CS 1.3: Core Data Structures & Algorithms

Trees & Tree Traversals Worksheet

Name: _____

Part 1: Binary Search Tree

P1: Write pseudocode (in English) to explain the sequence of steps in the implementation of the binary search tree's **search(target)** method. ***Hint:*** *You should use either recursion OR a loop.*

A.

B.

C.

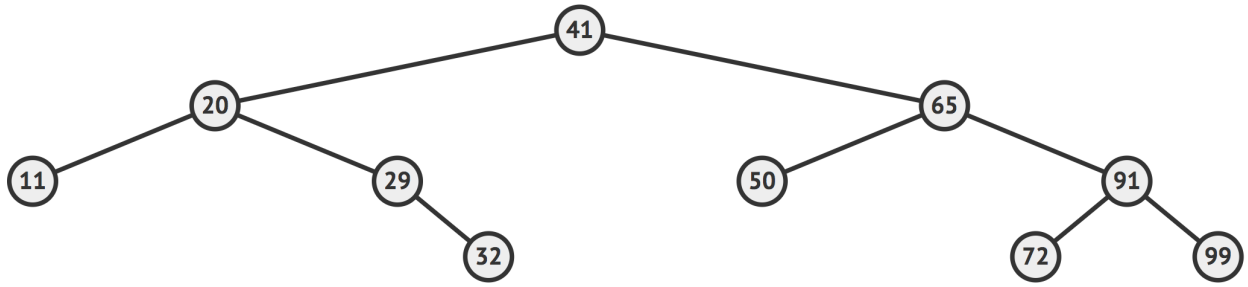
D.

E.

F.

P2: Test your pseudocode by executing **search(target)** on each of the **target** values below. Step through each line of pseudocode carefully and label or draw arrows on the tree diagram to show when each step is executed as you're following the logic to test if your pseudocode works.

Value of **target** to search for	Number of nodes visited	Found **target** or not found?
20		
50		
7		
32		
41		
68		



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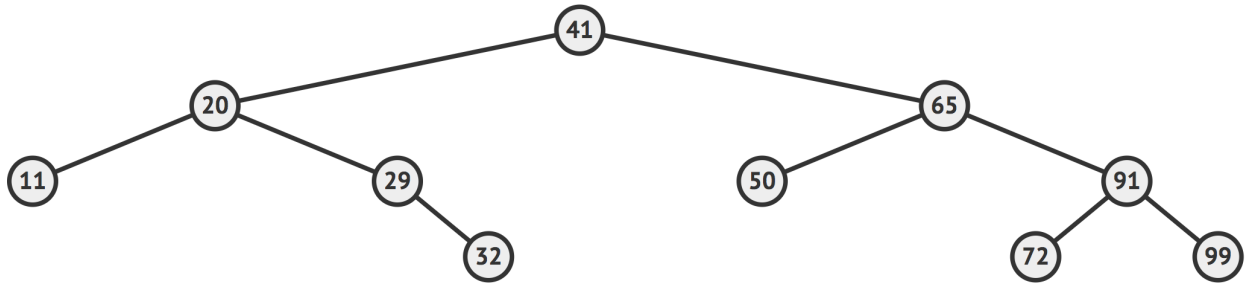
Part 2: Binary Tree Traversals

Depth-First Search

P3: Draw the path a squirrel would follow around the tree, down its branches, and to each node when it wants to collect all the "nuts" (i.e., perform a depth-first search to visit all node values).

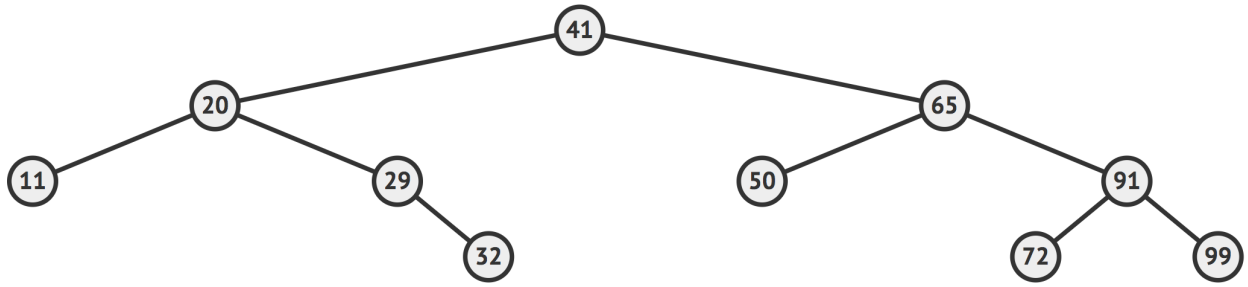


P4: Write values from the tree above in the order nodes will be visited for each tree traversal.

Tree traversal type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Depth-first search: in-order										
Depth-first search: pre-order										
Depth-first search: post-order										

Breadth-First Search

P5: Draw the path a road runner would follow across the tree levels to each node when it wants to collect all the "nuts" level-by-level (i.e., perform a breadth-first search to visit all node values).



P6: Write values from the tree above in the order nodes will be visited for level-order traversal.

Tree traversal type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Breadth-first search: level-order										