Optimal Merge Pattern

Problem Statement

$n = 3$

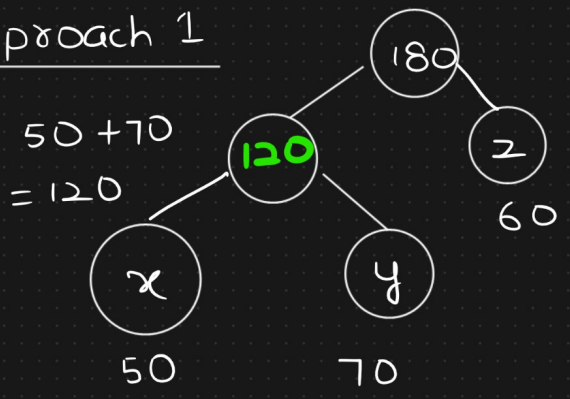
$x = 50$

$y = 70$

$z = 60$

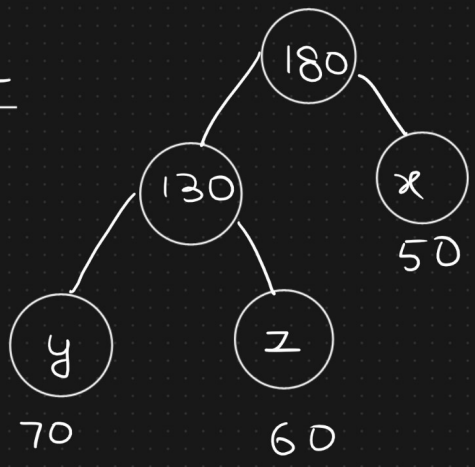
⇒ Objective :- Minimize the computational cost of merging all the given files.

Approach 1



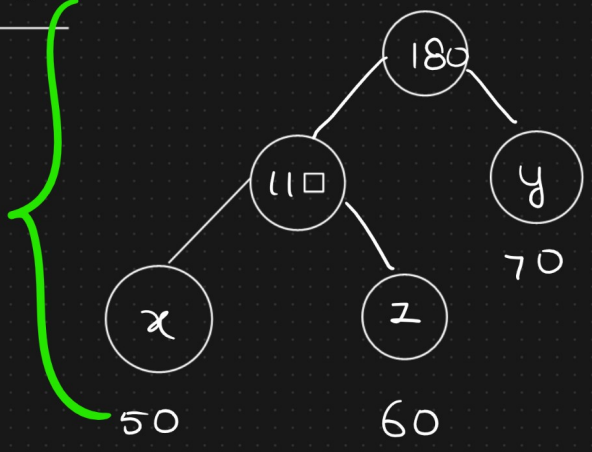
120 + 180 = 300

Approach 2



130 + 180 = 310

Approach 3



180 + 110 = 290

Approach 3

↳ Min. computational cost

Approach → Huffman coding

1) Build heap —— $O(n)$

2) Pop 2 elements —— $(n-1)\,3\log n$

↳ addition of those 2 poped element & insertion in the minheap

Time complexity $= O(n \log n)$