

JIE MEI z5173405

### Question3

Combine all the apples, two apples into a pair, divided into several groups. Weigh each pair of apples to select the one that weighs the most, then recombine all the apples that have chosen the heavier, then weigh again to choose the heavier one. Repeat the above steps until you find the heaviest apple among all apples. We will do  $2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 1023$  weightings. We will get the heaviest apple.

Then we will find the second heaviest apple. We need to find all the apples that have been weighed with the heaviest apple, and then find the heaviest apple among them (10 apples-10 weightings). Because in each weighing process, the second-heavy apple may be discarded as a lighter apple. So, we need to weigh 9 times to find the heaviest of the 10 apples. Finally, we will find the second heaviest apple.

Through the above steps, we performed  $1023+9=1032$  weightings to find the heaviest apple and the second apple.