1. Yes. For node i, its parent is floor((i-1) / 4) , its four children, from left to right, are [4i+1, 4i+2, 4i+3, 4i+4].

2. $\Theta(\log4 [(4-1)n]) \to \Theta(\log 3n)$; since there are now 4^k nodes on level k of the tree.

3. The quaternary tree will faster asymptotically for enqueue and dequeue. If the number of nodes for both trees are the same, the quaternary tree will have a lower height than the binary tree, and therefore requires less time traversing the tree.

4. In practice, the binary tree will likely perform better. When inserting or removing nodes from the tree, we need to rearrange the tree by comparing values between parent and child nodes. In a binary tree we only need to compare two values; while for a quaternary tree we need to compare four values to find the minimum, which cost more time.