and implement an API to check if a new line segment added by the user intersects existing PCB design (existing traces). Provide tests covering the implementation.

Details

- PCB design is a collection of traces
- Each trace is represented as a 2D **polyline**
- Users draw traces by adding new line segments to them
- Line segment is given as two 2D points: start and end

Requirements

- The task needs to be implemented in C++
- Using existing libraries is permitted

Bonus

Create a minimal GUI application where it is possible to add traces using a mouse.
Inputs leading to crossing traces are rejected.

Things to keep in mind

Important points that can be a part of the follow-up discussion:

- Design choices (API, data structures, algorithms)
- Code structure (readability, maintainability, extensibility)
- Documentation and tests
- Performance considerations (possible optimizations, handling different input sizes, task parallelization)
- Code portability (cross-platform code and tooling are preferred)
- How can the task to split and organized when implemented by a team

Please think of motivating used solutions and explaining the overall design for the follow-up discussion.

Good luck! 😊