

# Computer Engineering 171

## Homework 1: Imperative Programming

**Due: October 11th at 9:00 am**

The goal of this assignment is to introduce you to writing code in two imperative language designed for different purposes. You should not mimic Pascal code in C, nor C code in Pascal, but rather use the best mechanisms provided by each language. Use the Linux machines in the Engineering Computing Center for this assignment. The Pascal compiler is `fpc` and the C compiler is `gcc`.

### 1 Quicksort

On the course website, you will find an implementation in Pascal of **quicksort**, an efficient sorting algorithm. Translate the program to C, keeping the same procedure and function names and parameters. Call this program `sort.c` and place it in the shared folder.

**Goal:** To learn about methods of passing parameters and recursion.

**Hints:** None.

### 2 Binary Search Trees

A **binary search tree** is either empty, or it consists of a node with two binary search trees as subtrees. Each node holds an integer. The elements in a binary search tree are arranged so that smaller elements appear in the left subtree of a node and larger elements appear in the right subtree. On the course website, you will find an implementation of a binary search tree in C. Translate the program to Pascal, keeping the same function names and parameters. Call this program `tree.p` and place it in the shared folder.

**Goal:** To learn about types and data representation.

**Hints:** You will need to use a record or structure to represent a tree node, and tree nodes need to be dynamically allocated. It is easiest to have both functions be recursive. You will find an example in Pascal of a stack built using a linked list on the website.