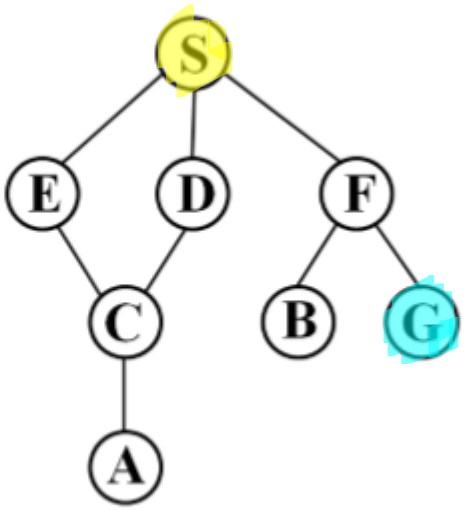
Search In-Class Exercise (1)

Monday, May 15, 2017 3:39 PM

DFS/BFS on a graph



- start state is S
- goal state is G

1. DFS with Tree Search and cycle pruning

Start:

[S]

inverse alphabetical order

~~[E D F]~~ [SD, SE, SF]

[C D F] [SDC, SE, SF]

[A D F] [SDCA, SDCE, SE, SF]

[D F] [SDCE, SE, SF]

[SE, SF]

[[SF]

Search In-Class Exercise (2)

Tuesday, 4 July 2017 4:57 PM

[SECA, SECD, SF]

[SECD, SF]

[SF]

[SFB, SFG]

[SFG] # GOAL

Sequence of partial paths:

SF, SE, SD, SDC, SDCE, SDCA, SEC, SECD, SECA, SFG, SFB

2. DFS with Graph Search

Explored set, ☺

[SD, SE, SF]

[SDC, SE, SF]

[SDCA, SDCE, SE, SF]

[SE, SF]

[SF] ⟶ [SFB, SFG]

Search In-Class Exercise (3)

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3. BFS with graph search

Explored set:
S, F, E, D, G

[SF, SE, SD]

[SE, SD, SFG, SFB]

[SD, SFG, SFB, SEC]

[SFG, SFB, SEC, ~~SDC~~]

C is in frontier, cancel any one

[SFG, SFB, SEC]

↘ GOAL #

Sequence of partial paths:

SF, SE, SD, SFG, SFB, SEC

Search In-Class Exercise (4)

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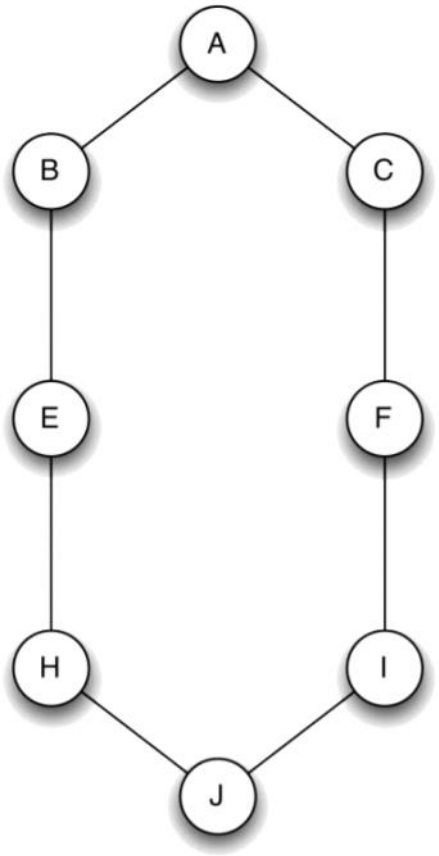
another graph



- start state is **A**
- goal state is **F**
- children are pushed on the fringe/frontier/agenda (same thing, different words) in **reverse** alphabetical order. Depending on whether you run BFS or DFS the order of taking them from the fringe is different.
- no cycles: we are not considering paths that revisit the same state (within the path)

Task: You are running tree search.

- What path will be found by DFS?
- What path will be found by BFS?

Search In-Class Exercise (5)

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DFS Graph Search

[A]

[AB, AC]

[ABE, AC]

[ABEH, AC]

[ABEHJ, AC]

[ABEHJI, AC]

[ABEHJIF, AC]

[ABFHJIF, AC]

BFS Graph search

[A]

[AC, AB]

[AB, ACF]

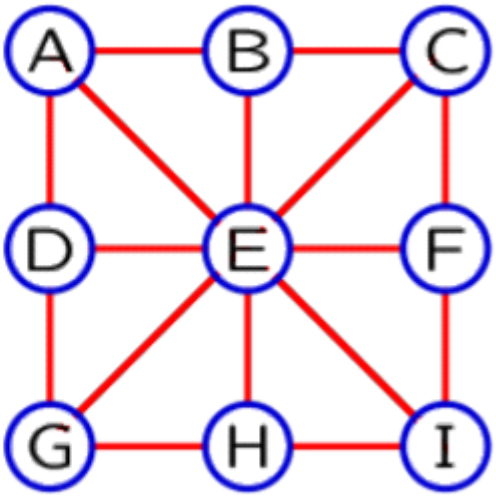
[ACF, ABE]

→ # GOAL

Search In-Class Exercise (6)

Thursday, 6 July 2017 4:14 PM

even another graph Tree search



- start state is **A**
- goal state is **I**

- What is the final path found by a breadth-first search?

[A]

[AE, AD, AB]

[AD, AB, AEI, AEH, AEG, AEF, AEC]

[AB, AEI, AEH, AEG, AEF, AEC]

[AEI, AEH, AEG, AEF, AEC]

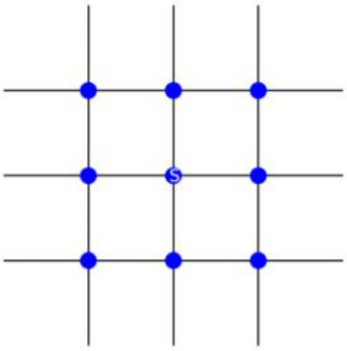
↳ GOAL

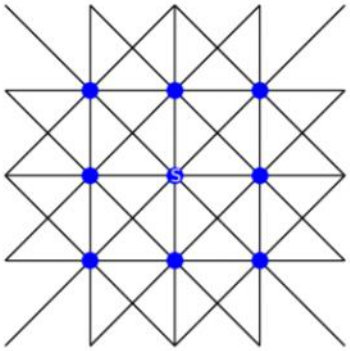
- What is the final path found by a depth-first search?

ABCFI

Search In-Class Exercise (7)

Thursday, 6 July 2017 4:22 PM





Answer the following questions about breadth-first search with no pruning (not even Cycle Pruning).

- In the left grid, how many paths with one edge are ever added to the agenda(frontier)? 4
- In the left grid, how many paths of with 2 edges are ever added to the agenda(frontier)? 16
- In the right grid, how many paths with one edge are ever added to the agenda(frontier)? 8
- In the right grid, how many paths with 2 edges are ever added to the agenda(frontier)? 64

Answer the following questions about breadth-first search with Cycle Pruning, which prunes from the tree paths that contain any state more than once.

- In the left grid, how many paths with one edge are ever added to the agenda(frontier)? 4
- In the left grid, how many paths of with 2 edges are ever added to the agenda(frontier)? 12
- In the right grid, how many paths with one edge are ever added to the agenda(frontier)? 8
- In the right grid, how many paths with 2 edges are ever added to the agenda(frontier)? 56

Answer the following questions about breadth-first tree search with Dynamic Programming, which would never add the same node twice to the agenda

4, 8, 8, 16