Assignment

On

Artificial Intelligence Theory (2)

Course Title: Artificial Intelligence

Course Code: CSE 417

Submitted To:

Richard Philips

Lecturer Dept. of Computer Science Engineering

Submitted By:

Md. Shahadat Hossain

Id# 153402338

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Missionaries and Cannibals Problem

Initial State:

A missionaries and cannibals problem state would be

(3M, 3C, B, 0M, 0C)

Successor Function:

The successor function of missionaries and cannibals problem which is solved Breadth First Search(BFS) and Depth First Search(DFS).

Breadth First Search:

Missionaries	Cannibals	Via	Pos	Missionaries	Cannibal
3M	3C	B	L	0M	0C
3M	1C	B	R	0M	2C
3M	2C	B	L	0M	1C
3M	0C	B	R	0M	2C
3M	1C	B	L	0M	2C
1M	1C	B	R	2M	2C
2M	2C	B	L	1M	1C
0M	2C	B	R	3M	1C
0M	3C	B	L	3M	0C
0M	1C	B	R	3M	2C
0M	2C	B	L	3M	1C
0M	0C	B	R	3M	3C

Depth First Search:

Solution using depth First Search is giving an optimal solution:

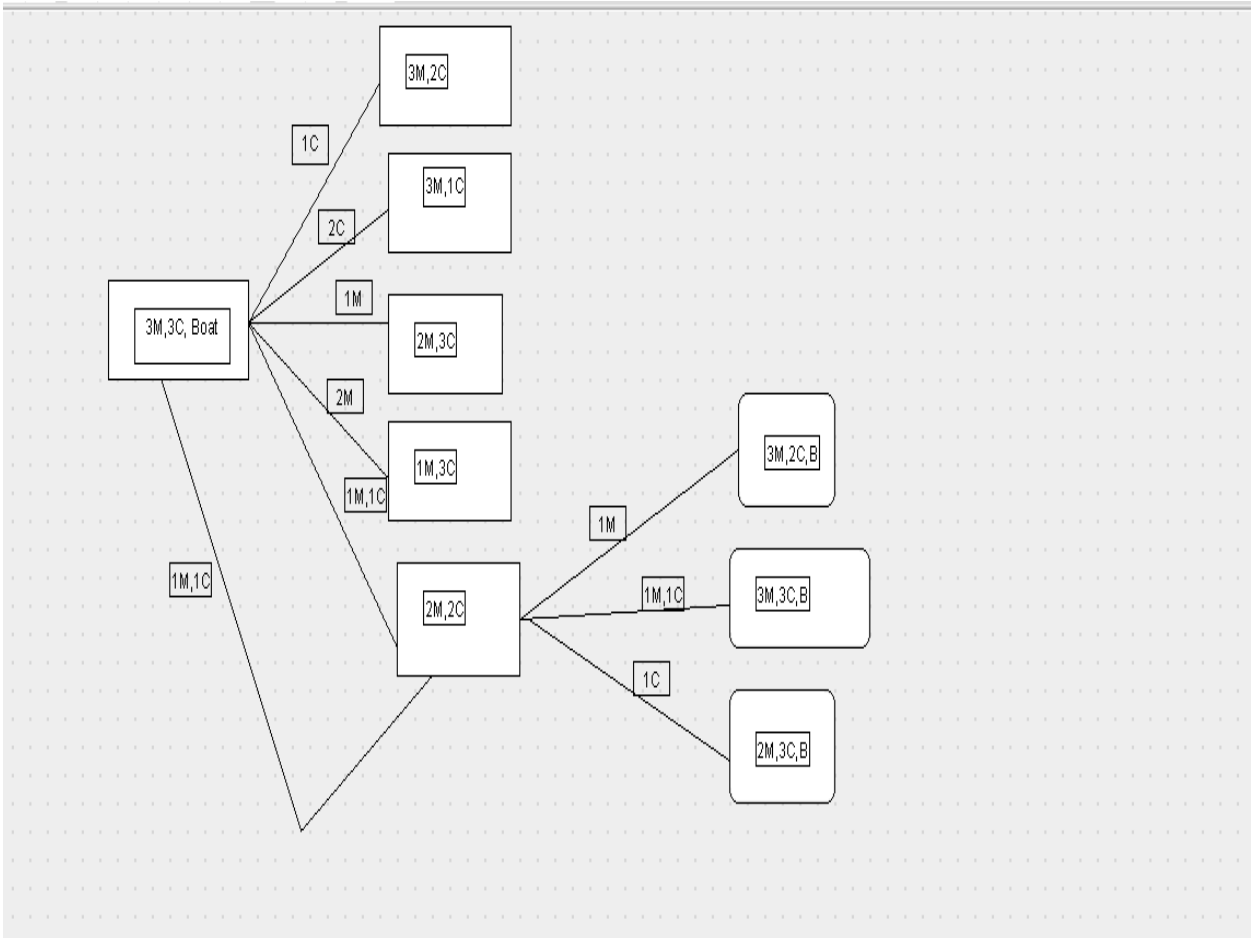
Missionaries	Cannibals	Via	Pos	Missionaries	Cannibal
3M	3C	B	L	0M	0C
2M	2C	B	R	1M	1C
3M	2C	B	L	0M	2C
3M	0C	B	R	0M	3C
3M	1C	B	L	0M	2C
1M	1C	B	R	2M	2C
2M	2C	B	L	1M	1C
0M	2C	B	R	3M	1C
0M	3C	B	L	3M	0C
0M	1C	B	R	3M	2C
1M	1C	B	L	2M	2C
0M	0C	B	R	3M	3C

Goal State:

The goal state is:

(0M, 0C, B, 3M, 3C)

Diagram of the state Space:



Man, woman and Two Child problem

Initial State:

At initial state, the condition approaches:

(1M, 1W, 2c , B, 0M, 0W, 0C).

Successor Function:

The successor function of this state solved by BFS and DFS:

Breadth First Search :

Man	Women	Child	Via	Pos	Man	Women	Child
1M	1W	2C	B	L	0M	0W	0C
1M	0W	2C	B	R	0M	1W	0C
1M	0W	0C	B	L	0M	1W	2C
0M	1W	0C	B	R	1M	0W	2C
0M	0W	0C	B	L	1M	1W	2C

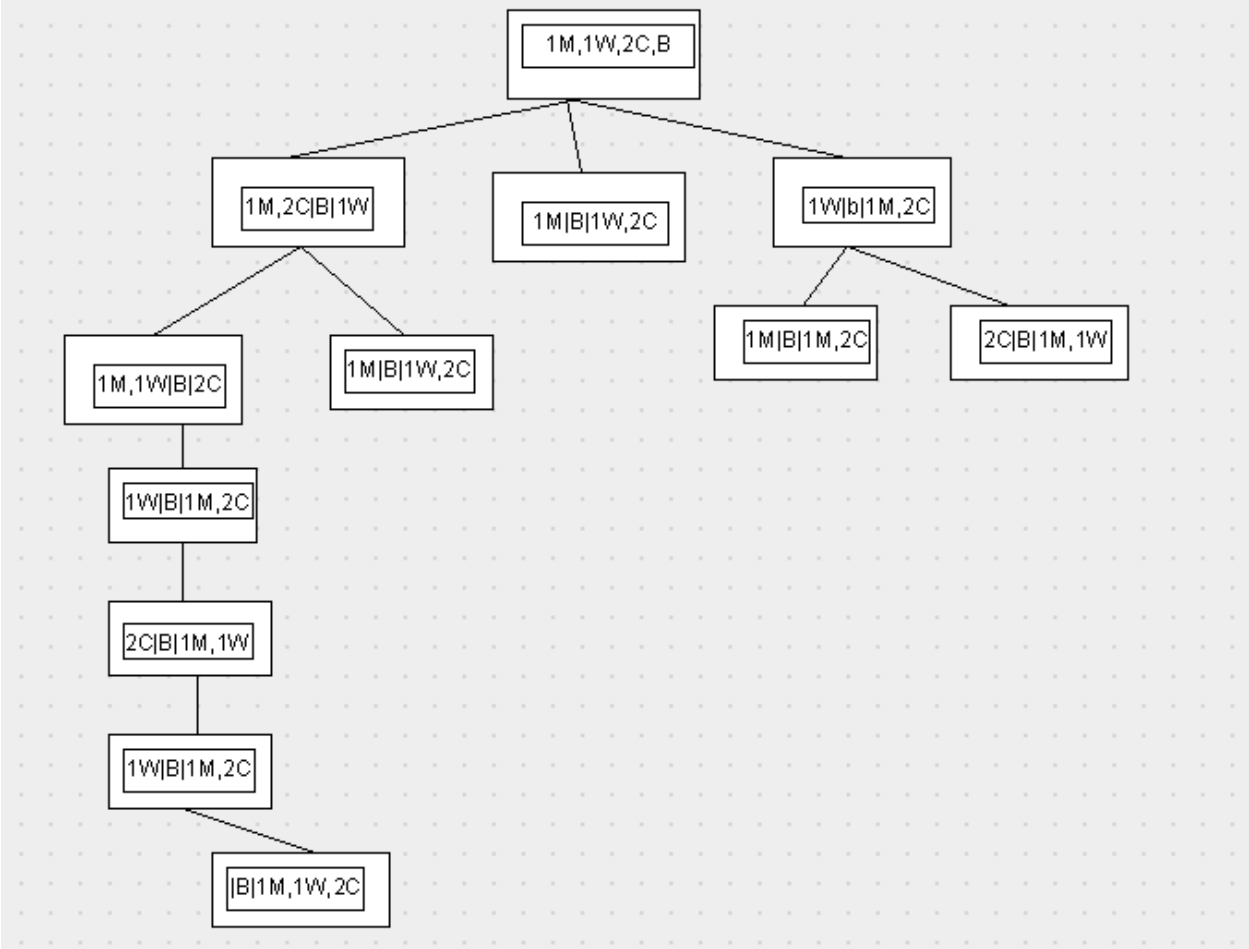
Depth First Search:

1M	1W	2C	B	L	0M	0W	0C
1M	1W0	0C	B	R	0M	0W	2C
1M	0W	0C	B	L	0M	1W	2C
0M	0W	2C	B	R	1M	1W	0C
0M	0W	0C	B	L	1M	1W	2C

Goal State: At goal state, the final condition approaches:

(0, 0 , 0, B, 1M, 1W,2C).

Diagram of a state space:



Lion , Lamb and Grass Problem

Initial State:

At initial state , the condition of lion, lamb and grass position is:

(Li, La, G, B, 0, 0, 0).

Successor Function:

Successor function is being solved using BFS and DFS.

Breadth First Search:

Lion	Lamb	Grass	Via	Pos	Lion	Lamb	Grass
Li	La	G	B	L	0	0	0
Li	0	G	B	R	0	1	0
0	La	G	B	L	1	0	0
0	La	0	B	R	1	0	1
0	0	0	B	L	1	1	1

Depth First Search:

Lion	Lamb	Grass	Via	Pos	Lion	Lamb	Grass
Li	La	G	B	L	0	0	0
0	La	G	B	R	1	0	0
0	La	0	B	L	1	0	1
Li	0	0	B	R	0	1	1
0	0	0	B	L	1	1	1

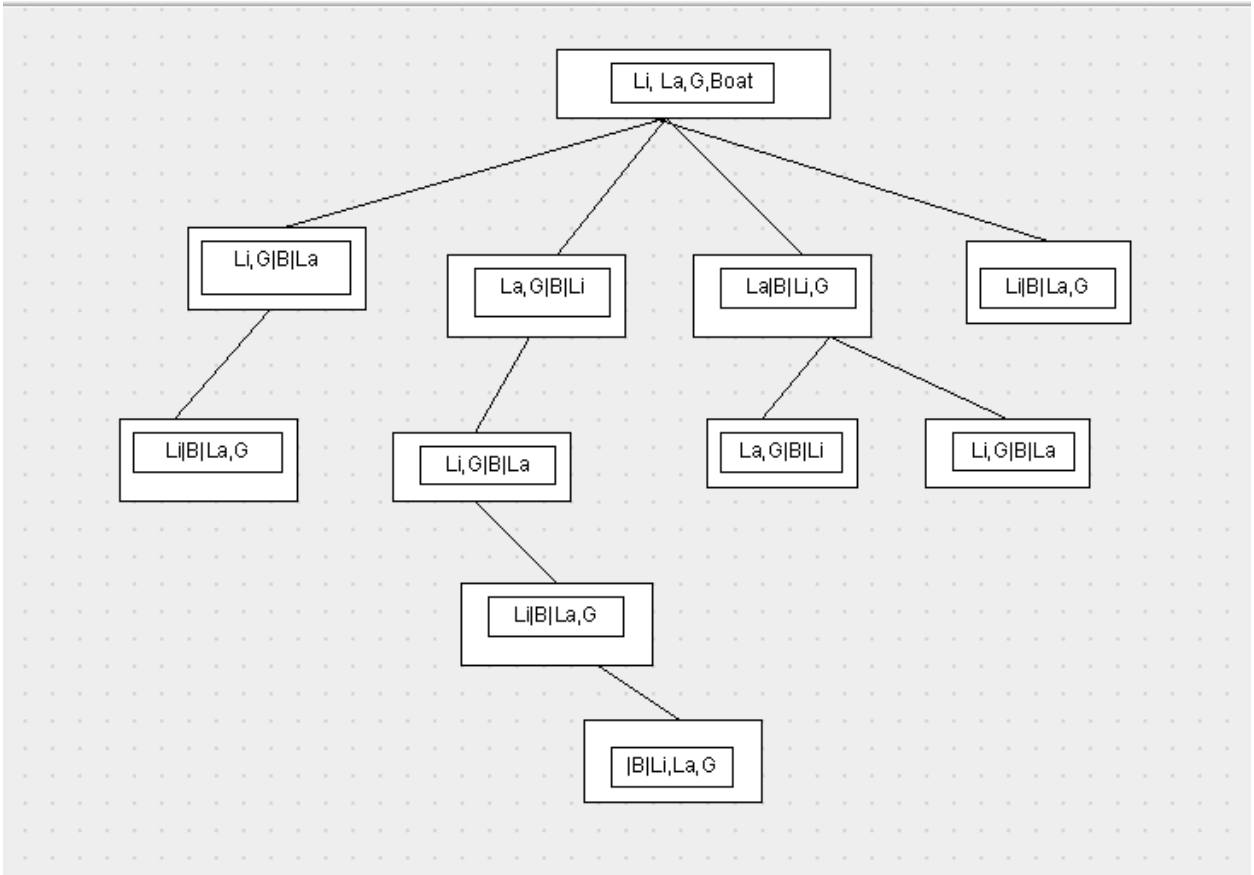
Goal State:

At goal State, the condition approaches:

(0, 0, 0, B, Li,La,G).

Diagram of a state space:

The state space diagram of Lion, Lamb and Grass problem is given below:



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