Q3

As the question mentioned, 1024 apples which equals to 2^{10}, we can assume we have a complete binary tree with 2^{10} leaves and $2^{10} - 1$ internal nodes and of depth 10. We place all apples at the leaves, compare each pair and "promote" the heavier apple to the upper level and proceed in such a way till you reach the root of the tree, which will contain the heaviest apple. Clearly, each internal node is a result of one comparison and there are $2^{10} - 1$ many nodes thus also the same number of comparison so far.

And the second heaviest apple must be among in the apples which were compared with the heaviest apple along the way. There are 10 apples so finding the heaviest among them will take $10 - 1 = 9$comparisons by brute force. Note that the worst case is that at the leave level the first and the second heaviest apples were compared, so the second heaviest had been left on the bottom level. In total this is exactly at most $2^{10} + 10 - 2 = 1032$ weightings.