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DFS)

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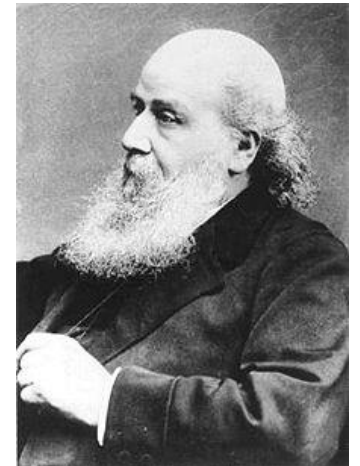
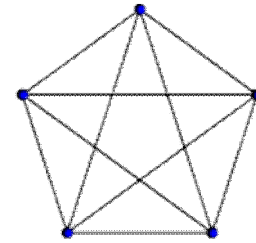
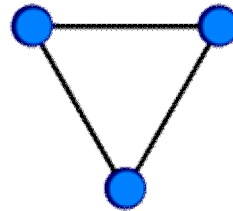
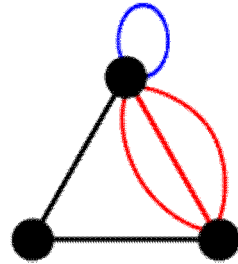
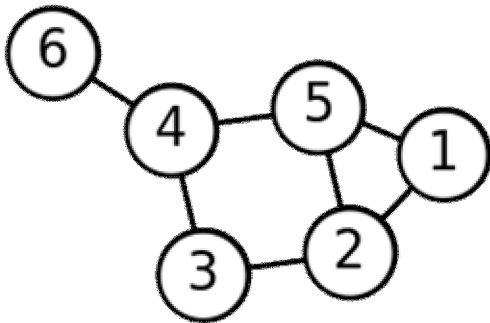
(Depth-first search .

(Breadth-first search

(graph)

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James Joseph Sylvester

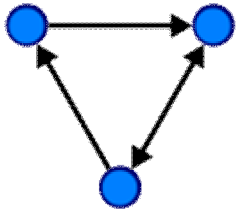
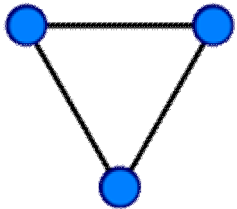


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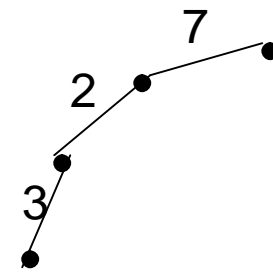
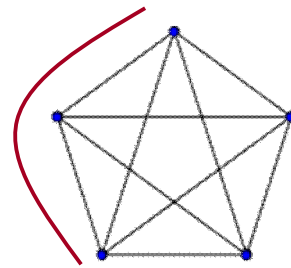
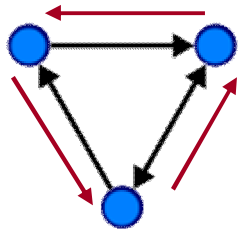
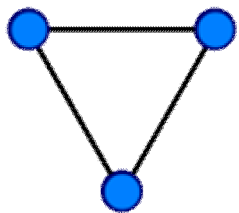


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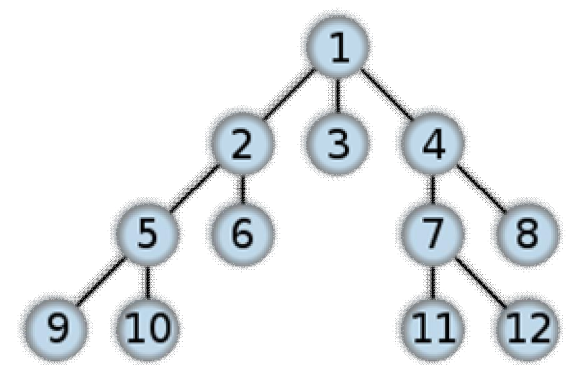
1:

BFS)

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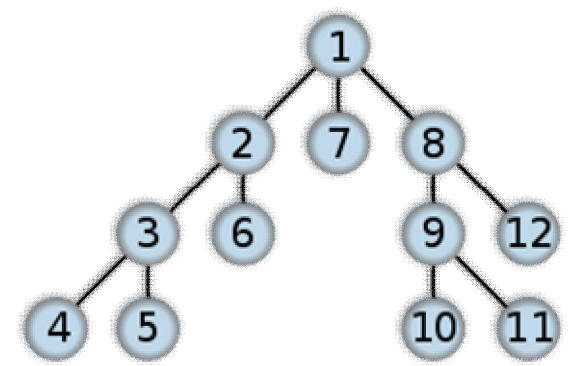
2:

(Breadth-first search-



First search-DFS)

(Depth-



(shortest path problem)

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V (vertices)
V₁, V₂

G
E (edges)
V

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∴ , ”
V₁, V₂

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(shortest path problem)

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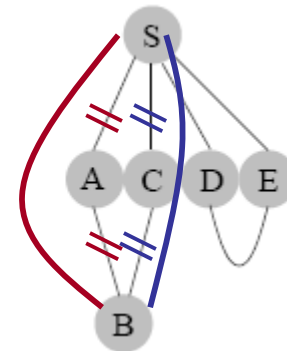
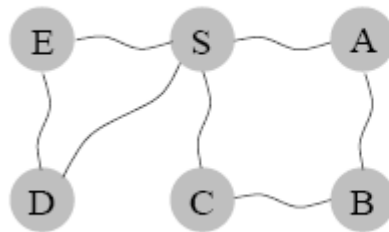
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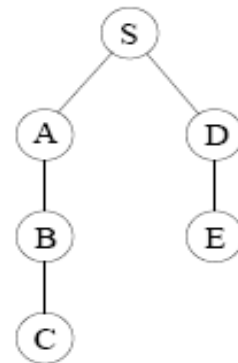
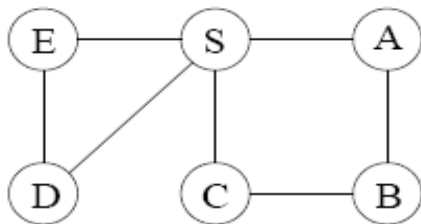
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(Depth-first search - DFS)

(depth-first search- DFS)

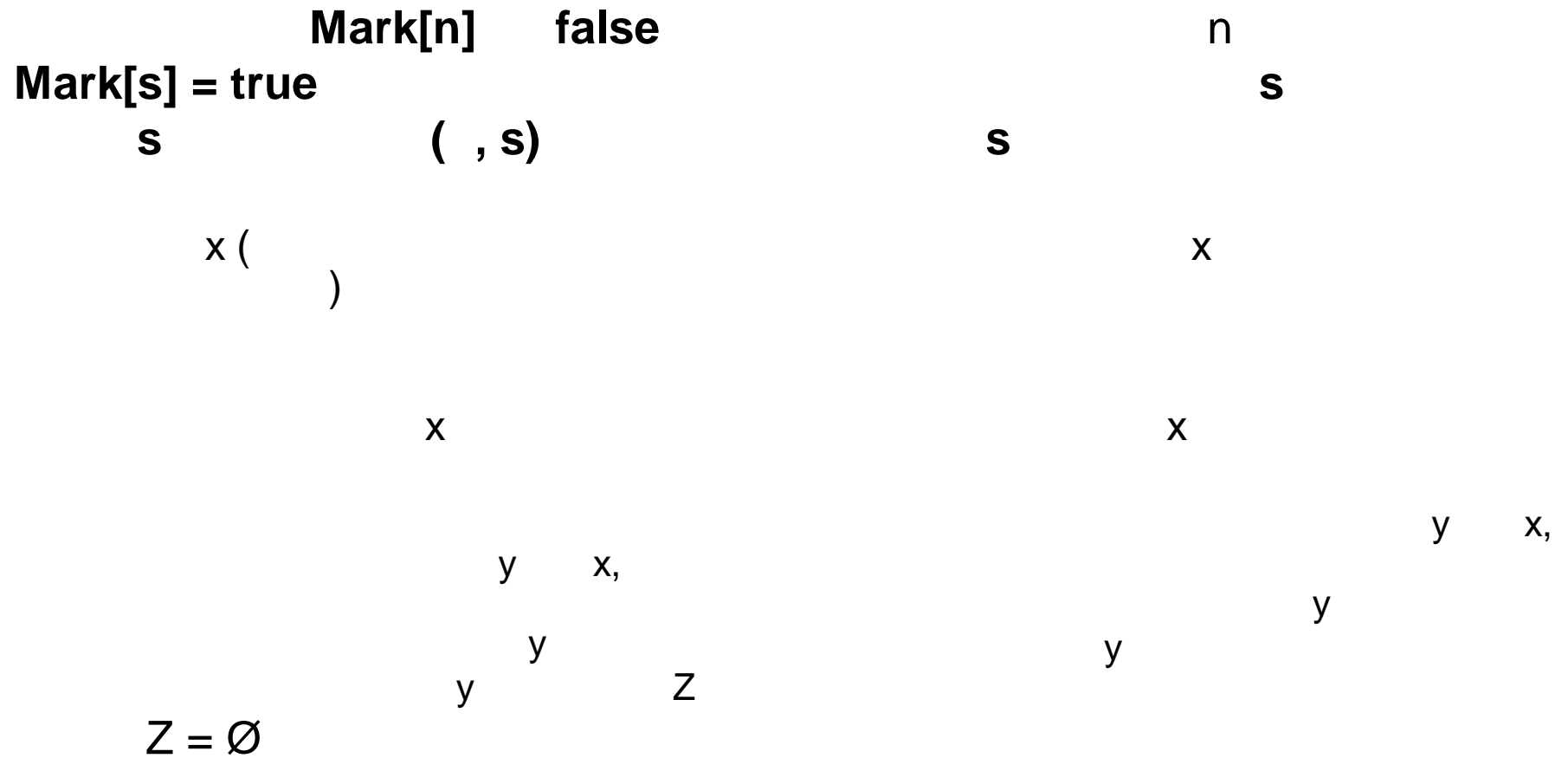
(DFS tree)



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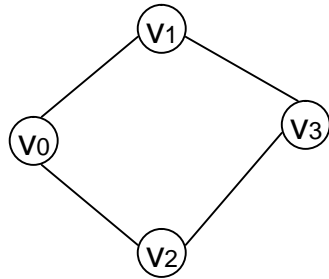


(Depth-first search - DFS)



(1)

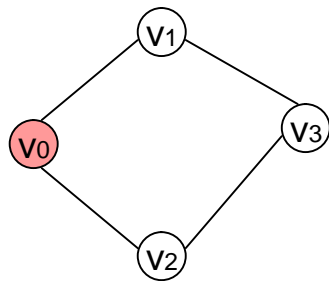
DFS



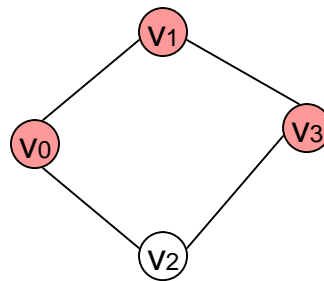
$V_0: \{V_1, V_2\}$
 $V_1: \{V_3\}$
 $V_2: \{V_3\}$
 $V_3: \{\}$

-

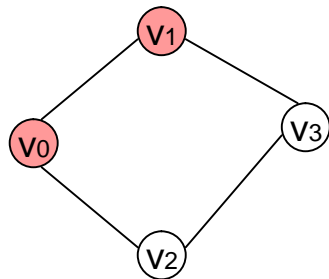
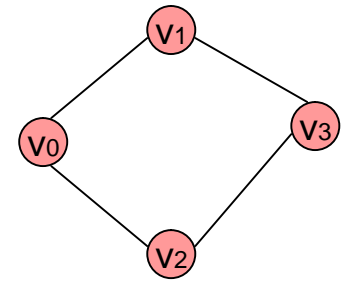
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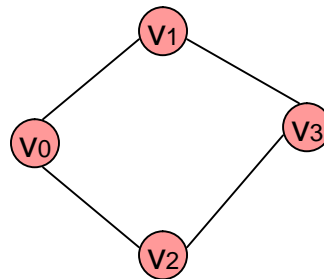
V0



V3
V1
V0



V1
V0



V2
V3
V1
V0

(1) DFS

“

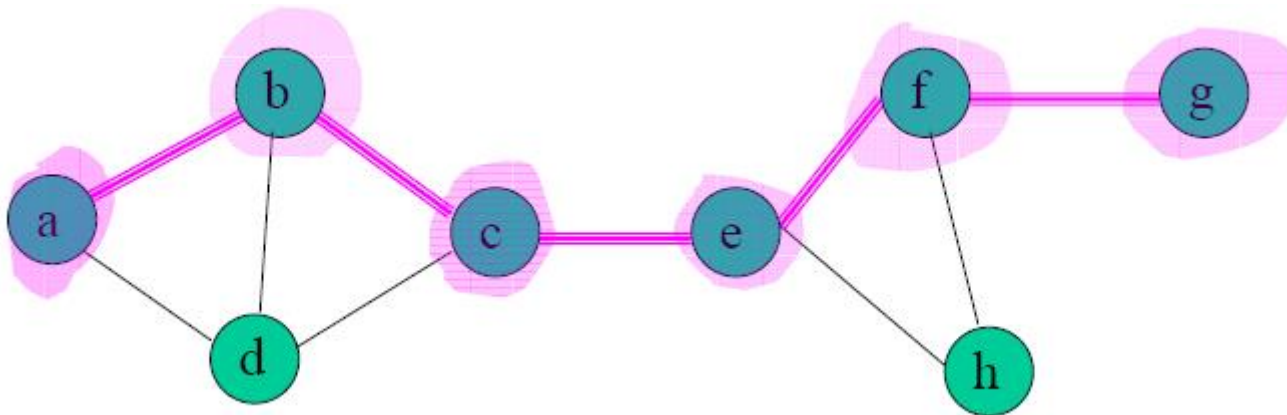
:

- a:1, b:2, c:3, e:4, f:5, g:6, h:7, d:8

”

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- a, ab, abc, abce, abcef, abcefg, abcef, abcefh, abcef, abce, abc, abcd, abc, ab, a, \emptyset



(Depth-first search - DFS)

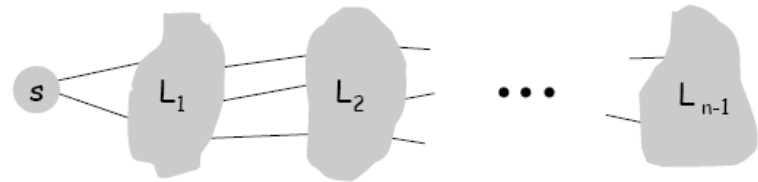
“ DFS
|V| |E| ;
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: (|V|)
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“ : (|V|+|E|) (« »
(1))

(Breadth-first search - BFS)

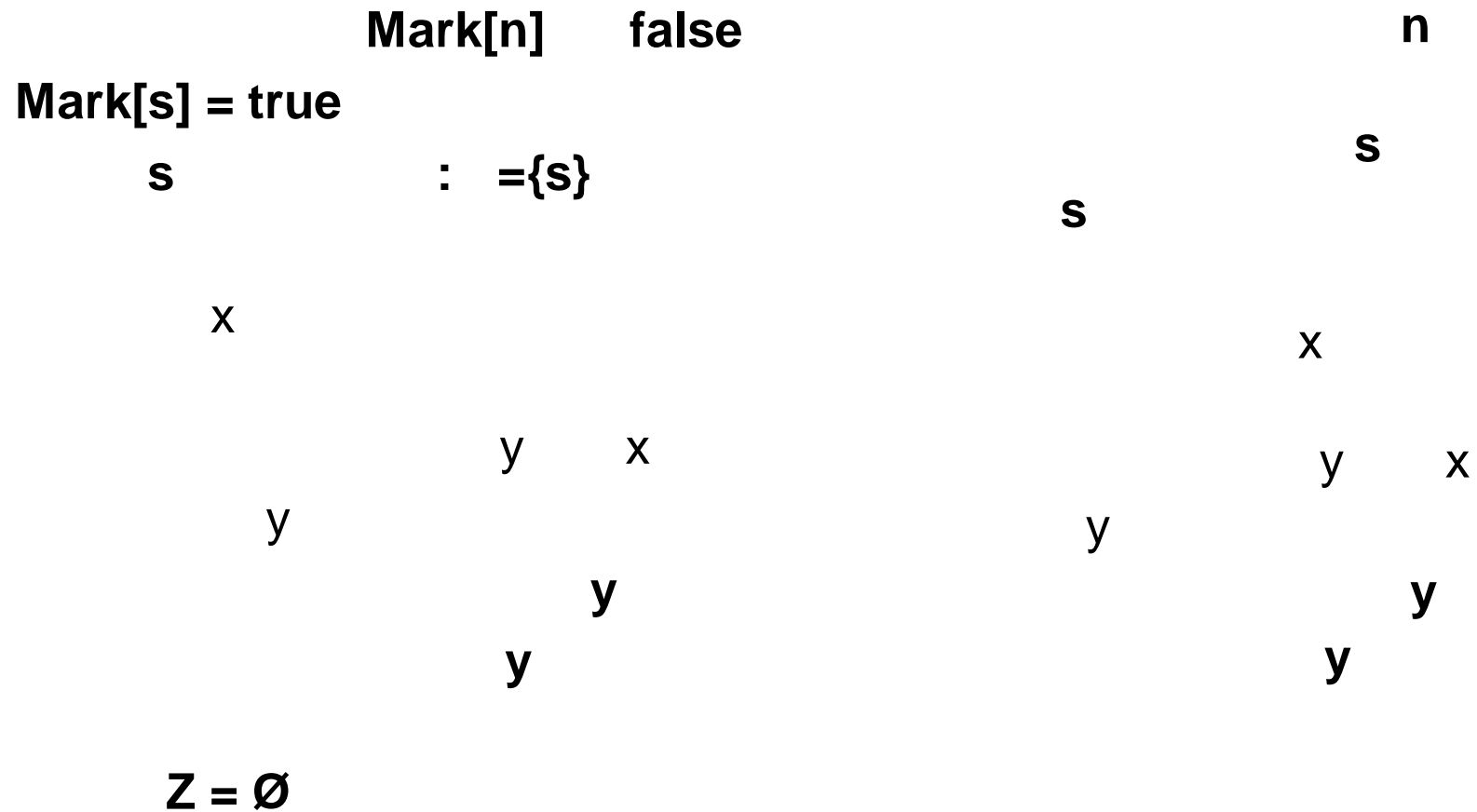
“ first search - BFS) (breadth-
 : d, 2
 d + 1, d
 : ,

BFS

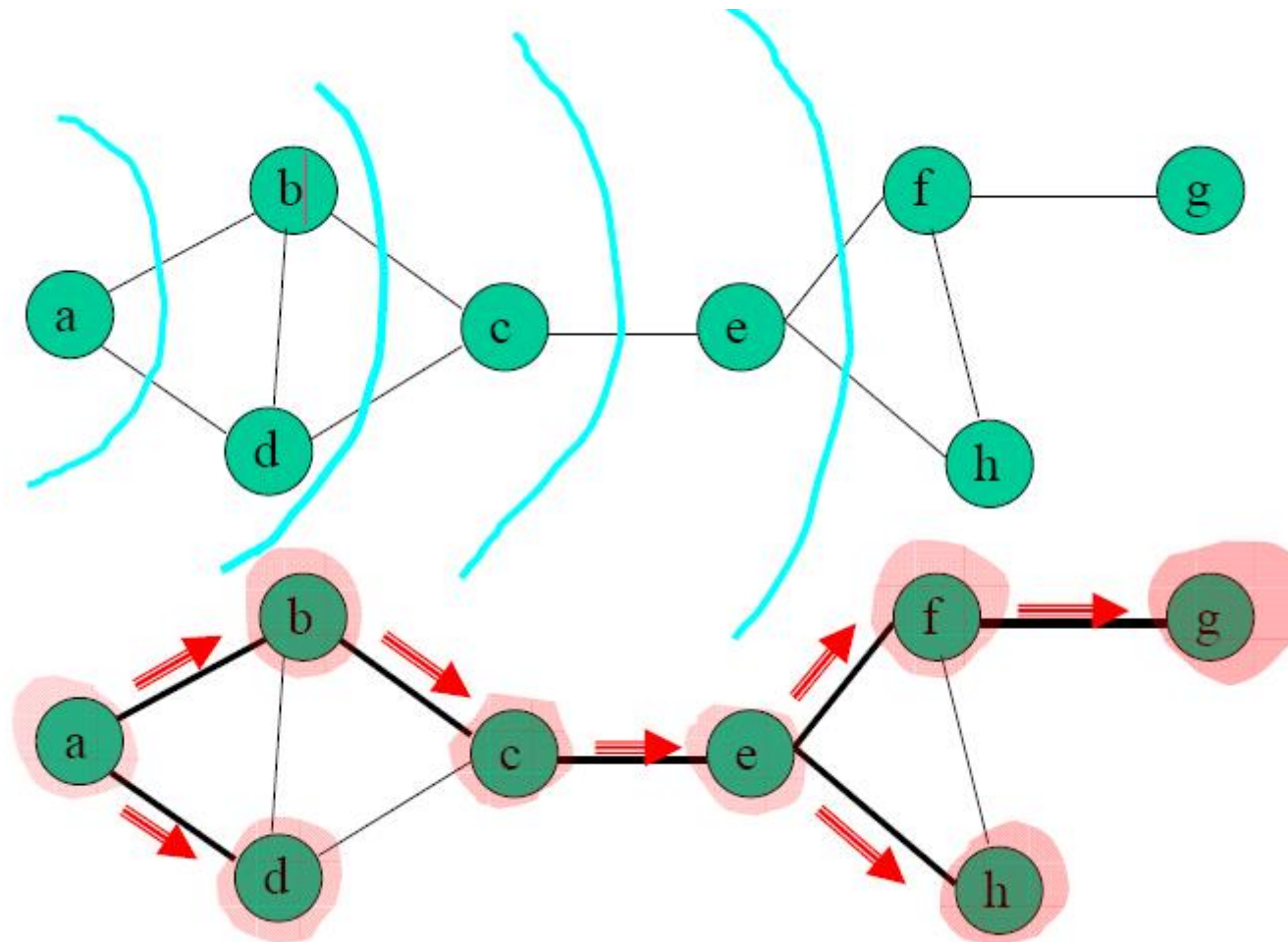
1. $L_0 = \{s\}$
2. $L_1 =$ L_0
3. $L_2 =$ $L_0 \quad L_1$
4. $L_{i+1} =$ $L_1 \quad L_i$



(Breadth-first search - BFS)



(Breadth-first search - BFS)



(Breadth-first search - BFS)

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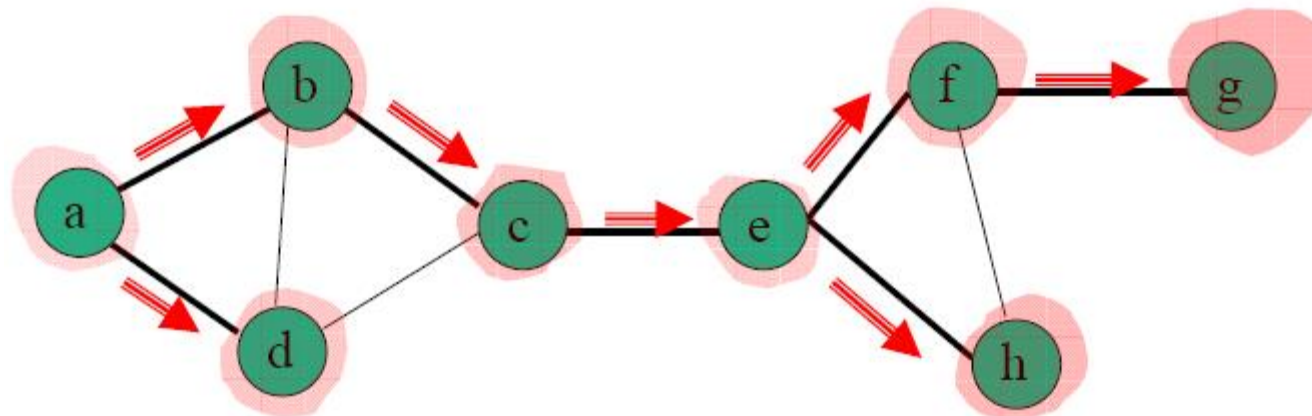
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- . a:1, b:2, d:3, c:4, e:5, f:6, h:7, g:8

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- . a, db, cd, c, e, hf, gh, g, \emptyset



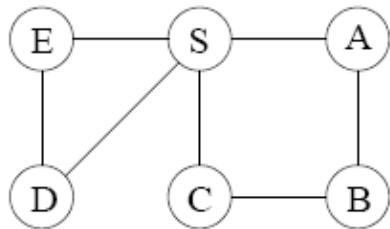
(Breadth-first search - BFS)

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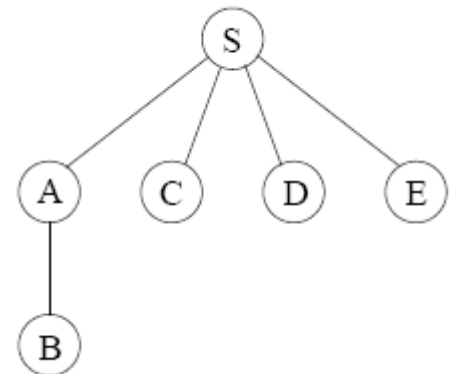
BFS:

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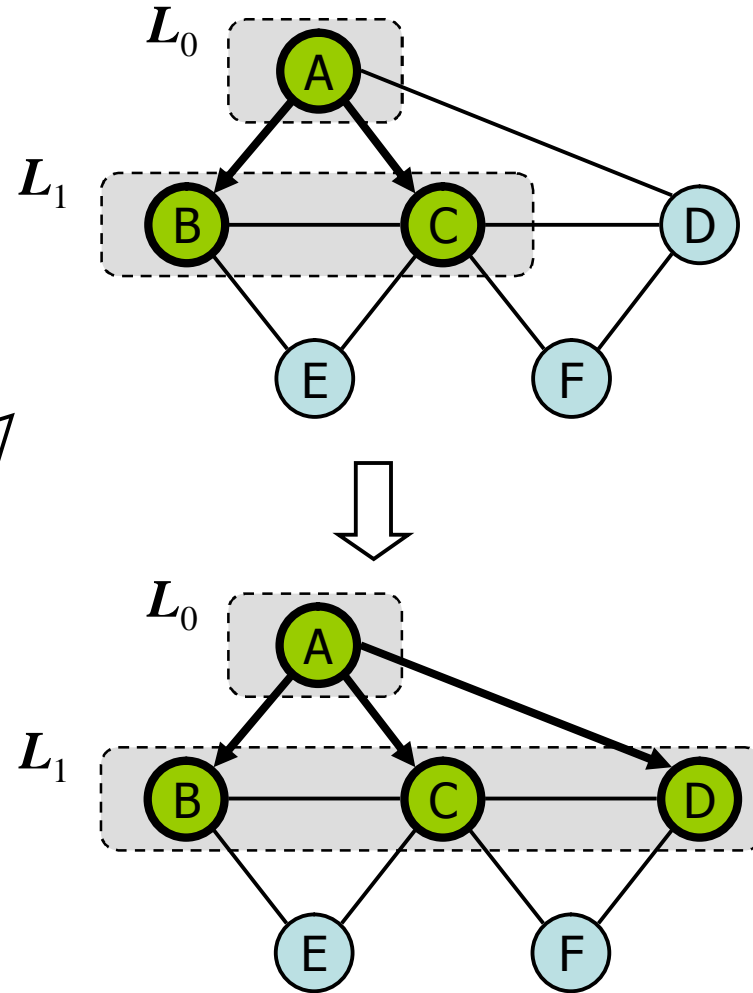
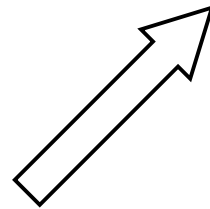
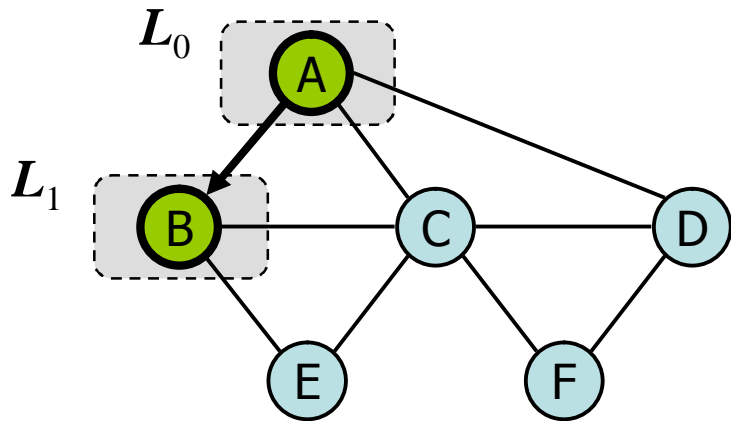
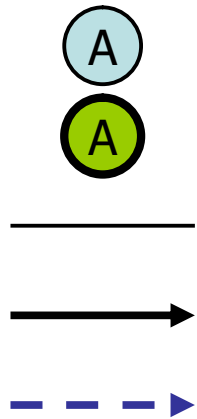


S	[S]
A	[A C D E]
C	[C D E B]
D	[D E B]
E	[E B]
B	[B]
	[]



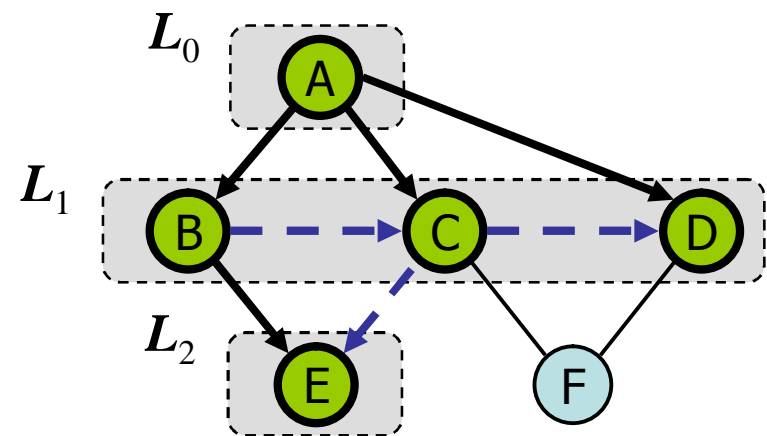
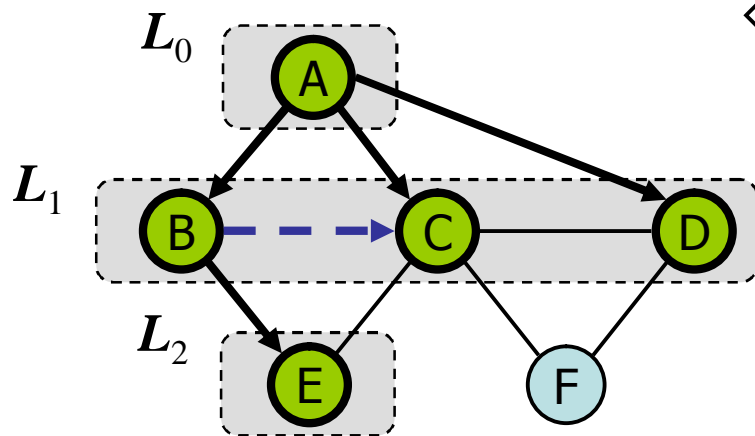
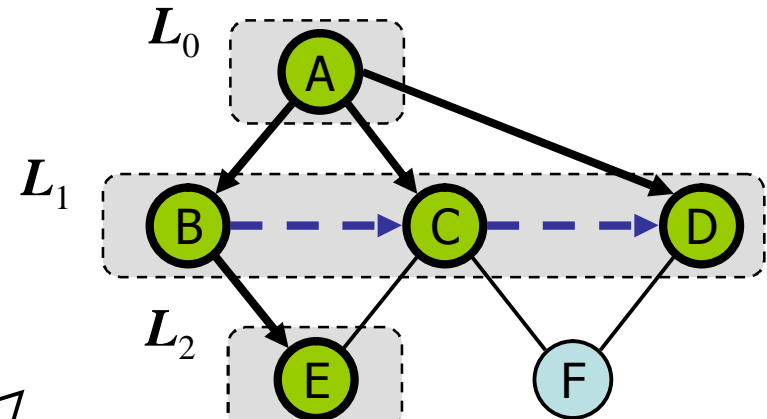
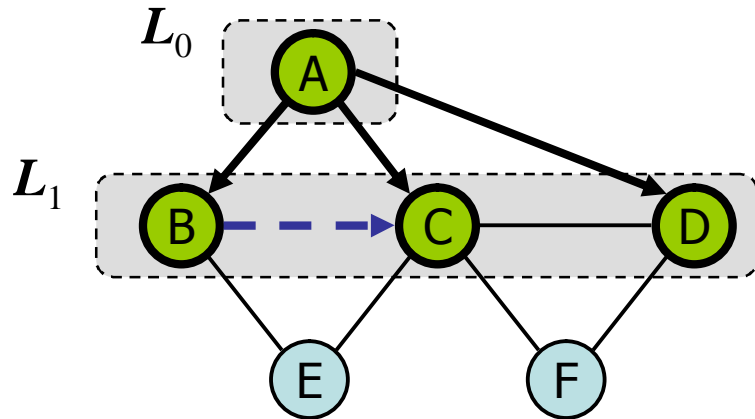
(1)

BFS



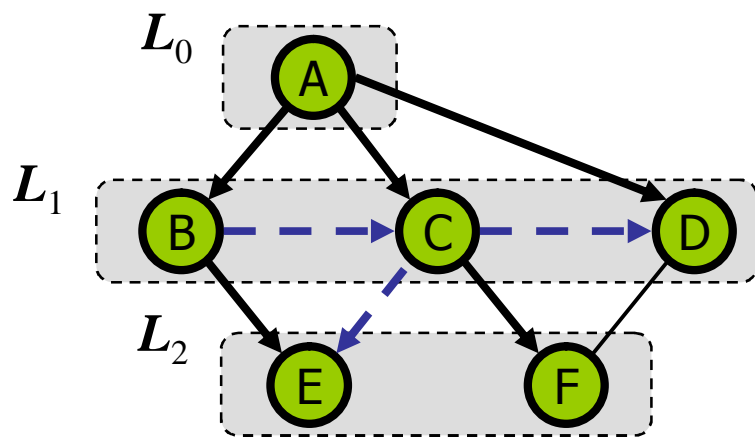
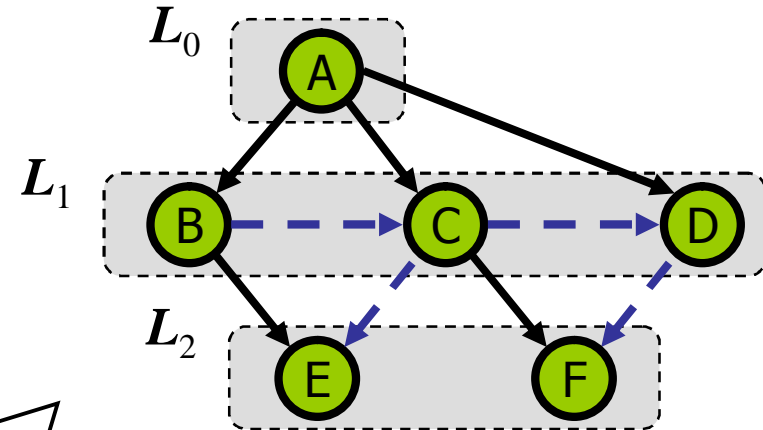
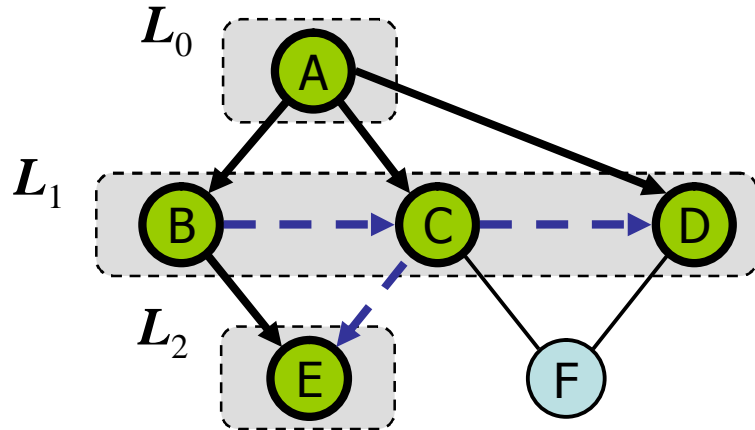
(1)

BFS



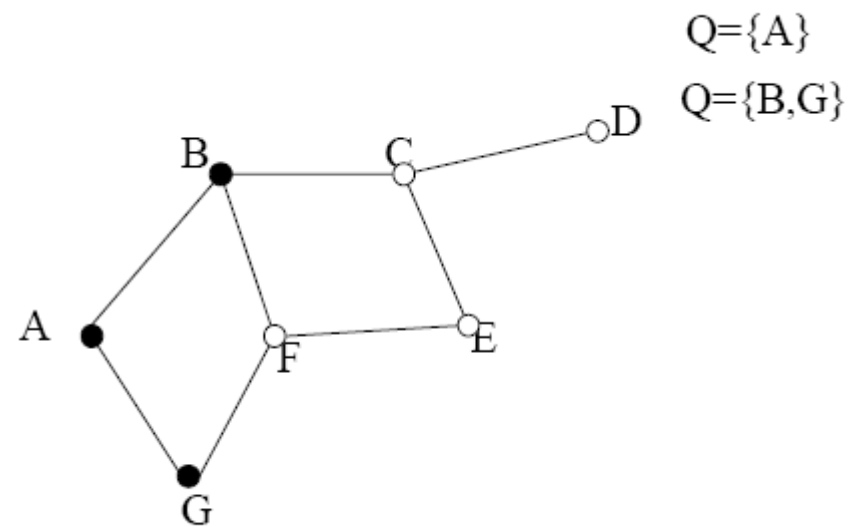
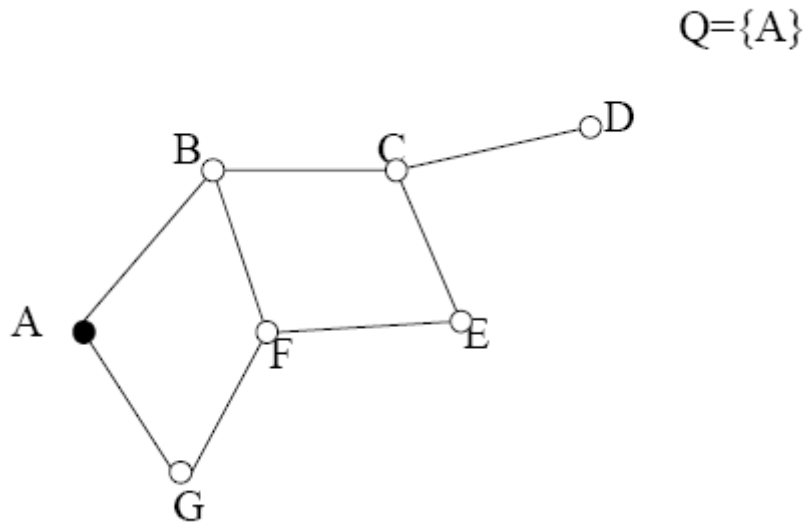
(1)

BFS



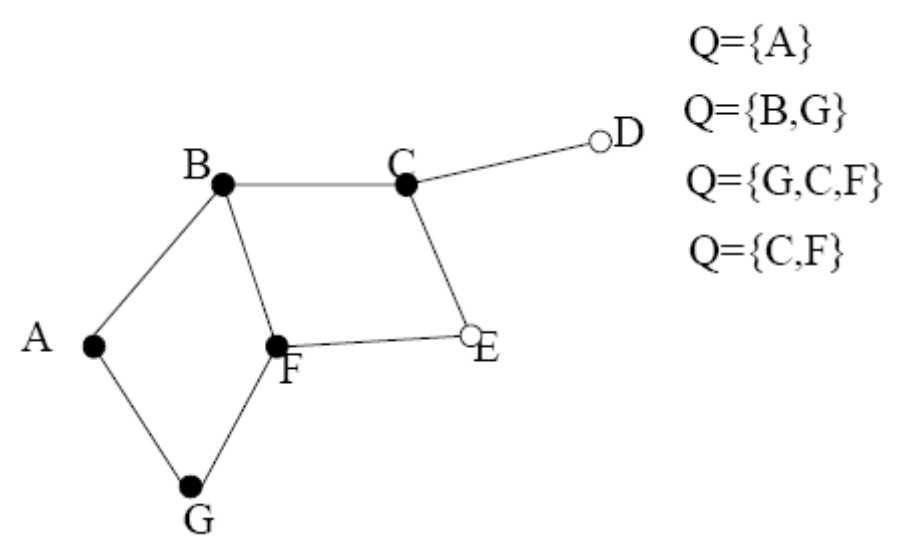
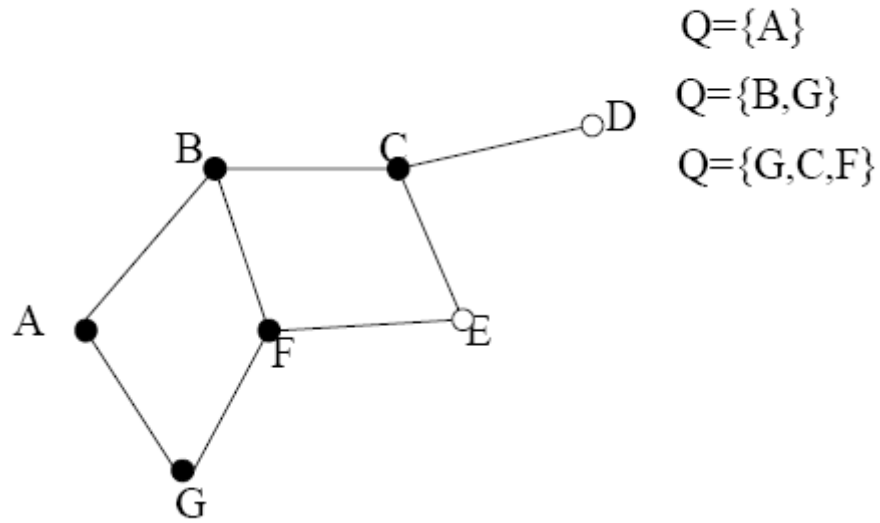
(2)

BFS



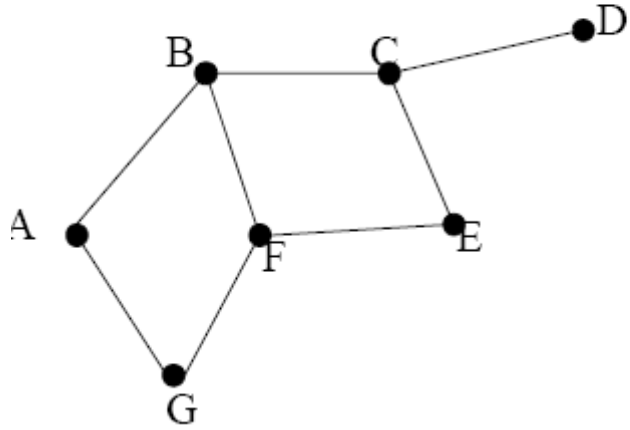
(2)

BFS

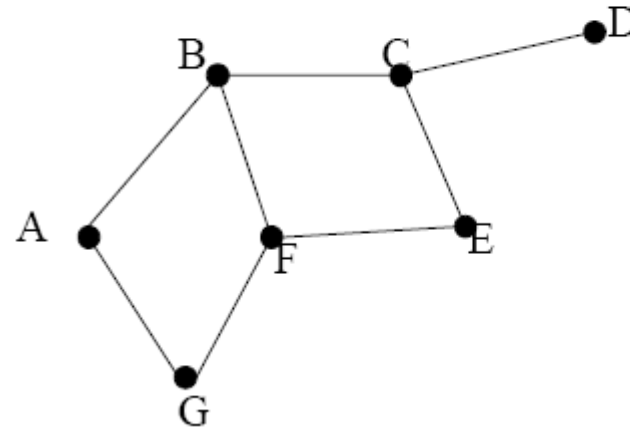


(2)

BFS



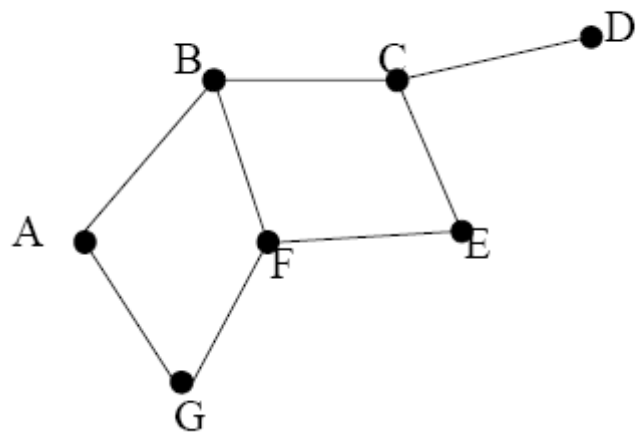
- $Q=\{A\}$
- $Q=\{B,G\}$
- $Q=\{G,C,F\}$
- $Q=\{C,F\}$
- $Q=\{F,D,E\}$



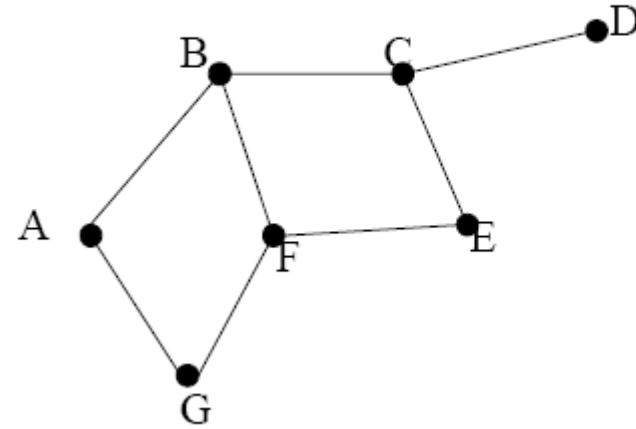
- $Q=\{A\}$
- $Q=\{B,G\}$
- $Q=\{G,C,F\}$
- $Q=\{C,F\}$
- $Q=\{F,D,E\}$
- $Q=\{D,E\}$

(2)

BFS



- $Q=\{A\}$
- $Q=\{B,G\}$
- $Q=\{G,C,F\}$
- $Q=\{C,F\}$
- $Q=\{F,D,E\}$
- $Q=\{D,E\}$
- $Q=\{E\}$



- $Q=\{A\}$
- $Q=\{B,G\}$
- $Q=\{G,C,F\}$
- $Q=\{C,F\}$
- $Q=\{F,D,E\}$
- $Q=\{D,E\}$
- $Q=\{E\}$
- $Q=\{\}$

(Breadth-first search - BFS)

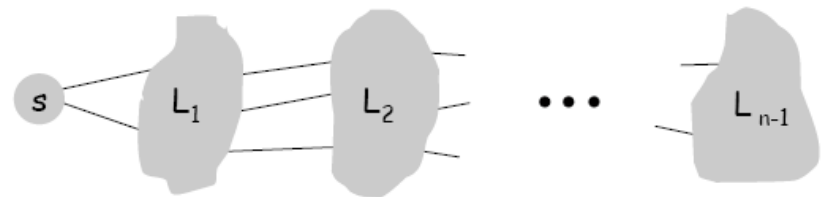
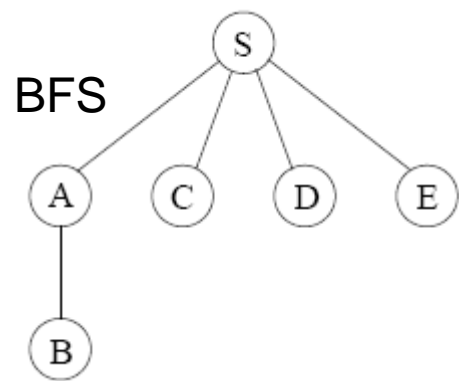
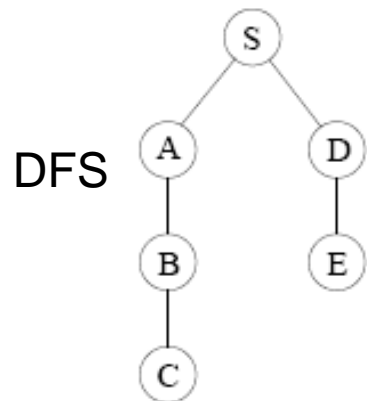
“ BFS

(DFS)

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(Breadth-first search - BFS)

" O BFS $O(|V|+|E|)=O(n+m)$

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DFS BFS

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