Assignment 1
Software Technology 2 (7170)
Semester 1, 2024
University of Canberra
Faculty of Science and Technology

1. Write **two different** algorithms and implement java programs for each algorithm for ***Tower of Hanoi puzzle*** as the following instruction. One algorithm should be written in Recursion Algorithm. The second algorithm should be written by applying one of the data structures introduced in lecture. (60 Marks).

   1.1 Describe Algorithm1 and Algorithm2 pseudocode as you learned in week 2 in a word file. (15 Marks).
   1.2 Write Java code programs for both algorithms in two separated file/project. The code should run correctly. (30 Marks).
   1.3 Measure Time and Space Complexity for both algorithms explain them in the word file. (10 Marks).
   1.4 Write a paragraph and describe which algorithm is better and why in the word file. (5 Marks).

   In the follows you can find description about Tower of Hanio puzzle.

   In the Towers of Hanoi puzzle, we are given a platform with three pegs, a, b, and c, sticking out of it. On peg a is a stack of n disks, each larger than the next, so that the smallest is on the top and the largest is on the bottom. The puzzle is to move all the disks from peg a to peg c, moving one disk at a time, so that we never place a larger disk on top of a smaller one. See Figure 5.15 for an example of the case n =4. Describe a recursive algorithm for solving the Towers of Hanoi puzzle for arbitrary n. (Hint: Consider first the subproblem of moving all but the nth disk from peg a to another peg using the third as “temporary storage.”)

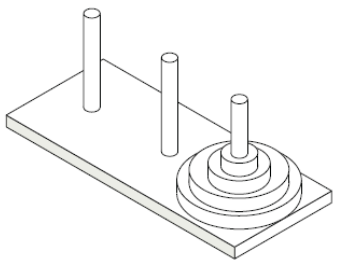

Fig. 1.1. Illustration of Tower of Hanoi puzzle.

You will require to upload two java files and a word file for section 1 of assignment 1.

2. write a java code for student management system purpose as described as follows: (40 Marks)
   2.1. Read students name, grade, age, gender, level from the file (students.txt) attached in assignment 1 section. Show results. (10 Marks).
   2.2. Create a linked list and add each student’s information (name, grade, age, gender, level) on it. Show Results. (10 Marks).
   2.3. Update students ages by adding 2 years for male and reducing 2 years for female students. Show results. (10 Marks).
   2.4. Delete students with grade less than 50 and level is postgraduate. Show results. (10 Marks).

You will require to upload one java file for section 2 of assignment 1.