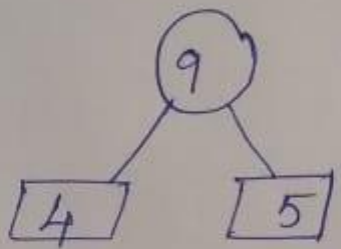
Consider the following messages $m_1, \ldots m_7$ with relative frequencies $(q_1 \ldots q_7) = (4, 5, 7, 8, 10, 12, 20)$

Step 1: Arrange the data in ascending order
4, 5, 7, 8, 10, 12, 20

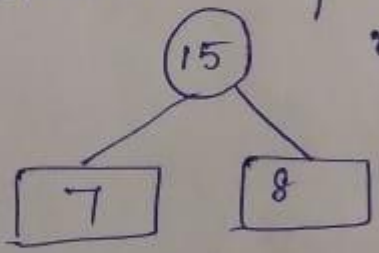
Step 2: Combine first two entries of a table
Create a minimum binary heap



min heap (sum of left node and right node)

step 3: Remove the entries 4 and 5 from the table, insert 9 in appropriate position
7, 8, 9, 10, 12, 20

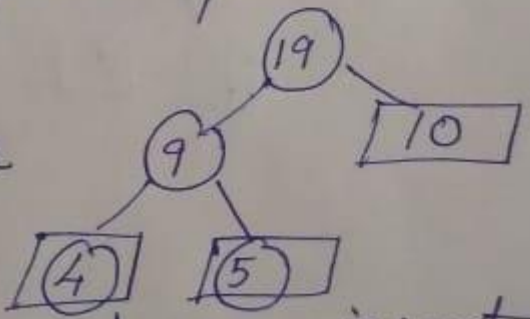
Combine minimum value of two blocks, Create a parent node,



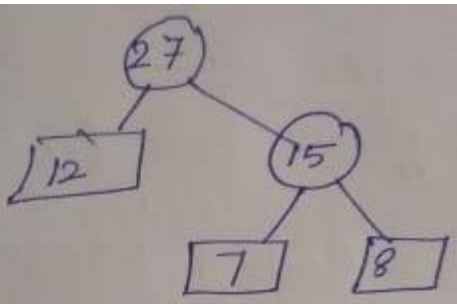
min heap

step 4: Remove the entries 7 and 8 from table, insert 15 at appropriate position
9, 10, 12, 15, 20

Combine minimum value

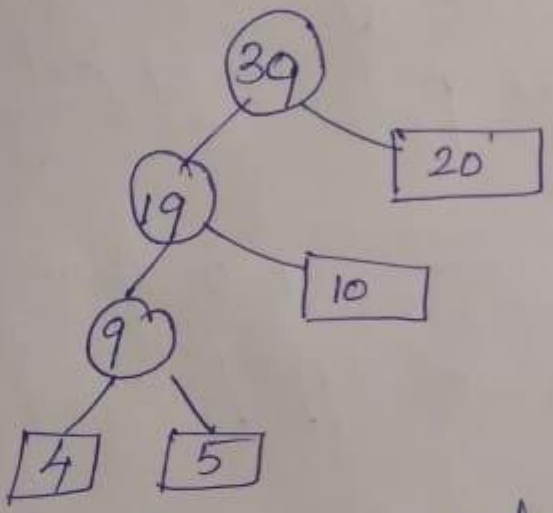


step 5: Remove entries 9 and 10, insert 19 at its proper position 12, 15, 19, 20

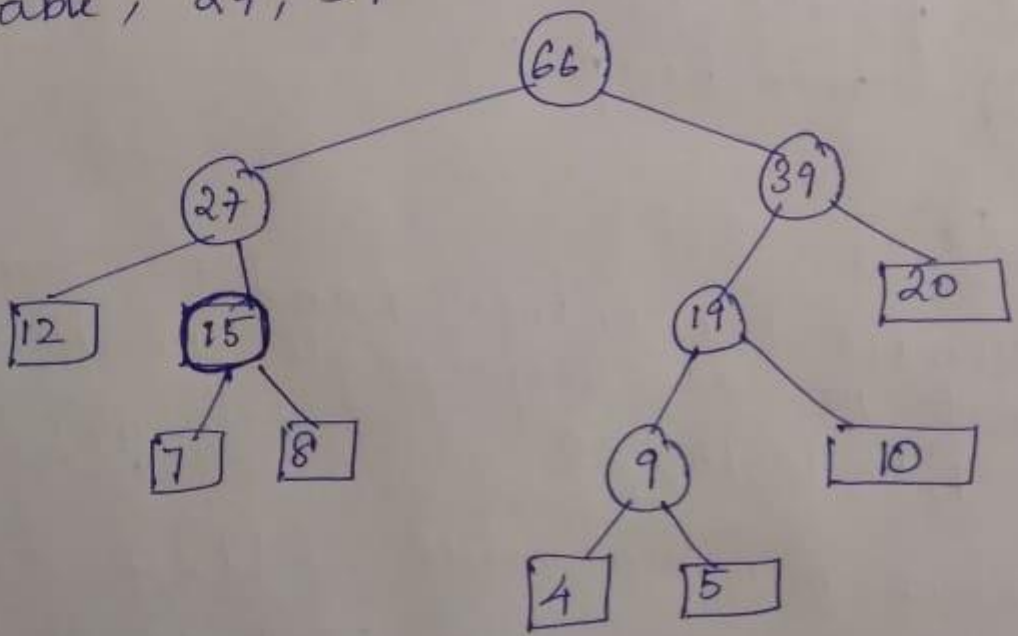


Step 6: Remove entries 15 and 12 from table, insert 27 at appropriate position

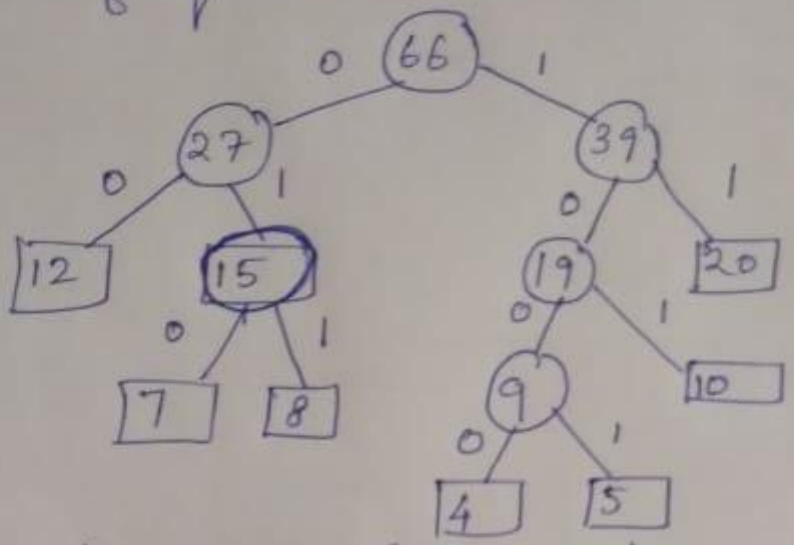
19, 20, 27



Step 7: Remove entries 19 and 20, insert 39 in table, 27, 39



Now assign left child 0, right child 1 to encode frequencies



Codes for given frequencies,

Frequencies	Codes
4	1000
5	1001
7	010
8	011
10	101
12	00
20	11

} Variable length Codeword

Huffman Encoding is not applicable for fixed length code, The character that has highest frequency will has Codeword of minimum length.

Time Complexity: Construction of minheap

∴ Complexity of minheap $O(n \log n)$

where n, is number of characters