

CSE 415 Assignment 2 Report: Evaluating Search Algorithms and Heuristics

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1 Introduction

I am Randolph Jenkins. This is my report for Assignment 2 covering both blind search algorithms and heuristic search.

2 Report on Part A: Problem Formulation and Blind Search Algorithms

2.1 Part A Step 4 (c)

In the 4th of these lines that has pre-conditions to prevent the next operation happening, it indicates the pre-condition for each operations that the remaining human after taking a certain number of humans to the other side must be greater than 0 and there must be more human remained than robot remained in one side.

2.2 Part A Step 8

(your answer for the question in Part A step 8 goes into the table below, as well as the path details in 2.3 and explanations in 2.4.)

The paths are not required in the report for the entries marked "skip."

Problem and Algorithm	Path Found	Path length	#Nodes Expanded
Humans, Robots and Ferry / DFS	(skip)		
Humans, Robots and Ferry / BreadthFS			
Farmer, Fox, Chicken and Grain/ DFS			
Farmer, Fox, Chicken and Grain/ BreadthFS			
4-Disk Towers of Hanoi/DFS	(skip)		
4-Disk Towers of Hanoi/BreadthFS			

2.3 Part A Step 8, Path details

Paths found (if not shown in the table). Copy the state sequences obtained from the search algorithm on the requested problems.

- HRF/BreadthFS:
- FFCG/DFS:
- FFCG/BreadthFS:
- 4-Disk TOH/BreadthFS:

2.4 Part A Step 8, Explanations of Certain Differences, Using Towers-of-Hanoi

(i. Why the maximum length of the OPEN list is more for one algorithm than the other)

(ii. Why why the solution PATH length is different for one algorithm from that of the other.)

3 Report on Part B: Heuristics for the Eight Puzzle

(Your results for Part B should be reported in the table below.)

3.1 Results with Heuristics for the Eight Puzzle

Puzzle	Heuristic	Solved?	# Soln Edges	Soln Cost	# Expanded	Max Open
A	none (UCS)	Y				
A	Hamming	Y				
A	Manhattan	Y				
B	none (UCS)					
B	Hamming					
B	Manhattan	Y				
C	none (UCS)					
C	Hamming					
C	Manhattan	Y				
D	none (UCS)					
D	Hamming					
D	Manhattan	Y				

Puzzle A: [3,0,1,6,4,2,7,8,5]

Puzzle B: [3,1,2,6,8,7,5,4,0]

Puzzle C: [4,5,0,1,2,8,3,7,6]

Puzzle D: [0,8,2,1,7,4,3,6,5]

3.2 (Optional) Evaluating Our Custom Heuristics

Describe your custom heuristic here. What is the underlying intuition for it? Is it admissible? Why or why not, or why is it difficult to determine if that is the case. How would you compare its computational cost with that of the Hamming heuristic and the Manhattan distance heuristic?

What puzzles did you try it on, and how did it compare? You may add rows to your table above to support your answer about comparison. (Give your heuristic an appropriate short name to identify it in the table.)

4 Partnership Retrospective

4.1 Partnership?

Did you work in a partnership? (yes or no).

If so, who were the partners (repeating your names from below the title on the first page)?

4.2 Collaboration

Also if so, how did you divide the work of this assignment?

4.3 Newness of the Collaboration

If this was a new sort of experience for either of you, please mention that, and in what way(s) it felt new.