# UCS1504 - Artificial Intelligence Lab

## Department of CSE, SSN College of Engineering

## 3. Uninformed Search Strategies Application

## State Space Search — Decantation Problem (Water Jug Problem)

## 01.09.2022

You are given two jugs, a 4-litre one and a 3-litre one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 litres of water into the 4-litre jug.

1. Formulate the problem: Identify state, initial state, goal state, conditions, actions and state apace tree.
   Hint: Complete state space tree till level 3 and partial structure with all solution paths from level 4 to level 6.
   State: (X, Y)
   Initial state: (0,0)
   Goal state: (2, n)
   Conditions: Given in problem
   Actins: 10 Rules

2. Use a suitable data structure to keep track of the parent of every state. Write a function to print all possible solution sequences from the initial state to the goal state (number of solutions)

3. Write a function next state(S) that returns a list of successor states of a given state 'S'.

4. Implement the following ***Search Algorithms*** to search the state space tree for a goal state that produces the required sequence of pouring's from the initial state and its path cost.
   (a) BFS (b) DFS (c) DLS with limit=6 (d) IDS

   Compare the path cost of each search algorithm and find the best solution. Justify your answer.