



Algorithms and Data Structures – Conditional Course Winter Term 2026/27

Exercise Sheet 6

Due: Wednesday, 02 December 2026, 12:00

Exercise 1: Reconstruction from Traversals (13 Points)

- (a) Reconstruct the binary search tree whose **preorder** traversal is

$$P = (8, 4, 2, 6, 5, 7, 12, 10, 14, 13).$$

(2 Points)

- (b) Give the **postorder** traversal of the reconstructed tree.

(2 Points)

- (c) Describe a recursive algorithm that reconstructs the **postorder** traversal of a binary search tree with pairwise distinct keys from its **preorder** traversal. Your algorithm should run in $O(n)$ time.

Hint: An $O(n \log n)$ solution can earn up to 4 points.

(7 Points)

- (d) Let T and T' be binary search trees containing exactly the same keys. Prove or disprove: *If their **inorder** traversals are identical, then T and T' are identical.*

(2 Points)

Exercise 2: Common Keys of Two Search Trees (7 Points)

Let T_1 and T_2 be binary search trees with n_1 and n_2 nodes, respectively. Within each tree, all keys are distinct. Find all keys that occur in both trees.

A natural approach is to search T_2 for every key in T_1 . However, this is too slow. What is the running time of this approach?

(2 Points)

Describe an algorithm that outputs all common keys of T_1 and T_2 in $O(n_1 + n_2)$ time. Justify your answer.

(5 Points)