**CS2302 Data Structures**

**Spring 2020**

**Quiz 5**

**Open notes. You may request assistance from TA, IA, PL, teammate and instructor**

1. The range of a node in a B-tree is the difference between the largest and the smallest items in the node. For example, the range of the root of the tree the figure is 0 (10-10=0), the range of the root’s leftmost child is 4 and the range of the root’s rightmost child is 3. Write the function *nodeRange(t)* that returns the range of BTreeNode t.
2. Write the function *countNodes(t)* that receives a reference to the root of a B-tree and returns the number of nodes in the tree. For example, if t is a reference to the root of the tree in the figure, *countNodes(t)* should return 9.
3. Write the function *countItemsAtDepthD(t,d)* that receives a reference to the root of a B-tree and an integer d and returns the number of data items that are stored in the tree at depth d. For example, if t is a reference to the root of the tree in the figure *countItemsAtDepthD(t,0)* should return 1, *countItemsAtDepthD(t,1)* should return 4, *countItemsAtDepthD(t,2)* should return 16 and *countItemsAtDepthD(t,3)* should return 0.

