

# Implementing the sweeping algorithm for segment intersection.

May 18, 2023

## 1 Project description

You are going to implement and test a C/C++ program that takes as input  $n$  segments in the plane, represented by their coordinates  $(x_{left,i}, y_{left,i})$   $(x_{right,i}, y_{right,i})$  of their endpoints and either returns two indices  $k, l$  and a point  $(x, y)$  that is the intersection of segments  $I_k$  and  $I_l$ , or reports that no such point exists.

- You may use the map data structure from STL, as well as STL algorithms (e.g. sort) too implement the algorithm.
- Once you are done with this implementation, you should implement one of AVL trees, red-black trees or splay trees and use it instead of map in your program. You may consult external sources for complete algorithms.

**Discuss your design choices and results in the report you submit.**

## 2 What to turn in

You will turn in

1. *a short written report* containing:
  - A description of the significant choices/issues in the design of your code.
  - Listing of your experiments, showcasing the capabilities of the program.
2. The sourcecode of your program.

You may turn in the document via [moodle.unibuc.ro](https://moodle.unibuc.ro) (Class moodle).

### **3 Coding standards**

A percentage of your grade will be based on the quality of your code, so pay attention to it. Discuss changes (if any) you made to programs presented in class. Take extra care in documenting the code you are implementing on your own. Properly modularize the code (for instance implement separate functions for significant parts of the program).

### **4 Deadline**

June 5, 2023, noon local time. This is a strict deadline. No credit will be given for homework turned in late.