# Competitive Programming Course

Leonardo Gabriel Martínez Uribarren, MS. in Computer Science and Engineer
lg.mu@hotmail.com

Competitive Programming is an activity in which participants code specific logic and mathematical problems mainly focusing on getting the correct result. To solve such problems, is imperative to know the basics of Algorithm theory. For this reason, in the fist section we will discus what is *Competitive Programming* and its relation with the Computer Theory field. Following by a brief explanation of the Computational Complexity concept, an introduction to to static and dynamic data structures and how to implement more complex structures such as Stacks, Queues, and Graphs using them. Finalizing with an introduction to an important programming strategy.

At the end of this course, students will learn what is Competitive Programming and how to get into, the importance of understanding Algorithm theory over memorizing, and the basic data structures and strategies widely used to solve computer problems.

**Outline**



| Schedule | | |
|---|---|---|
| August 1, 2024 | Course Overview | 10 min |
| | Competitive Programming | 20 min |
| | Computational Complexity | 30 min |
| August 8, 2024 | Arrays and Lists | 30 min |
| | Programming Exercises | 30 min |
| August 15, 2024 | Stacks and Queues | 30 min |
| | Programming Exercises | 30 min |
| August 22, 2024 | Graph Theory | 30 min |
| | Programming Exercises | 30 min |
| August 29, 2024 | Programming Strategies | 30 min |
| | Programming Exercises | 30 min |

## References

[1] Antti Laaksonen. *Competitive Programmer's Handbook*. URL: `https://cses.fi/book/book.pdf`.
[2] Ronald L. Rivest & Clifford Stein Thomas H. Cormen Charles E. Leiserson. *Introduction to Algorithms, Fourth Edition*. MIT Press, 2022.
[3] Jon Kleinberg & Eva Tardos. *Algorithm Design*. Addison Wesley, 2014.
[4] Adam Drozdek. *Data Structures and Algorithms in C++, Fourth Edition*. Cengage Learning, 2013.