CS 101 Fall 2020 - Quiz 6-B

29/10/2020 - 20 Minutes **Name:** **ID number:**

Problem 1 (6pts)

For each questions, you can get full marks iff you choose all correct answers. Otherwise, you will get zero scores. Fill all the answers in the table below

Question(1)	Question(2)	Question(3)
D	A	D

(1) Which of the following is true about Binary Trees?

(A) Every binary tree is either complete or full.

(B) Every complete binary tree is also a full binary tree.

(C) Every full binary tree is also a complete binary tree.

(D) A binary tree could be both complete and full.

(E) None of above.

(2) There are n elements inserted one by one into an initially empty binary heap. What is the total running time in the worst case?

(A) $O(n \log n)$

(B) $O(n)$

(C) $O(\log n)$

(D) $O(1)$

(3) A perfect binary tree with n non-leaf nodes contains _____ nodes.

(A) n

(B) $2n - 1$

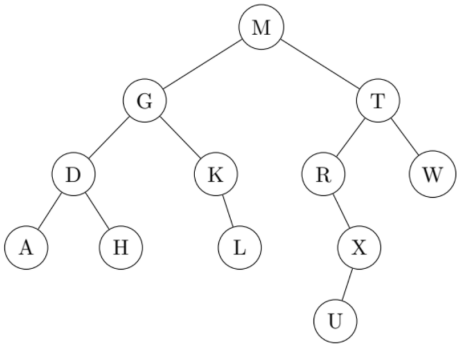
(C) $2n$

(D) $2n + 1$

Problem 2 (4pts)

Given the inorder and preorder traversal of a binary tree are ADHGKLMRUXTW and MGDAHKLTRXUW respectively.

(1) Reconstruct the tree.

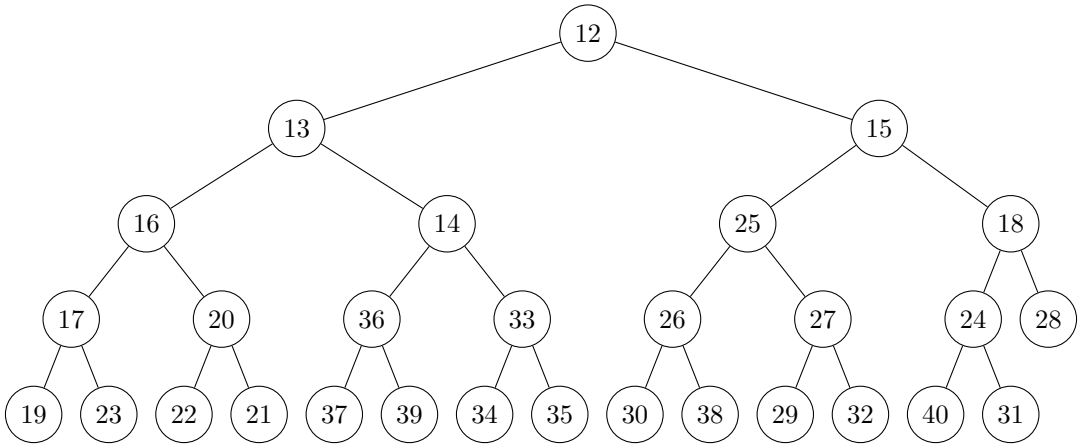


(2) Write down the postorder traversal of this tree

AHDLKGUXRWTM

Problem 3 (5pts)

Consider the following binary heap:



(1) Is this heap a max-heap or a min-heap?

Min-heap

(2) Suppose that you pop the key from the heap above. Write down all the elements that are involved in one (or more) compares.

13,14,15,16,31,33,36

(3) Suppose that the figure above was the last operation performed in the binary heap when inserting the key x. Write down all possible value of x.

31,24,18,15

To insert a node in a binary heap, we place it in the next available lead node and swim it up. Thus,31,24,18,15 and 12 are the only keys that we might move. But, the last inserted key could not have been 12, because,then, 15 would have been the old root (which would violate heap order because the left child of the root is 13)