Computer Engineering 171
Homework 1: Imperative Programming

Due: October 9th 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

Under `/scratch/coen171/homework1`, 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, for all but the top-level program, which will become the function `main` in C. 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. In the course folder, you fill find an implementation of a binary search tree in C. Translate the program to Pascal, keeping the same function names and parameters, for all but the function `main`, which will become the top-level program in Pascal. 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 in the course folder.