	Humans, Robots and Ferry		Farmer, Fox, Chicken, Grain		Towers of Hanoi (4 Disks)	
	DFS	**BFS**	**DFS**	**BFS**	**DFS**	**BFS**
Path found (start to goal):	See [5]	See [6]	See [4]	See [3]	See [1]	See [2]
Length of path:	9	7	7	7	40	15
Number of nodes expanded	10	10	7	9	40	70

1) Why is the maximum length of the OPEN list longer for BFS than DFS? (16 vs. 7)
    a. Since BFS spreads breadth-first, it can have all nodes at a certain depth in its OPEN list at once. Depth-first is limited to having as many nodes as it goes deep.
2) Why is the solution path length different between DFS and BFS?
    a. DFS goes deeper first, potentially finding a solution in less time than BFS. However, since BFS goes wider first, it is guaranteed to pick the shortest path. The downside is that the processing time can be significantly higher – see the 40 states expanded for DFS to BFS's 70!

[1]: Towers of Hanoi, 4 disks, DFS Solution Path

1. [[4, 3, 2, 1] ,[] ,[]]
2. [[4, 3, 2] ,[1] ,[]]
3. [[4, 3] ,[1] ,[2]]
4. [[4, 3, 1] ,[] ,[2]]
5. [[4, 3] ,[] ,[2, 1]]
6. [[4] ,[3] ,[2, 1]]
7. [[4, 1] ,[3] ,[2]]
8. [[4] ,[3, 1] ,[2]]
9. [[4, 2] ,[3, 1] ,[]]
10. [[4, 2, 1] ,[3] ,[]]
11. [[4, 2] ,[3] ,[1]]
12. [[4] ,[3, 2] ,[1]]
13. [[4, 1] ,[3, 2] ,[]]
14. [[4] ,[3, 2, 1] ,[]]
15. [[] ,[3, 2, 1] ,[4]]
16. [[1] ,[3, 2] ,[4]]
17. [[] ,[3, 2] ,[4, 1]]
18. [[2] ,[3] ,[4, 1]]
19. [[2, 1] ,[3] ,[4]]
20. [[2] ,[3, 1] ,[4]]
21. [[] ,[3, 1] ,[4, 2]]
22. [[1] ,[3] ,[4, 2]]
23. [[] ,[3] ,[4, 2, 1]]
24. [[3] ,[] ,[4, 2, 1]]
25. [[3, 1] ,[] ,[4, 2]]
26. [[3] ,[1] ,[4, 2]]
27. [[3, 2] ,[1] ,[4]]
28. [[3, 2, 1] ,[] ,[4]]
29. [[3, 2] ,[] ,[4, 1]]
30. [[3] ,[2] ,[4, 1]]
31. [[3, 1] ,[2] ,[4]]
32. [[3] ,[2, 1] ,[4]]
33. [[] ,[2, 1] ,[4, 3]]
34. [[1] ,[2] ,[4, 3]]
35. [[] ,[2] ,[4, 3, 1]]
36. [[2] ,[] ,[4, 3, 1]]
37. [[2, 1] ,[] ,[4, 3]]
38. [[2] ,[1] ,[4, 3]]
39. [[] ,[1] ,[4, 3, 2]]
40. [[1] ,[] ,[4, 3, 2]]
41. [[] ,[] ,[4, 3, 2, 1]]

[2] Towers of Hanoi, 4 disks, BFS Solution Path

1. [[4, 3, 2, 1] ,[] ,[]]
2. [[4, 3, 2] ,[1] ,[]]
3. [[4, 3] ,[1] ,[2]]
4. [[4, 3] ,[] ,[2, 1]]
5. [[4] ,[3] ,[2, 1]]
6. [[4, 1] ,[3] ,[2]]
7. [[4, 1] ,[3, 2] ,[]]
8. [[4] ,[3, 2, 1] ,[]]
9. [[] ,[3, 2, 1] ,[4]]
10. [[] ,[3, 2] ,[4, 1]]
11. [[2] ,[3] ,[4, 1]]
12. [[2, 1] ,[3] ,[4]]
13. [[2, 1] ,[] ,[4, 3]]
14. [[2] ,[1] ,[4, 3]]
15. [[] ,[1] ,[4, 3, 2]]
16. [[] ,[] ,[4, 3, 2, 1]]

[3] Farmer-fox-chicken-grain BFS Path

1----------
Left side:
farmer
fox
chicken
grain

Right side:

2----------
Left side:
fox
grain

Right side:
farmer
chicken

3----------
Left side:
fox
grain
farmer

Right side:
chicken

4----------
Left side:
Grain

Right side:
chicken
farmer
fox

5----------
Left side:
grain
farmer
chicken

Right side:
fox

6----------
Left side:
Chicken

Right side:
fox
farmer
grain

7----------
Left side:
chicken
farmer

Right side:
fox
grain

8----------
Left side:

Right side:
fox
grain
farmer
chicken

[4] Farmer-fox-chicken-grain BFS Path

1----------
Left side:
farmer
fox
chicken
grain

Right side:
2----------
Left side:
fox
grain

Right side:
farmer
chicken
3----------
Left side:
fox
grain
farmer

Right side:
chicken
4----------
Left side:
grain

Right side:
chicken
farmer
fox
5----------
Left side:
grain
farmer
chicken

Right side:
fox
6----------
Left side:
chicken

Right side:
fox
farmer
grain
7----------
Left side:
chicken
farmer

Right side:
fox
grain
8----------
Left side:

Right side:
fox
grain
farmer
chicken

[5] Humans Robots Ferry DFS Path

H on left:3
R on left:3
  H on right:0
  R on right:0
ferry is on the left.

H on left:2
R on left:2
  H on right:1
  R on right:1
ferry is on the right.

H on left:3
R on left:2
  H on right:0
  R on right:1
ferry is on the left.

H on left:0
R on left:2
  H on right:3
  R on right:1
ferry is on the right.

H on left:2
R on left:2
  H on right:1
  R on right:1
ferry is on the left.

H on left:1
R on left:1
  H on right:2
  R on right:2
ferry is on the right.

H on left:3
R on left:1
  H on right:0
  R on right:2
ferry is on the left.

H on left:0
R on left:1
  H on right:3
  R on right:2
ferry is on the right.

H on left:1
R on left:1
  H on right:2
  R on right:2
ferry is on the left.

H on left:0
R on left:0
  H on right:3
  R on right:3
ferry is on the right.

[6] Humans Robots Ferry BFS Path

H on left:3
R on left:3
H on right:0
R on right:0
ferry is on the left.

H on left:2
R on left:2
H on right:1
R on right:1
ferry is on the right.

H on left:3
R on left:2
H on right:0
R on right:1
ferry is on the left.

H on left:0
R on left:2
H on right:3
R on right:1
ferry is on the right.

H on left:2
R on left:2
H on right:1
R on right:1
ferry is on the left.

H on left:0
R on left:1
H on right:3
R on right:2
ferry is on the right.

H on left:1
R on left:1
H on right:2
R on right:2
ferry is on the left.

H on left:0
R on left:0
H on right:3
R on right:3
ferry is on the right.