Jia-Jia (Jay) Lin
UW NetID: jial8
Student Number: 1820474
CSE 415A, Winter 2020

Assignment 2: Comparing DFS and BFS on puzzles

Table 1: Efficiency Overall

	Missionaries and Cannibals	Farmer, Fox, Chicken, and Grain	4-Disk Towers of Hanoi
Iterative DFS	Length of solution path: **9 edges** **10 states** expanded	Length of solution path found: **7 edges** **9 states** expanded.	Length of solution path found: **40 edges** **40 states** expanded.
Iterative BFS	Length of solution path found: **7 edges** **10 states** expanded.	Length of solution path found: **7 edges** **9 states** expanded.	Length of solution path found: **18 edges** **70 states** expanded.

Table 2: Solution Paths

	Missionaries and Cannibals	Farmer, Fox, Chicken, and Grain	4-Disk Towers of Hanoi

Iterative DFS	M on left:3
	C on left:3
	  M on right:0
	  C on right:0
	boat is on the left.
	M on left:2
	C on left:2
	  M on right:1
	  C on right:1
	boat is on the right.
	M on left:3
	C on left:2
	  M on right:0
	  C on right:1
	boat is on the left.
	… (continued)
	M on left:1
	C on left:1
	  M on right:2
	  C on right:2
	boat is on the left.
	M on left:0
	C on left:0
	  M on right:3
	  C on right:3
	boat is on the right.
		Left of River: Farmer: 1 fox: 1 Chicken: 1 Grain: 1
		Right of River: Farmer: 0 fox: 0 Chicken: 0 Grain: 0
		The boat is on the left.
		Left of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 1
		Right of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 0
		The boat is on the right.
		Left of River: Farmer: 1 fox: 1 Chicken: 0 Grain: 1
		Right of River: Farmer: 0 fox: 0 Chicken: 1 Grain: 0
		The boat is on the left.
		Left of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 0
		Right of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 1
		The boat is on the right.
		… (continued)
		Left of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 0
		Right of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 1
		The boat is on the left.
		Left of River: Farmer: 0 fox: 0 Chicken: 0 Grain: 0
		Right of River: Farmer: 1 fox: 1 Chicken: 1 Grain: 1
		The boat is on the right.
			[[4, 3, 2, 1] ,[] ,[]]
			[[4, 3, 2] ,[1] ,[]]
			[[4, 3] ,[1] ,[2]]
			[[4, 3, 1] ,[] ,[2]]
			[[4, 3] ,[] ,[2, 1]]
			[[4] ,[3] ,[2, 1]]
			[[4, 1] ,[3] ,[2]]
			[[4] ,[3, 1] ,[2]]
			[[4, 2] ,[3, 1] ,[]]
			…
			[[3] ,[2, 1] ,[4]]
			[[] ,[2, 1] ,[4, 3]]
			[[1] ,[2] ,[4, 3]]
			[[] ,[2] ,[4, 3, 1]]
			[[2] ,[] ,[4, 3, 1]]
			[[2, 1] ,[] ,[4, 3]]
			[[2] ,[1] ,[4, 3]]
			[[] ,[1] ,[4, 3, 2]]
			[[1] ,[] ,[4, 3, 2]]
			[[] ,[] ,[4, 3, 2, 1]]

Iterative BFS			

M on left:3
C on left:3
  M on right:0
  C on right:0
boat is on the left.
M on left:2
C on left:2
  M on right:1
  C on right:1
boat is on the right.
M on left:3
C on left:2
  M on right:0
  C on right:1
boat is on the left.
M on left:1
C on left:1
  M on right:2
  C on right:2
boat is on the right.
M on left:3
C on left:1
  M on right:0
  C on right:2
boat is on the left.
M on left:0
C on left:1
  M on right:3
  C on right:2
boat is on the right.
M on left:1
C on left:1
  M on right:2
  C on right:2
boat is on the left.
M on left:0
C on left:0
  M on right:3
  C on right:3
boat is on the right.
	Left of River: Farmer: 1 fox: 1 Chicken: 1 Grain: 1
	Right of River: Farmer: 0 fox: 0 Chicken: 0 Grain: 0
	The boat is on the left.
	Left of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 1
	Right of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 0
	The boat is on the right.
	Left of River: Farmer: 1 fox: 1 Chicken: 0 Grain: 1
	Right of River: Farmer: 0 fox: 0 Chicken: 1 Grain: 0
	The boat is on the left.
	Left of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 0
	Right of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 1
	The boat is on the right.
	Left of River: Farmer: 1 fox: 1 Chicken: 1 Grain: 0
	Right of River: Farmer: 0 fox: 0 Chicken: 0 Grain: 1
	The boat is on the left.
	Left of River: Farmer: 0 fox: 0 Chicken: 1 Grain: 0
	Right of River: Farmer: 1 fox: 1 Chicken: 0 Grain: 1
	The boat is on the right.
	Left of River: Farmer: 1 fox: 0 Chicken: 1 Grain: 0
	Right of River: Farmer: 0 fox: 1 Chicken: 0 Grain: 1
	The boat is on the left.
	Left of River: Farmer: 0 fox: 0 Chicken: 0 Grain: 0
	Right of River: Farmer: 1 fox: 1 Chicken: 1 Grain: 1
	The boat is on the right.
		[[4, 3, 2, 1] ,[] ,[]]
		[[4, 3, 2] ,[1] ,[]]
		[[4, 3] ,[1] ,[2]]
		[[4, 3, 1] ,[] ,[2]]
		[[4, 3] ,[] ,[2, 1]]
		[[4] ,[3] ,[2, 1]]
		[[4, 1] ,[3] ,[2]]
		[[4, 1] ,[3, 2] ,[]]
		[[4] ,[3, 2, 1] ,[]]
		[[] ,[3, 2, 1] ,[4]]
		[[1] ,[3, 2] ,[4]]
		[[] ,[3, 2] ,[4, 1]]
		[[2] ,[3] ,[4, 1]]
		[[2, 1] ,[3] ,[4]]
		[[2, 1] ,[] ,[4, 3]]
		[[2] ,[1] ,[4, 3]]
		[[] ,[1] ,[4, 3, 2]]
		[[1] ,[] ,[4, 3, 2]]
		[[] ,[] ,[4, 3, 2, 1]]	