

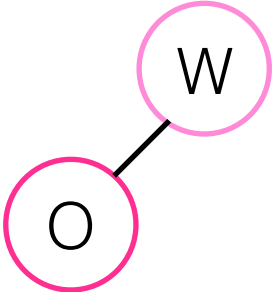
Theory Question 1 a)

INSERT: 1 2 3 4 5 6 7
 W O E C A L H

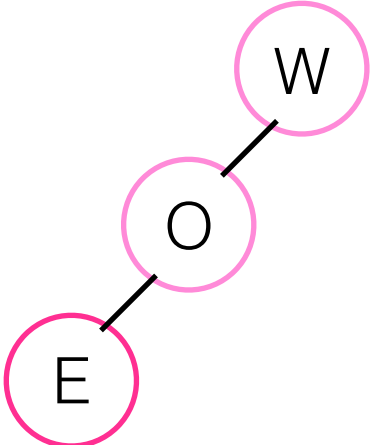
1.



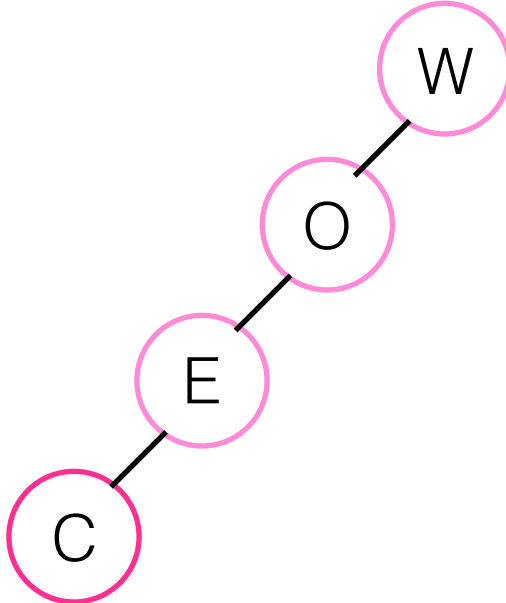
2.



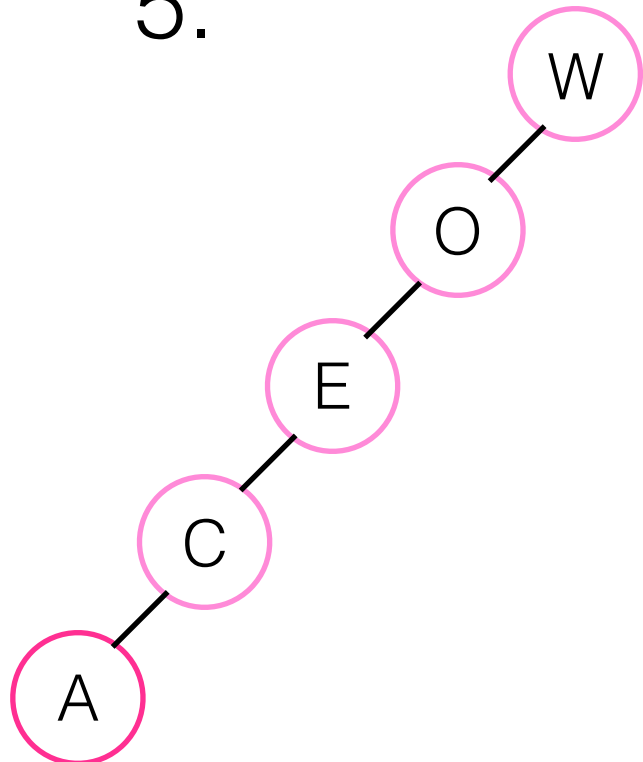
3.



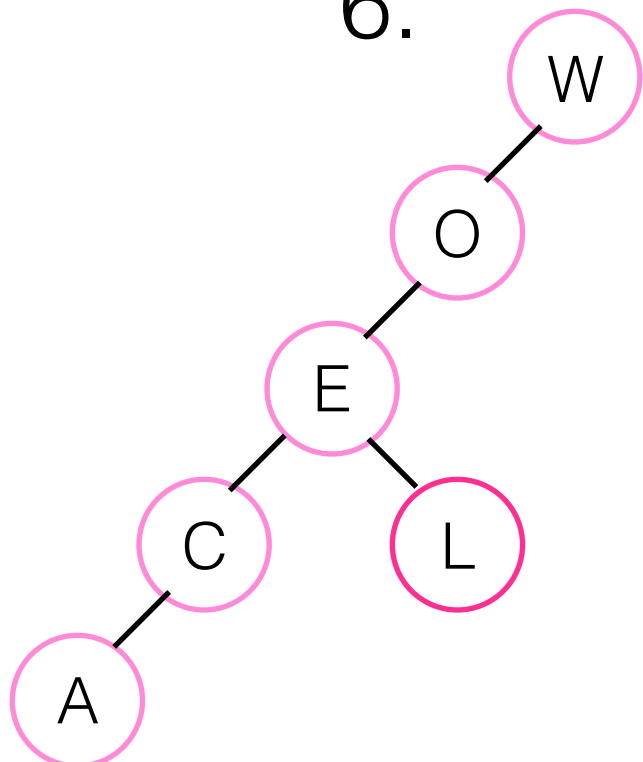
4.



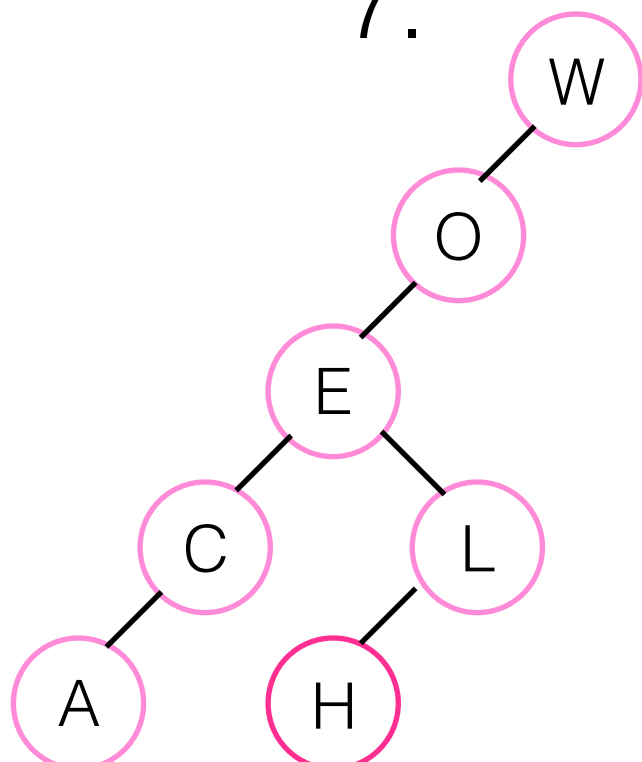
5.



6.

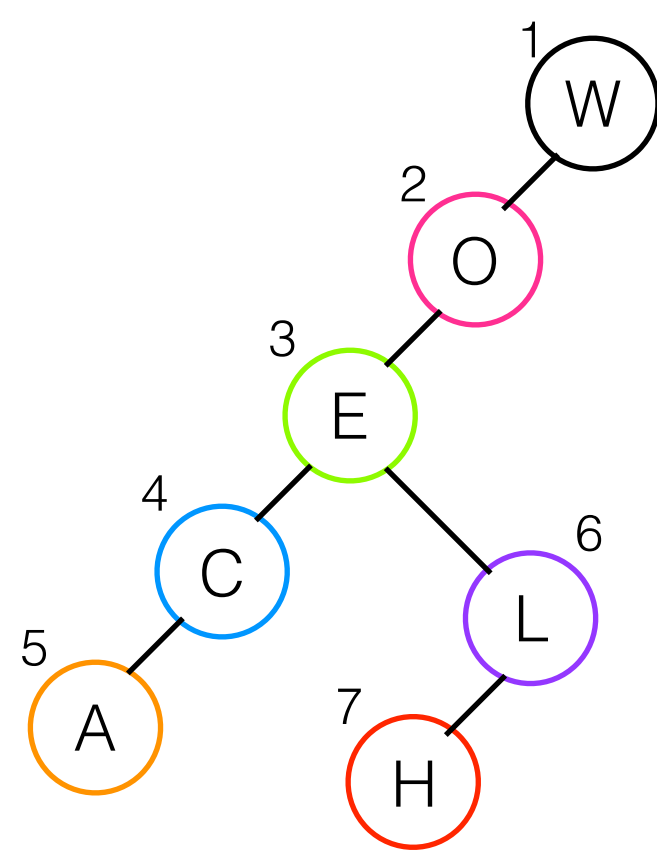


7.



Theory Question 1 b)

preorder: W O E C A L H

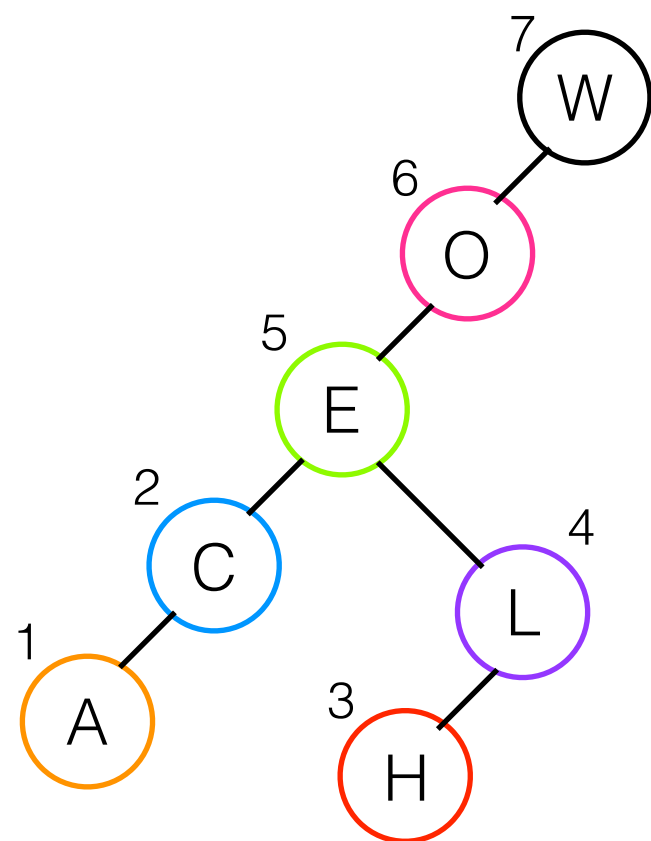


output: W O E C A L H

Preorder (Root, Left, Right)

Theory Question 1 b)

postorder: W O E C A L H

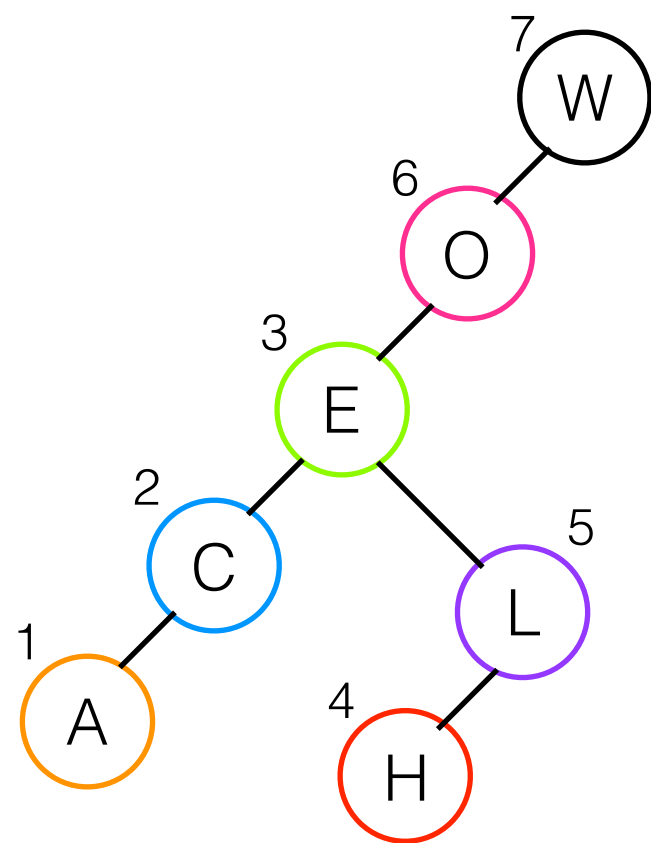


output: A C H L E O W

Postorder (Left, Right, Root)

Theory Question 1 b)

inorder: W O E C A L H



output: A C E H L O W

Postorder (Left, Root, Right)

Symbol Table Binary Search

$$\text{Runtime}(M) / T(M) = \text{Runtime}(N) / T(N)$$

$$\Leftrightarrow \text{Runtime}(N) = T(N) \cdot \text{Runtime}(M) / T(M)$$

Insertion time complexity: $1/2 \cdot N$

$$M = 100$$

$$N = 200$$

(ns)

Compiler showed $\text{Runtime}(M) = 1,359,130$

$$\text{Runtime}(N) = (1/2 \cdot 200) \cdot 1,359,130 / (1/2 \cdot 100) = 2,718,260$$

Compiler showed $\text{Runtime}(200) = 2,464,667$

Symbol Table Binary Search

$$\text{Runtime}(M) / T(M) = \text{Runtime}(N) / T(N)$$

$$\Leftrightarrow \text{Runtime}(N) = T(N) \cdot \text{Runtime}(M) / T(M)$$

Searching time complexity: $\lg(N)$

$$M = 100$$

$$N = 200$$

(ns)

Compiler showed $\text{Runtime}(M) = 411,819$

$$\text{Runtime}(N) = \lg(200) \cdot 1,359,130 / \lg(100) = 1,563,699$$

Compiler showed $\text{Runtime}(200) = 1,003,345$

Binary Search Tree

$$\text{Runtime}(M) / T(M) = \text{Runtime}(N) / T(N)$$

$$\Leftrightarrow \text{Runtime}(N) = T(N) \cdot \text{Runtime}(M) / T(M)$$

Insertion time complexity: $1.39 \cdot \lg(N)$

$$M = 100$$

$$N = 200$$

(ns)

Compiler showed $\text{Runtime}(M) = 3,317,674$

$$\text{Runtime}(N) = 1.39 \cdot \lg(200) \cdot 3,317,674 / 1.39 \cdot \lg(100) \approx 3,817,034$$

Compiler showed $\text{Runtime}(200) = 3,756,872$

Binary Search Tree

$$\text{Runtime}(M) / T(M) = \text{Runtime}(N) / T(N)$$

$$\Leftrightarrow \text{Runtime}(N) = T(N) \cdot \text{Runtime}(M) / T(M)$$

Searching time complexity: $1.39 \cdot \lg(N)$

$$M = 100$$

$$N = 200$$

(ns)

Compiler showed $\text{Runtime}(M) = 298,326$

$$\text{Runtime}(N) = 1.39 \cdot \lg(200) \cdot 298,326 / 1.39 \cdot \lg(100) \approx 366,990$$

Compiler showed $\text{Runtime}(200) = 343,228$