

Artificial Intelligence

HW-2

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After running the program several times, we noticed that our solution was different for some of the runs. The reason for this is the use of Non-Deterministic Search. So instead of starting from the root node and then progressing depth wise or breadth wise as in Depth First Search or Breadth First Search, Non-Deterministic Search randomly chooses a node from the queue and then attempts to expand the path from there. And due to this we sometimes get different solution paths instead of a single path as in the case of DFS or BFS. Below are the screenshots of two runs where we got different solution paths.

1- In this run, if we look at the first 5 nodes visited, they are: 1,2,3,4,5

```
SOLUTION PATH
Node ID: 1
Original side: Soldier Soldier Soldier Boy Boy Boat
Across river:
CLOSED LIST
[1]
#####
SOLUTION PATH
Node ID: 2
Original side: Soldier Soldier Boy Boy
Across river: Soldier Boat
CLOSED LIST
[1, 2]
#####
SOLUTION PATH
Node ID: 3
Original side: Soldier Soldier Soldier
Across river: Boy Boy Boat
CLOSED LIST
[1, 2, 3]
#####
SOLUTION PATH
Node ID: 4
Original side: Soldier Soldier Soldier Boy
Across river: Boy Boat
CLOSED LIST
[1, 2, 3, 4]
#####
SOLUTION PATH
Node ID: 5
Original side: Soldier Soldier Soldier Boy Boat
Across river: Boy
CLOSED LIST
[1, 2, 3, 4, 5]
```

2- In the run below however, the first 5 nodes visited are in a different order i.e 1,4,3,2,5

```
SOLUTION PATH
Node ID: 1
Original side:  Soldier  Soldier  Soldier  Boy  Boy  Boat
Across river:
CLOSED LIST
[1]
#####
SOLUTION PATH
Node ID: 4
Original side:  Soldier  Soldier  Soldier  Boy
Across river:  Boy  Boat
CLOSED LIST
[1, 4]
#####
SOLUTION PATH
Node ID: 3
Original side:  Soldier  Soldier  Soldier
Across river:  Boy  Boy  Boat
CLOSED LIST
[1, 3, 4]
#####
SOLUTION PATH
Node ID: 2
Original side:  Soldier  Soldier  Boy  Boy
Across river:  Soldier  Boat
CLOSED LIST
[1, 2, 3, 4]
#####
SOLUTION PATH
Node ID: 5
Original side:  Soldier  Soldier  Soldier  Boy  Boat
Across river:  Boy
CLOSED LIST
[1, 2, 3, 4, 5]
```

As for the output, we are outputting the following information for each node: The Solution Path and the Closed List. The Solution Path contains information like the Node's ID, and the current states of both of the river's sides and the Closed List holds all the nodes visited until now.