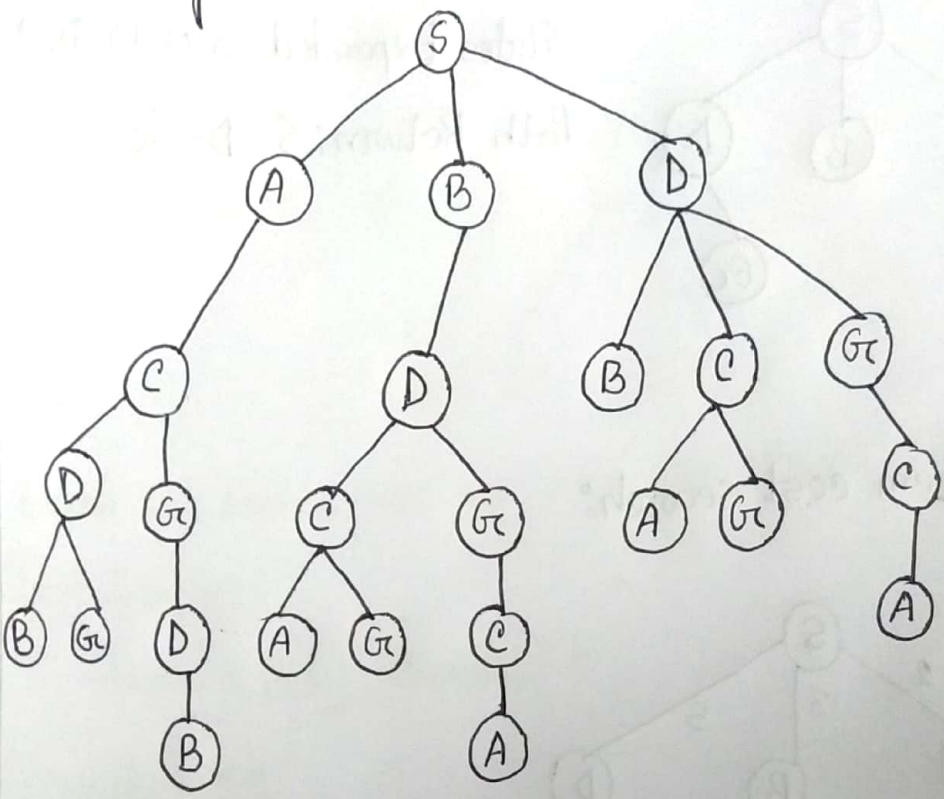
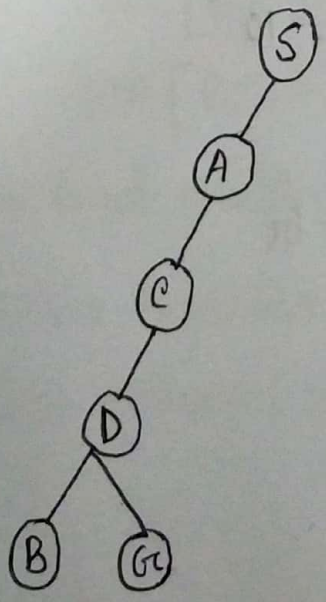
Problem-1

Considering Start node as (S) and Goal node as (Gt),



This is the search tree of the given problem.

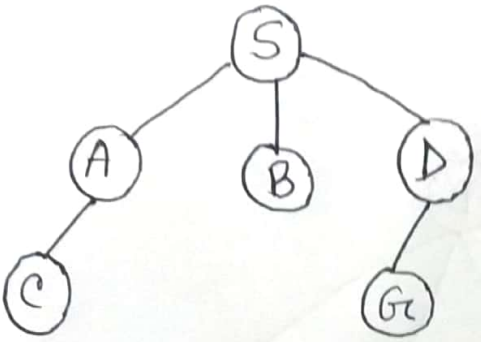
(a) Depth-first search:



States Expanded: S, A, C, D, B, Gt

Path Return: S-A-C-D-Gt

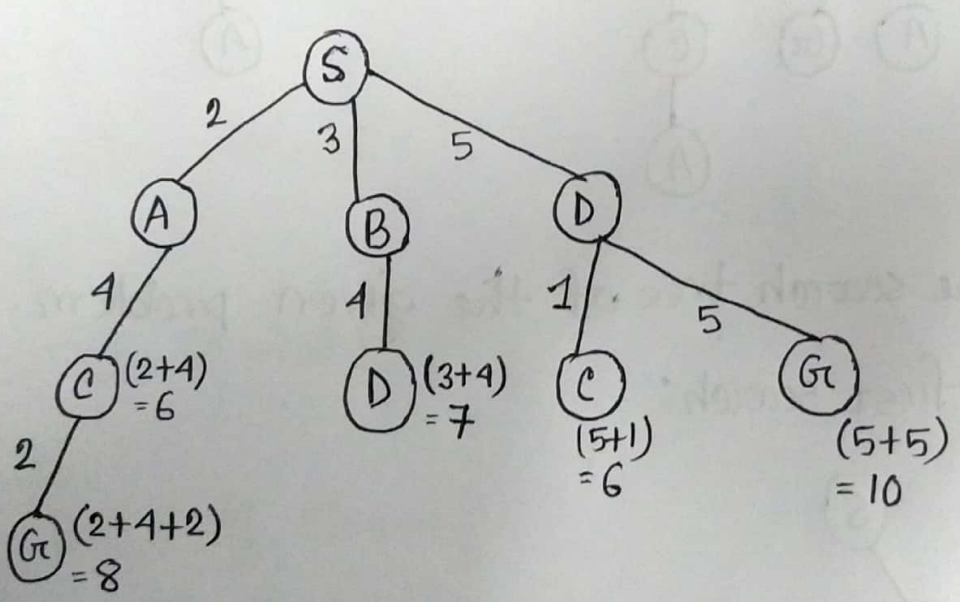
(b) Breadth-first search:



States Expanded: S, A, B, D, C, Gc

Path Return: S-D-Gc

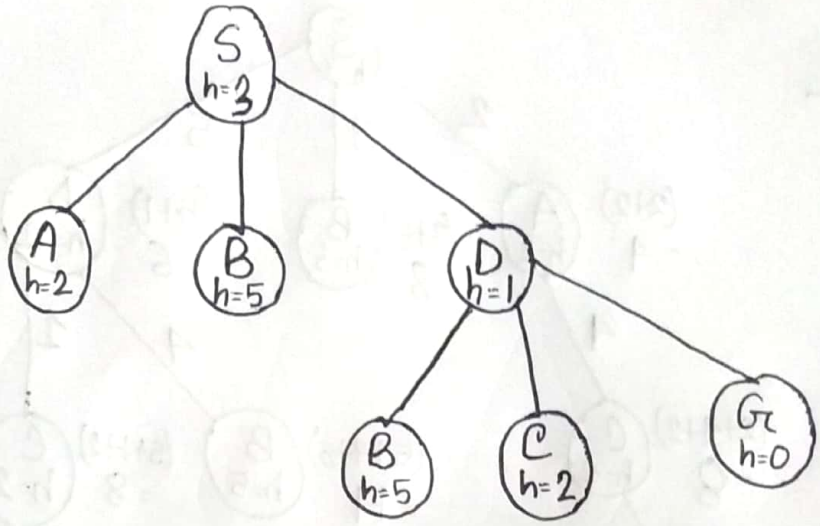
(c) Uniform cost search:



States Expanded: S-A-B-D-C-Gc

Path return: S-A-C-Gc

(d) Greedy search with the heuristic h shown on the graph.



node	h(n)
S	3
A	2
B	5
C	2
D	1
G	0

Expanded states are put into the closed list.

Initialization:

Open [A, B, D], Closed [S]

Iteration 1:

Open [A, B], Closed [S, D]

Iteration 2:

Open [B, C, G, A], Closed [S, D]

Open [B, C, A], Closed [S, D, G]

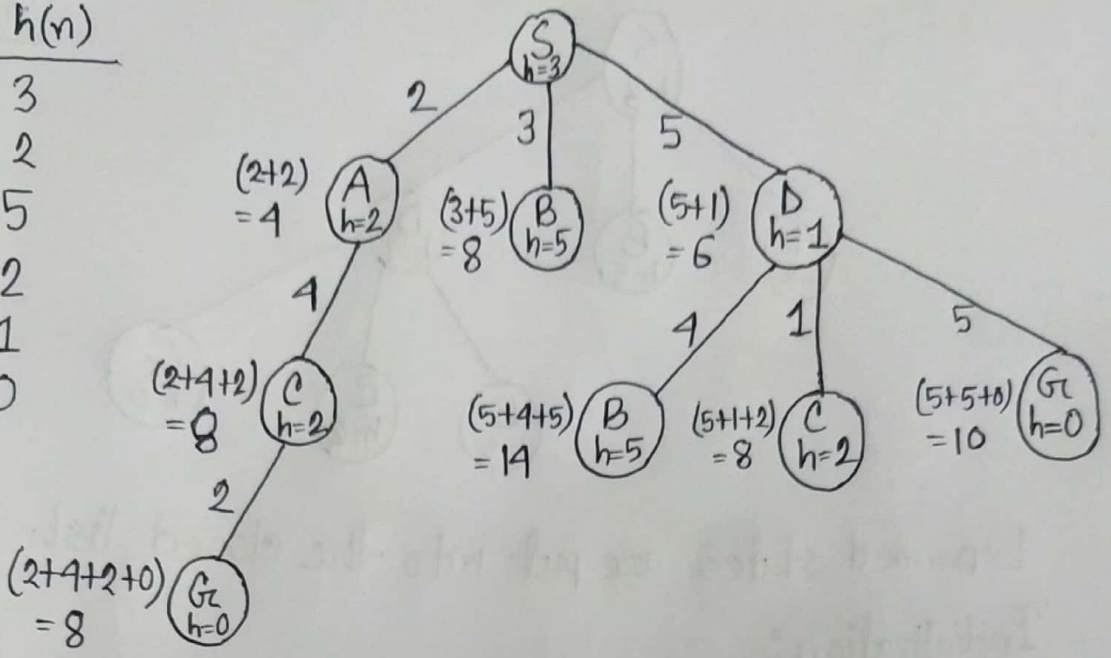
The final solution path will be: S → D → G.

States Expanded: S, D, G

Path return: S-D-G

(e) A* search

node	h(n)
S	3
A	2
B	5
C	2
D	1
Gr	0



Initialization: $\{(S,3)\}$

Iteration 1: $\{(S\to A,4),(S\to B,8),(S\to D,6)\}$

Iteration 2: $\{(S\to A\to C,8),(S\to B,8),(S\to D,6)\}$

Iteration 3: $\{(S\to A\to C\to Gr,8),(S\to B,8),(S\to D\to B,14),(S\to D\to C,8),$
$(S\to D\to Gr,10)\}$

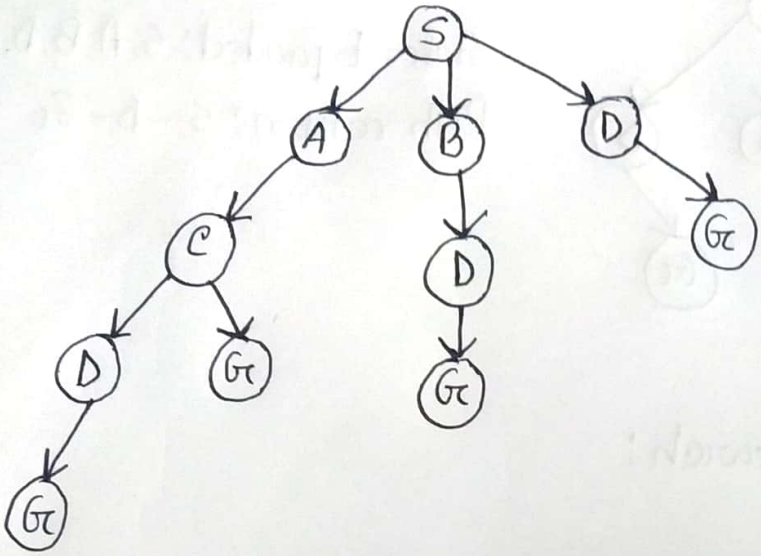
Final result will be: $S\to A\to C\to Gr$, optimal cost 8.

States Expanded: S, A, D, C, Gr

Path return: $S\to A\to C\to Gr$.

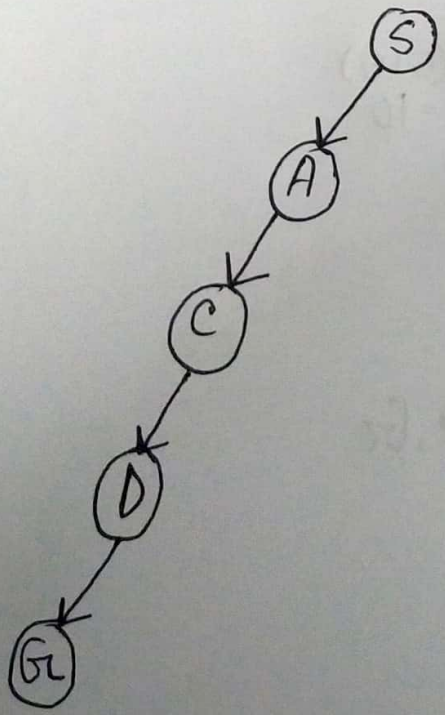
Problem - 2

Considering start node as (S) and goal node as (Gr),



This is the search tree of the given problem.

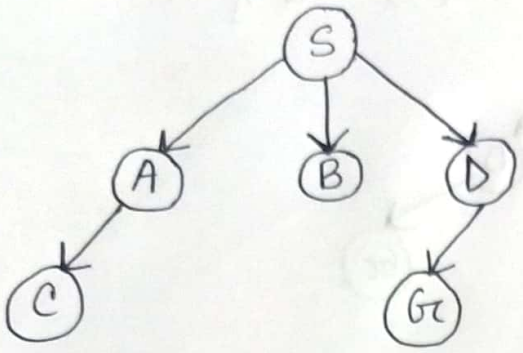
(a) Depth-first search:



States Expanded: S, A, C, D, Gr

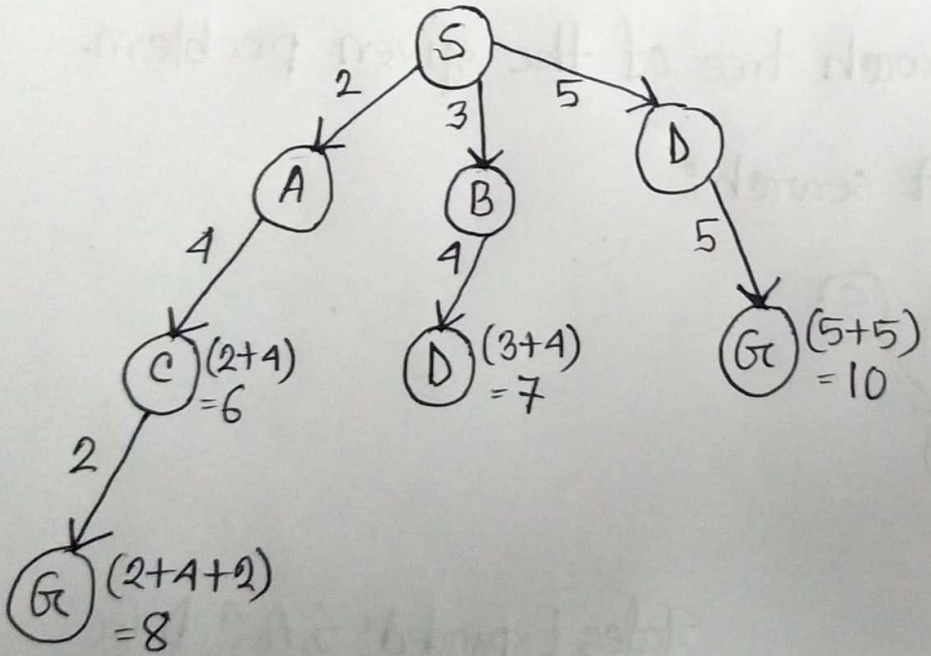
Path return: S - A - C - D - Gr

(b) Breadth-first search:



States Expanded: S, A, B, D, C, Gr
Path return: S—D—Gr

(c) Uniform cost search:



States Expanded: S, A, B, D, C, Gr

Path return: S-A-C-Gr