

1. (5 points) Indicate the sum of the values corresponding to all statements that are **True**. Mark 0 if none are **True**:

- (1) The best-case performance of finding the smallest element in a BST is $\Theta(1)$
- (2) The worst-case performance of finding the largest element of a BST is $\Theta(1)$
- (4) In a max-heap each key is greater or equal to the keys of all ancestors
- (8) Any complete tree can be efficiently represented as an array

1. _____

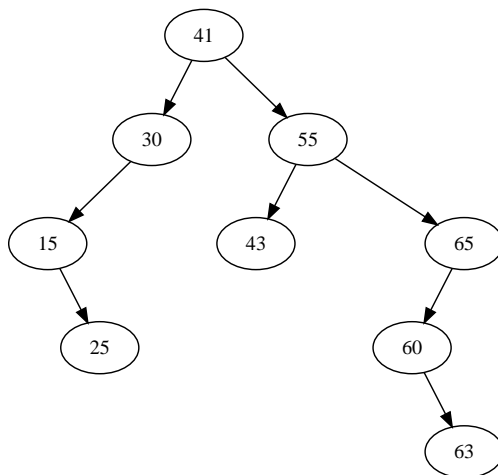
2. (5 points) A post-order traversal of a *max-heap* with 7 elements is $1, 2, \dots, 6, 7$. What is the sum of all keys in nodes of height $h = 1$?

2. _____

3. (5 points) Consider an empty hash table of length 11, in which keys 17, 22, 11, 36, 28, 41, 19, 30 are inserted with $h(x) = (x+5) \bmod 11$ and separate chaining. What is the total number of *collisions*?

3. _____

4. (5 points) Considering the BST below:



What is the output of a postorder traversal that, for each visit, prints the *depth* of the node?

- A. None of the others
- B. 4, 2, 1, 0, 1, 3, 2, 1, 0

C. 3, 2, 1, 2, 4, 3, 2, 1, 0

D. 3, 2, 1, 2, 3, 3, 1, 1, 0

E. 3, 2, 3, 2, 1, 4, 2, 1, 0

4. _____

5. (5 points) Indicate the sum of the values corresponding to all statements that are **True**. Mark 0 if none are **True**:

(1) A binary heap is a complete BST

(2) 2^h is the minimum number of nodes in a binary heap of height h

(4) Traversing a BST using *pre-order* results in a sorted list of keys

(8) A binary heap is a complete binary tree

5. _____