# Data Structures and Algorithms
# Laboratory rules

## 1. Laboratory Schedule

- Laboratory is structured as 2 hour classes every two weeks.
- Lab assignments received at a given laboratory have to be turned in at the next laboratory, with the exception of the first two labs.

| Lab | Lab topic description | Week received – Week delivered |
|---|---|---|
| L1 | Dynamic Array | 1/2 - 5/6 |
| | ---- | ------- |
| L2 | Linked list with dynamic allocation | 3/4 – 5/6 |
| L3 | Linked list on arrays | 5/6 – 7/8 |
| L4 | Binary heap and problems using binary heaps | 7/8 – 9/10 |
| L5 | Hash table | 9/10 – 11/12 |
| L6 | Binary search tree | 11/12 – 13/14 |

## 2. Laboratory activity and grading

The main goal of the second lab (the one without a topic in the above table) will be to help students prepare their first assignment.

Each of the laboratories L1-L6 focuses on a data structure. Students will receive a container (ADT) and will have to realize and application in C++ to implement the given **container** using a given representation and the given **data structure.**

Requirements:

- The interface of every ADT (together with the description of the operations) has to be respected (they can be found at the course web page).
- **With the exception of Lab 4, it is not allowed to implement a separate class for the data structure. The data structure will be used directly for implementing the given container.**
- Elements of the container will be of the generic type **TElem** (or **TComp** for sorted containers).
- For testing the implementation, **TElem = int** (and **TComp = int**) will be used.
- Every implemented operation will be followed (or preceded) by a line of comment, containing the complexity of the algorithm, preferably in the C++ file (and not in the .H file).
- When the laboratory is delivered, the application will be tested by the student (in front of the lab teacher) on the 2 test sets (**ShortTest** and **ExtendedTest**) provided for the container. Test

sets can be found at the course web page in the same archive where the interface of the container is foud.

Lab delivery process:

- In the first part of the lab (45-60 minutes, it will be communicated by the lab teacher) every student who wants to deliver an assignment:
  - will make sure that the implementation passes the provided test sets (**ShortTest** and **ExtendedTest**). This can be checked at home as well.
  - will receive a new functionality and:
    - has to implement and test it (in C++)
    - has to write the implementation in Pseudocode on paper
    - has to deduce the complexity of the functionality (best case, worst case, total complexity).
- When the allocated time is over, the lab teacher will check the application and the extra requirements presented above.

Lab grading:

- Lab assignments are graded in the following way:
  - 1 point: Start
  - 3 points: Application works correctly for the provided tests (1 point if only for short tests)
  - 2.5 point: Explanations regarding the implementation
  - 1 point: Pseudocode for new functionality
  - 1 point: Complexities (0.25 for complexities of the ADT operations, 0.25 for each of best/worst/total case).
  - 1.5 point: Testing and explanations for the new functionality

**3. Laboratory rules**

- A plagiarized laboratory assignment will receive a grade of **0**.
- In case of a delay of one lab (two weeks) the grade for the assignment will be **multiplied by 0.8**. Delays greater than one lab (two weeks) are not accepted.
- Laboratory attendance is mandatory for **90% of the labs** (6 out of 7 labs). Students who do not have at least 6 attendances at the laboratory cannot participate at the written exam, neither in the regular, nor in the retake session and they cannot pass this course.
- **At most one laboratory attendance** can be recovered with a different group, but only with the explicit agreement of the lab teacher. In this case the assignment grade is computed according to the points from *Lab grading.* In case of illness, absences will be motivated by the lab teacher, based on a medical certificate. Medical certificates have to be presented at most one week after the absence, after that period they will not be accepted. Medical certificates have to be presented to the lab teacher in original and a scan of them has to be sent by mail to the lab teacher in order to get the absence motivated.

- During a laboratory **at most 2 assignments** can be presented. If two assignments are presented, the extra activity from *Lab delivery process* will have to be done for both assignments in the provided time interval.
- **Final laboratory grade,** LG, will be computed as the weighted average of the grades received for the 6 lab assignments. If a lab assignment is not delivered, its grade is 0.

$$LG = \frac{12 * L1 + 12 * L2 + 17 * L3 + 15 * L4 + 22 * L5 + 22 * L6}{100}$$