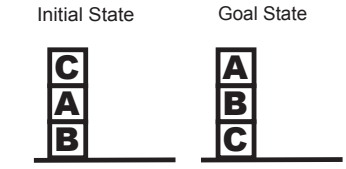
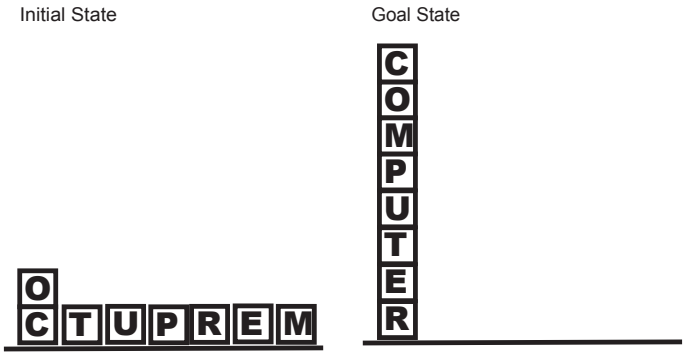
COMP304: Artificial Intelligence
Assignment One
Due Date: 22 August 2018

Blocks World Problem

The blocks world problem involves arranging blocks in a particular order in a stack. An initial state for the problem contains blocks in a stack and on the table next to the stack. Given this initial state the problem involves identifying a set of moves that will get from an initial state to a goal state. The legal moves include moving the topmost block from the stack to the table and moving a block from the table to the top of the stack. Only one block can be moved at a time. Examples of initial and goal states are illustrated below:





1. Write a program that (35 marks):
   (a) Implements the depth-first search, breadth-first search and A* algorithm.
   (b) Allows a user to enter an initial and goal state for an instance of the blocks-world problem. The user should be allowed to enter a string representing a state.
   (c) Provides the user with the option of solving the problem using either the depth-first search, breadth-first search or A* algorithm.
   (d) Solves the instance of the problem using the chosen search.
   (e) Outputs the solution path.
2. Submit a report describing (15 marks):
   (a) The heuristic evaluation function used for the A* algorithm.
   (b) A comparison of the performance of the three search methods in solving problems of differing difficulty.

Notes:

- Use either Java or C++ to implement the program.
- Submit both the source code and you must submit executable programs that run without the IDE being installed on the user's system.
  - Java programs: Submit a jar file or the class files that will run. Ensure that the jar/class files can be run on a machine with only the JDK installed (i.e. without the IDE that you have used to create the program).
  - C++ programs: Ensure that you compile the program to run on machines that do not have C++.
- The interface can be text-based or graphical.
- Programs that do not run will be allocated a mark of zero.

Submission

- The assignment **must** be submitted on or before 22 August 2018.
- You must use the Course website to submit. Click on **Assignments** in the Activities block (top left). Then click on **Assignment One**. You will be taken to a page which allows you to upload a file. You can re-upload a file but this will overwrite any file that was previously uploaded.
- Please be warned against plagiarism. This is an individual assignment and group work is **not** permitted. The school has access to software to check for plagiarism. Cases of suspected plagiarism will be submitted to the University proctor.