Homework #1 Search Problem (programming and written assignment) Due: 4/11

HW1-1: Programming Assignment (8-Puzzle)

- Problem: 8-puzzle problem using State-space representation.
- Algorithm: Use both BFS and A*

- Using State-space:
  1) Initial state :

2	8	3
1	6	4
7		5

  2) Final State:

1	2	3
8		4
7	6	5

  2) 4 Operators: Left, Right, Up, Down:

- Heuristic:
  A* ➔ H(n) = Use Mahattan Distance or create your own
  BFS➔ H(n) = 0

- Output
  1) Print out all the states in Open and Closed Queue
  2) Print out the evaluation function value(f value) for A* algorithm
  3) Print out the Optimal "Solution Path"

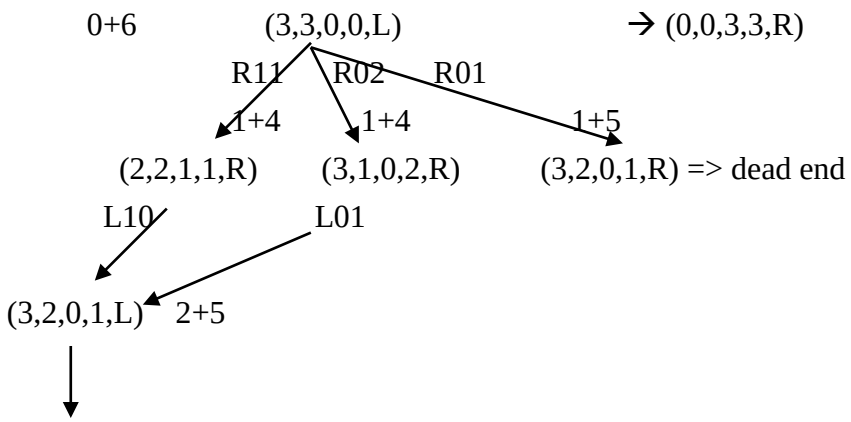
HW1-2: Missionary and Cannibals (written assignment)

- Problem Description

- 3 missionaries and 3 Carnivals are trying to across a river.
- A boat can hold at most 2 people at a time
  (if Carnivals > Missionaries on either side, Missionaries will be killed)
- Find a sequence of river crossings that gets everyone across the river safely.

- Using State-space: 5-tuple (m1, c1, m2, c2, L/R)
  3) Initial state : (3,3,0,0,L)
  4) Final state : (0,0,3,3,R)
  5) Operators:
     - Left to right moves: R11, R10,R01, R20,R02
     - Right to Left moves: L11, L01, L10, L20, L02
- Assumptions: At the present the Boat is on Left side of the river

- Algorithm:
  1) Heuristic Search H(n) = Create your own
  2) BFS H(n) = 0


0+6
(3,3,0,0,L)
→ (0,0,3,3,R)
R11
R02
R01
1+4
1+4
1+5
(2,2,1,1,R)
(3,1,0,2,R)
(3,2,0,1,R) => dead end
L10
L01
(3,2,0,1,L)
2+5