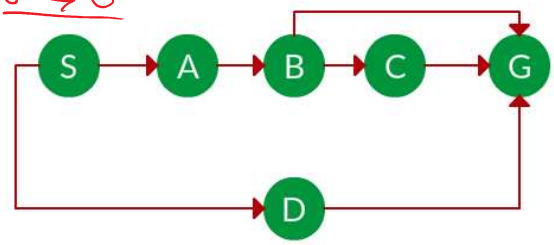
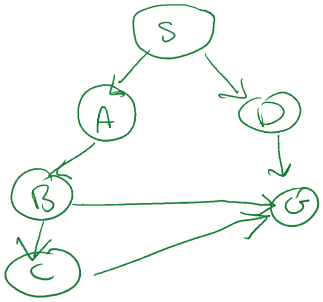
Sheet 6 solution

Friday, November 17, 2023 10:16 AM

Q1 DFS from S → G





→ Solution ←

DFS
Stack FIFO

step 1 :- visited = [ ]
stack = [S] called thing or frontier

step 2 :- visited = [S] , stack = [A, D]

step 3 :- visited = [S, D] , stack = [A, G]

step 4 :- visited = [S, D, G] , stack = [A]
goal and Traverse

for taking alphapetic order in consideration :-

Search path
↳ S → A → B → C → G

visited	stack
	[S]
S	[D, A]
A	[D, B]
B	[D, G, C]
C	[D, G, G]
goal → G	[D, G]

how to get Best path [solution path]

Note we search from left to Right is this problem

Path	Stack
	[[S]]
[S]	[S, D] , [S, A]
[S, A]	[S, D], [S, A, B]
[S, A, B]	[S, D] , [S, A, B, G] , [S, A, B, C]
[S, A, B, C]	[S, D] , [S, A, B, G] [S, A, B, C, G]

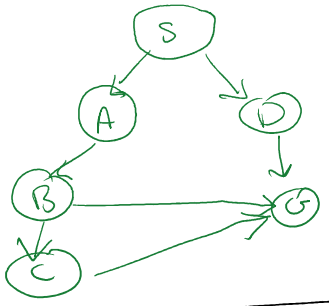
Solution path
↳ [S, A, B, G] return

Solution path

[S, A, B] ~)	[S, A, B, C, G]
↳ [S, A, B, G]	get goal

problem 2 :-

Breadth first



visited	frontier
	S
S	(A, D)
A	(D, B)
D	[B, G)
B	[G, C, G]
G	get goal

S → A → D → B → G

↳ search path

Traverse path.

⇒ Now we want to get Solution path ⇐

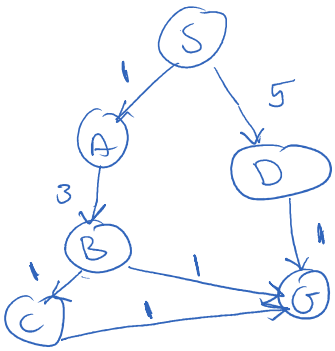
queue

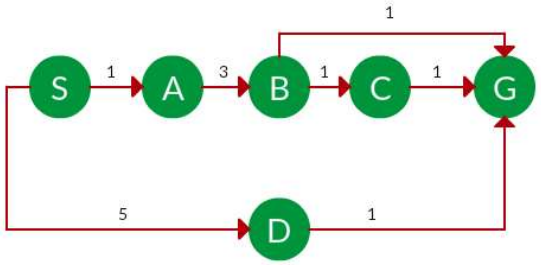
path	queue
	[S]
[S]	[S, A], (S, D)
[S, A]	[S, D], [S, A, B]
[S, D]	[S, A, B], [S, D, G]
[S, A, B]	[S, D, G], [S, A, B, G], [S, D, B, C]
(S, D, G)	get the goal

solution path

S → D → G

problem 3 :-





choose depends on cost of path

Path	visited	queue
		([S], 0)
[S]	S	[S, A], [S, D] (1) (5)
	A	

Path	visited	queue
[S]	S	[S,A] (1), [S,D] (5)
[S,A]	A	[S,A,B] (4), [S,D] (5)
[S,A,B]	B	[S,A,B,C] (5), [S,A,B,G] (5), [S,D] (5)
[S,A,B,C]	C	[S,D] (5), [S,A,B,G] (5), [S,A,B,C,G] (6)
[S,D]	D	[S,A,B,G] 5, [S,A,B,C,G] 6, [S,D,G] 6
[S,A,B,G] (5)	G	[S,A,B,G] (5), [S,A,B,C,G] (6)

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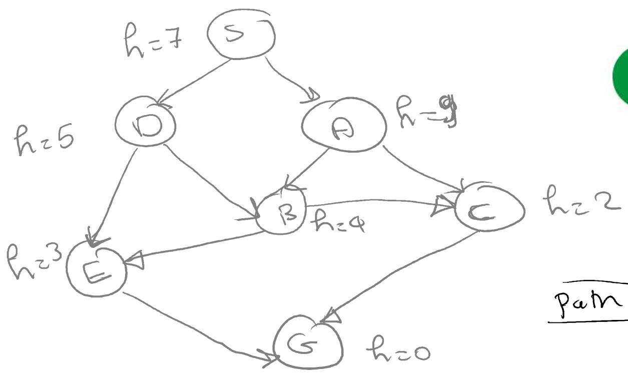
goal

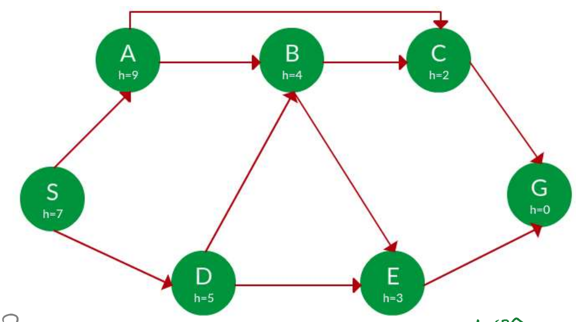
end →

search path = S → A → B → C → D → G

solution path = S → A → B → G [cost (5)]

⇒ Problem 4:





choose depend on the h value

search path: S → D → E → G

solution path: S → D → E → G

Path	visited	queue
		[S] 7
[S]	S	[S,D] (5), [S,A] 9
[S,D]	D	[S,D,B] 4, [S,A] 9, [S,D,E] 3
[S,D,E]	E	[S,D,B] 4, [S,A] 9, [S,D,E,G] 0
[S,D,E,G]	G	

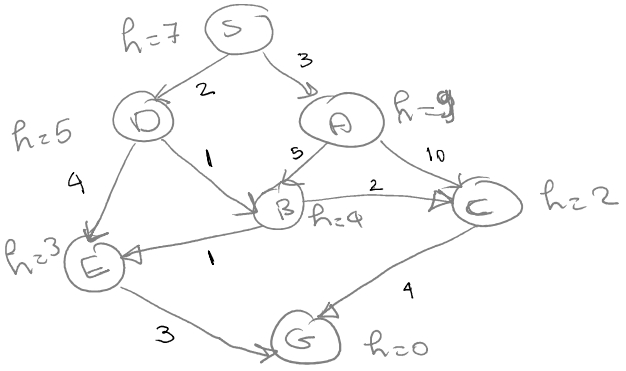
[S, D, E, G] | G

Problem 4 :-

Repeat the previous

But choice will depend on the f cost

$f(n) = h(x) + g(x)$ (greedy search + uniform cost)



Path	visited	queue
		[S] 7+0
[S]	S	[S,A] h=9 g=3 f= , [S,D] h=5 g=2 f=7
[S,D]	D	[S,A] f=12 , [S,D,B] h=4 g=3 f=7 , [S,D,E] h=3 g=6 f=9
[S,D,B]	B	[S,A] f=12 , [S,D,E] f=9 , [S,D,B,C] h=2 g=5 f=7 , [S,D,B,E] h=3 g=4 f=7
[S,D,B,C] f=7	C	[S,A] f=12 , [S,D,E] f=9 , [S,D,B,E] f=7 , [S,D,B,C,G] h=0 g=9 f=9
[S,D,B,E] f=7	E	[S,A] f=12 , [S,D,E] f=9 , [S,D,B,C,G] f=9 ; [S,D,B,E,G] h=0, g=~~7~~ f=~~7~~ (Because E is ~~f~~ visited)
		[S,A] f=11 , [S,D,B,C,G] f=7 , [S,D,B,E,G] f=~~7~~
(S,D,B,E,G) f=7	G	goal

search path → [S, D, B, C, E, G]

Solution path → [S → D → B → E → G], cost = 7