Applications of Algorithms
Assignment 3

(A) The first part of your assignment is to code up the algorithms in Chapter 21 of the 3rd edition of the textbook (Chapter 19 of the 4th), which is on Data Structures for Disjoint Sets.

(1) Code up the MAKE-SET, FIND-SET and UNION operations described in Section 21.2, using the *weighted-union heuristic*.
Set up experiments to get empirical evidence for the statement of Theorem 21.1.

(2) Code up the MAKE-SET, FIND-SET and UNION operations, described in Section 21.3, using the *union-by-rank* and *path compression heuristics*.
Set up experiments to get empirical evidence for the claim made on page 572 that the worst run-time is $\mathcal{O}(m\,\alpha(n))$.

(B) The second part of your assignment is to give a detailed solution to exercise 21.3-4 of the 3rd edition of the textbook.

You must submit the following:

(i) Your source code for the algorithms (using C, C++ or Java).
(ii) A document describing the experiments that you ran for part (A), and graphs illustrating the results.
(iii) A document with the solution to the exercise in part (B).

You must submit your files to the AA Moodle page by **Tuesday, 22 October**, at **23h00**.