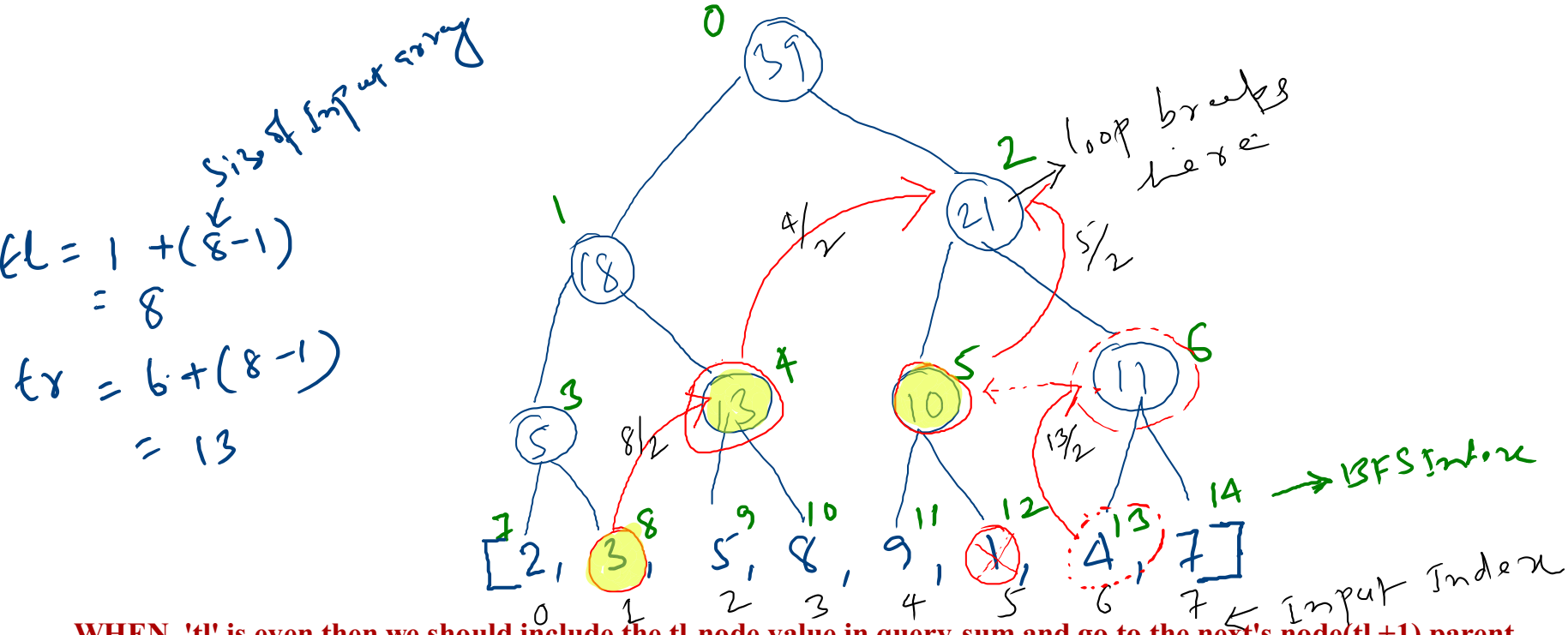
Query explanation for optimized sum segment tree

Query = [1, 6) ← exclusive
↑ Index



WHEN 'tl' is even then we should include the tl-node value in query-sum and go to the next's node(tl +1) parent i.e right sibling of tl-node's parent.

Since tl is even so next node is odd, so parent of tl+1 node : parent = (tl+1 -1)/2 = tl/2

For odd child formula => 2*parent +1 = child i.e; parent = (child -1)/2; substitute child with tl+1.

WHEN 'tl' is odd then no need to include the value of tl-node in query-sum, and go to the parent of 'tl' node.

WHEN 'tr' is even:

Since tr is exclusive in query range, so if tr is even then we should include the (tr-1)th node value in query-sum and go to the parent node of (tr-1).

WHEN 'tr' is odd : then no need to include the value of (tr-1)th node in query-sum, and go to the parent of 'tr' node.