

# Algorithmics and data structures - exam spring'24

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## BST (approx. 6 pts)

- Write a `symmetric(t)` function that takes a BST and (builds and) returns the symmetric of that BST
- Write a `breadthFirst(t)` function that takes a BST and displays its elements in a breadth-first manner (level after level, starting with the root)

## Graphs (approx. 4 pts)

What is the maximum number of edges in a graph of  $N$  nodes? Prove your answer using induction.

## Data structure (approx. 10 pts)

We want to design a telephone directory. Each contact in the directory has a name, an email address and of course a phone number. We want the chosen data structure(s) to guarantee best performance for lookups (by name, email or phone number) as well as additions of new contacts.

Choose and code ~~what~~ you think is the most suitable data structure for this directory, and code one of the search functions and the addition function.