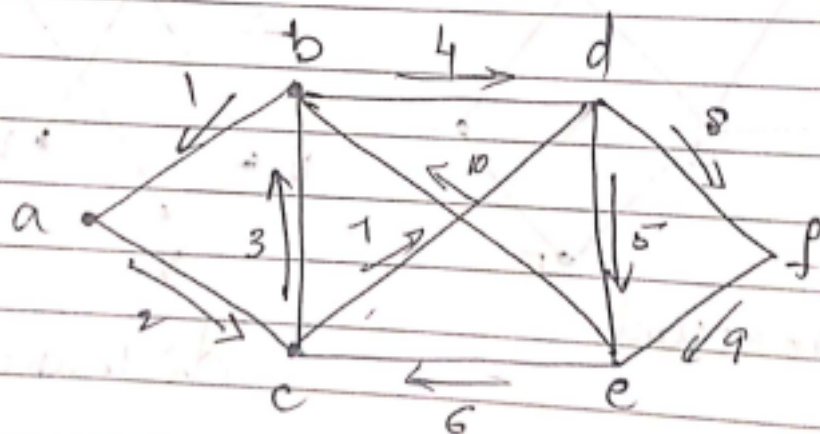
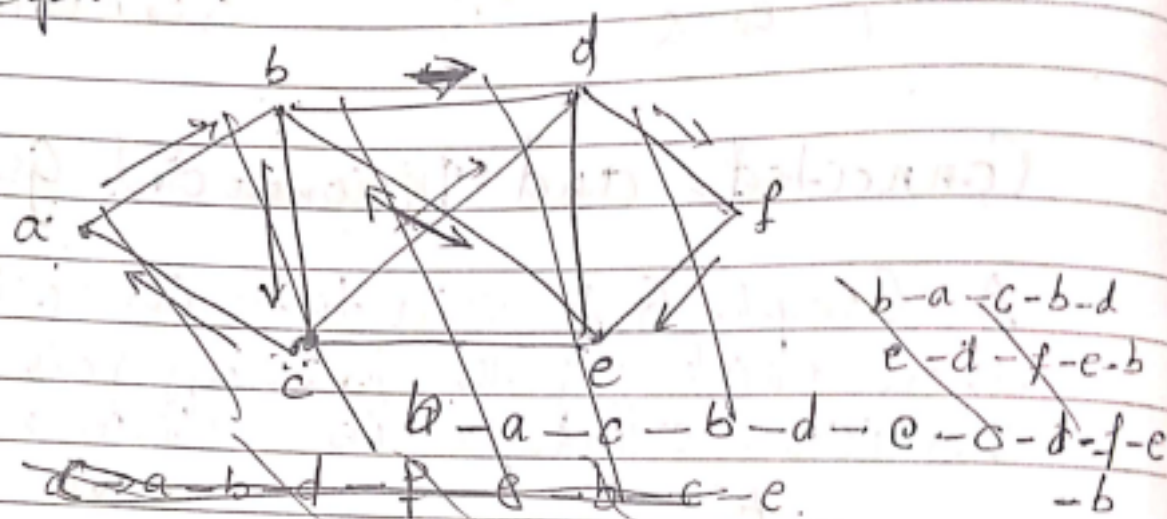


# Euler Circuit & Graph.

Euler Circuit :- A closed walk which traverses every edge of the graph only once is called Euler circuit.

Euler Circuit Graph :- A Graph  $G$  which contains Euler Circuit is called a Euler Graph.

\* Euler Graph is always a connected graph.



$b \rightarrow a \rightarrow c \rightarrow b \rightarrow d \rightarrow e \rightarrow c \rightarrow d \rightarrow f \rightarrow e \rightarrow b$

As there is Euler Circuit this is a Euler Graph.

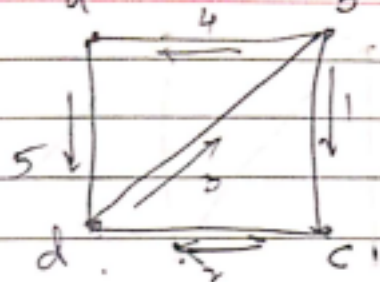
P. 8 & c



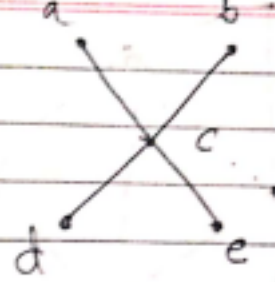
\* any graph having all the vertices degree is even then it's an Euler Graph.

\*\* If there is a vertex with odd degree then it's not an Euler graph.

Eg:-



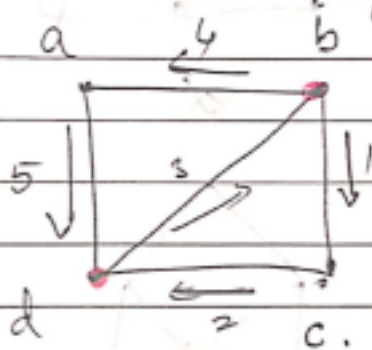
Not a Euler Graph.



Not a Euler Graph.

\* In Euler Circuit, vertex can be repeated and starting vertex & end vertex should be same.

\* In the above Graph.



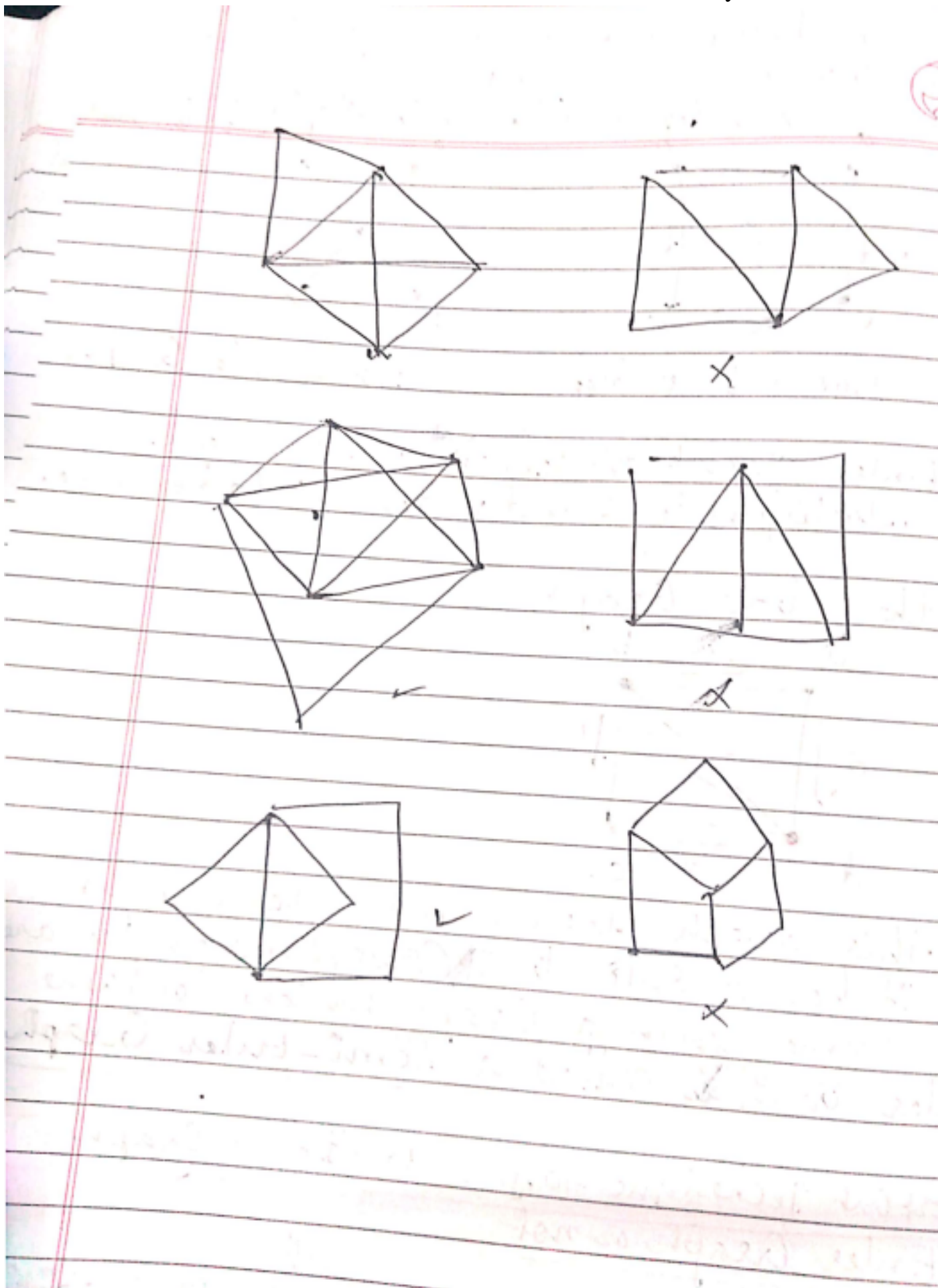
In this Graph there is not Euler Circuit but it has a Euler trail (starting & ending vertex are not same). Such a Graph which contains Euler trail is called a Semi-Euler Graph.

Shortcut Technique to find whether a Graph is Euler Graph or not

\* Graph should contain <sup>all</sup> vertices with even degree.

\* even if one vertex has odd degree then it's not Euler Graph.





## Weighted trees & prefix codes.

Weighted tree is a structure that enables us to represent and transmit info<sup>n</sup> that coded in terms of the symbols in a given alphabet.

Most often we use code, or represent character by means of strings of fixed length, or

### Different Coding Scheme :-

Common coding is called prefix code. A set  $P$  of binary sequences (represent set of symbols) is called a prefix code such that no sequence in  $P$  is prefix any other sequence  $p$ .

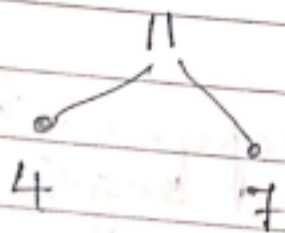
### Huffman coding Algorithm

Huffman Code or Huffman tree is a labeled tree that models a prefix code, where the frequency of occurrence of each symbol in the text is taken into account. Such that prefix code wherein the shorter sequences are used for the more frequently occurring symbols.

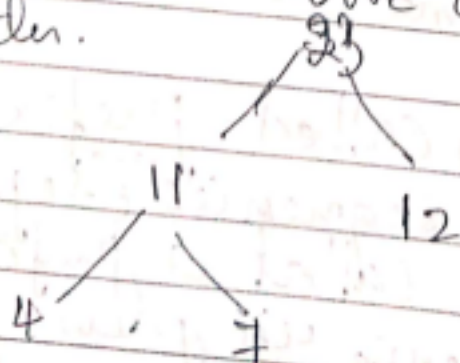
problems:-

Construct an optimal prefix code for the symbols a, o, q, u, y, z that occurs with frequencies 20, 28, 4, 17, 12, 7. respectively.

Arrange the frequencies in ascending order



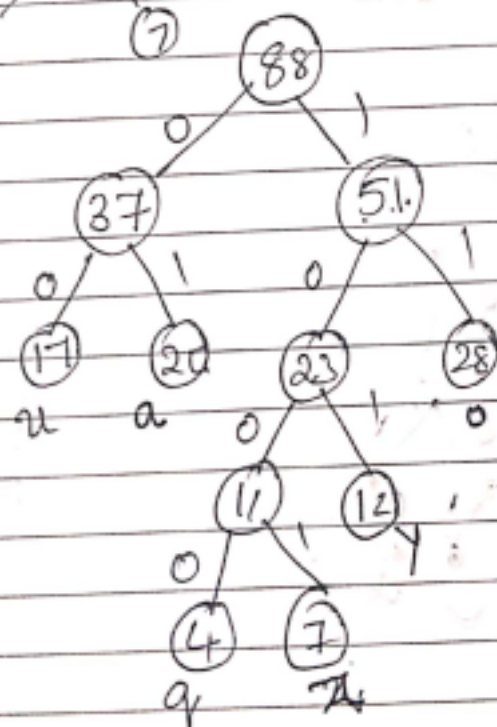
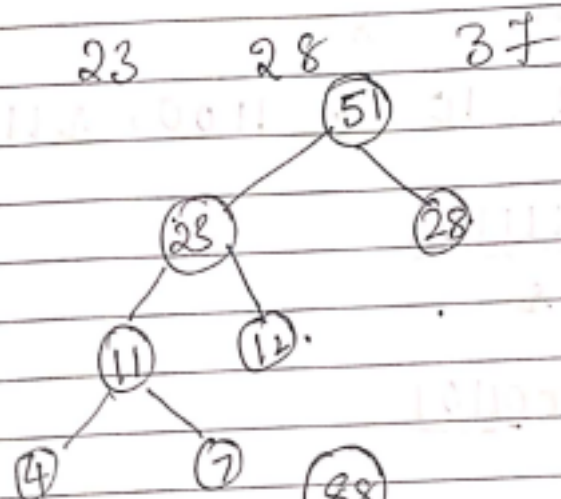
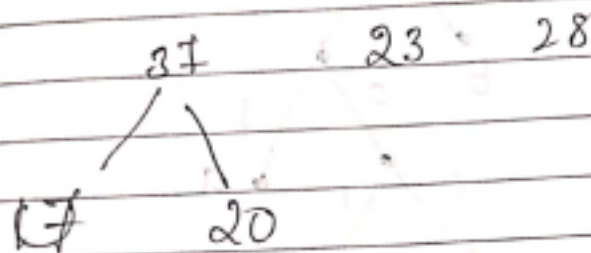
Consider the above and arrange in ascending order.







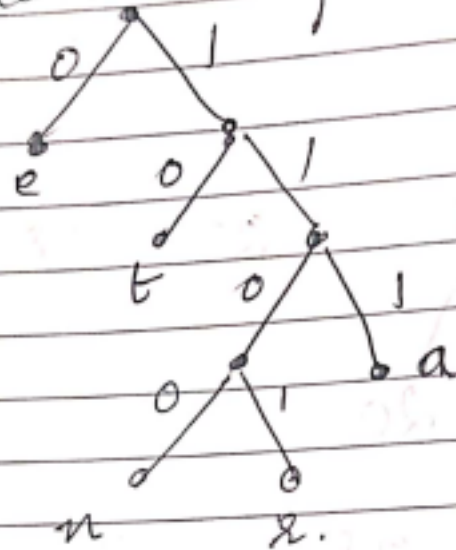
17 20 23 28



$a = 01$   $o = 11$   $q = 1000$ ,  $u = 00$   
 $y = 101$ ,  $z = 1001$



2) for the prefix code given the figure decode the sequences



$a = 111, e = 0, t = 10, n = 1100, x = 11$

decode a) 1001111101  
tear

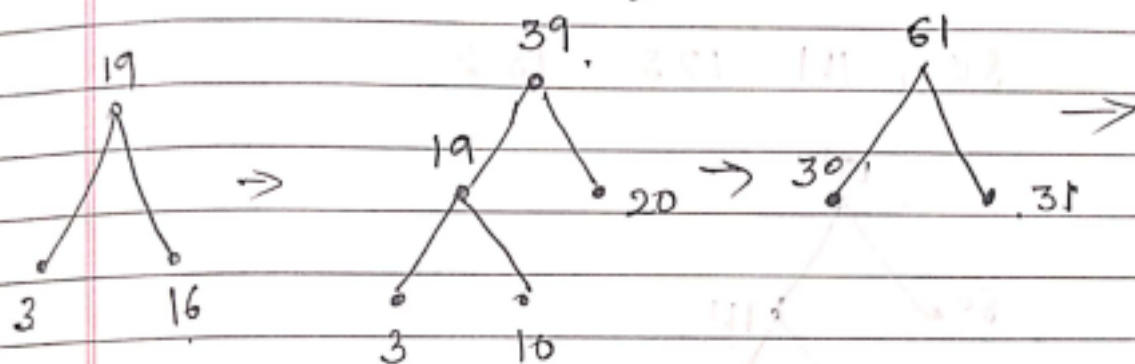
b) 10111100110001101  
takener

c) 1101111110010  
xant

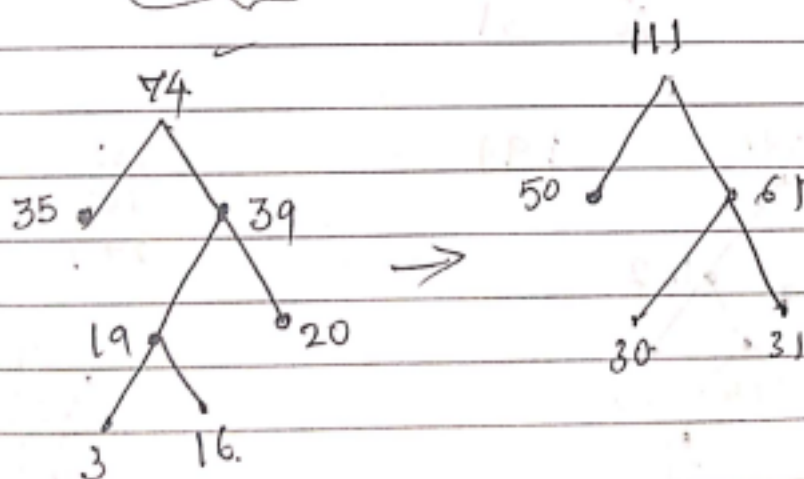
Construct an optimal prefix code for the symbols a, b, c, d, e, f, g, h, i, j that occurs with respective frequencies 78, 16, 30, 35, 125, 31, 20, 50, 80, 3

3 16 20 30 31 35 50 78 80 125

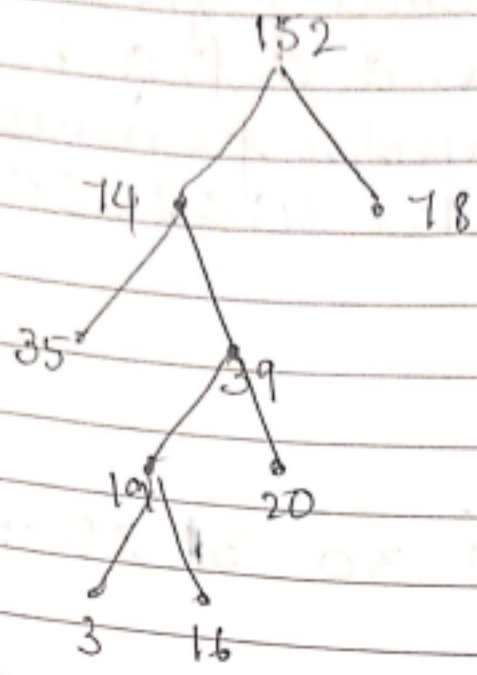
1 2 3



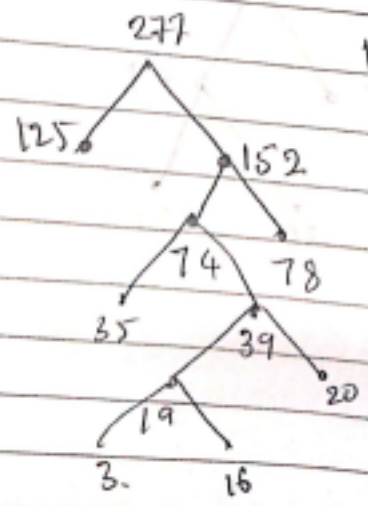
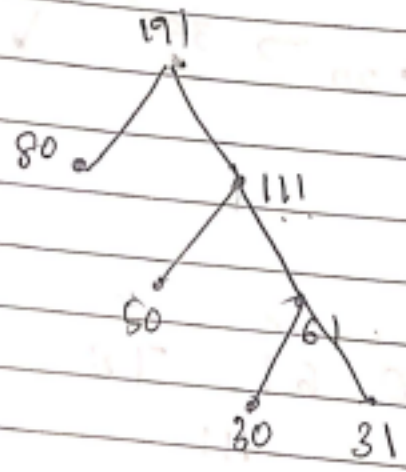
35 39 50 61 78 80 125







80, 111 125 152

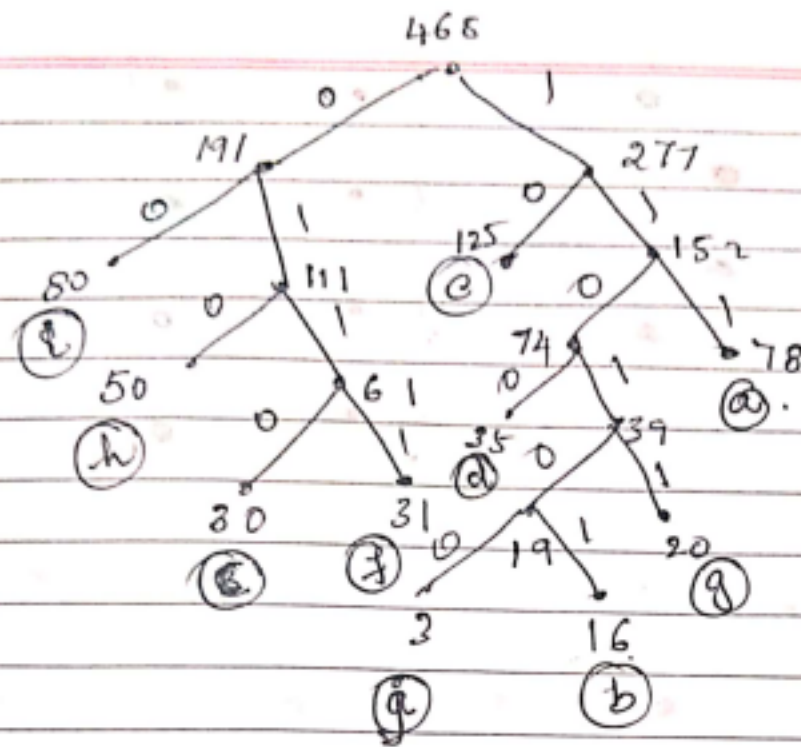


191

$$\begin{array}{r} 125 \\ 152 \\ \hline 277 \end{array}$$

$$\begin{array}{r} 277 \\ 191 \\ \hline 468 \end{array}$$





$a = 111$      $b = 110101$      $c = 0110$      $d = 1100$   
 $e = 10$      $f = 0111$      $g = 11011$      $h = 010$   
 $i = 00$      $j = 110100$

decode : 1101011110100 → bad  
           : 11001111100 → dad