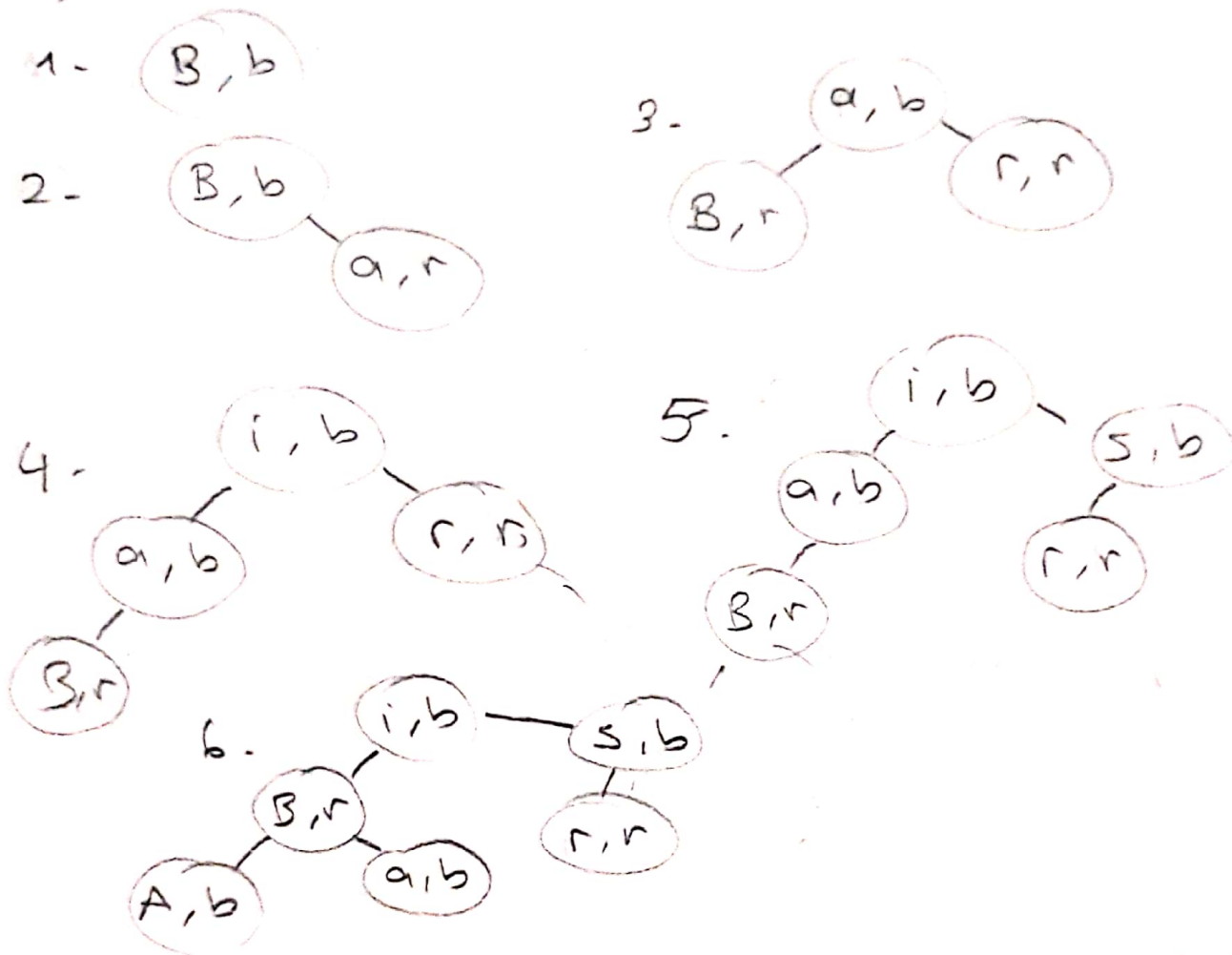


I hereby pledge on my honor that I will strictly adhere to academic integrity codes and the work done on this examination is solely my own and I will not receive/give any help from/to anybody or source during this examination.

3) d) Name = "Boris Ayyildiz" , b stands for black node
 , r stands for red node

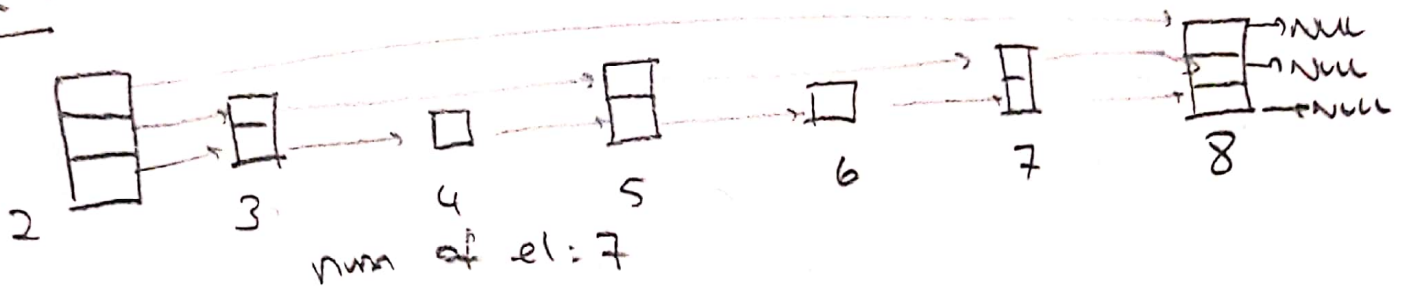


e) The nodes, in the path, where we inserted a new node might be effected

b) There are 4 cases. A node can be left-left, left-right, right-left or right-right heavy. If it is left-left or right-right heavy one rotation is enough. Otherwise we have to rotate twice. For left-left and right-right fix is performed where the parent of the unbalanced node. Other cases r.r is performed in both in the node and it's parent.

a) $2^{n-1} \leq \text{number of elements} \leq 2^n - 1$, n is height
 we decide when to increment size of the skip-list
 by this formula. We need to increment sometimes because
 we want to have an efficient data structure.

Before :



After

