Construct the Huffman Code for the following data:

symbol	A	B	C	D	_
frequency	0.35	0.1	0.2	0.2	0.15

Encode the text **DAD** and decode the text **10011011011101**

Solution:

First, we need to Construct Huffman tree by following below steps of Huffman algorithm:

Step1: Create 5- one node trees with symbol and its frequency as weight

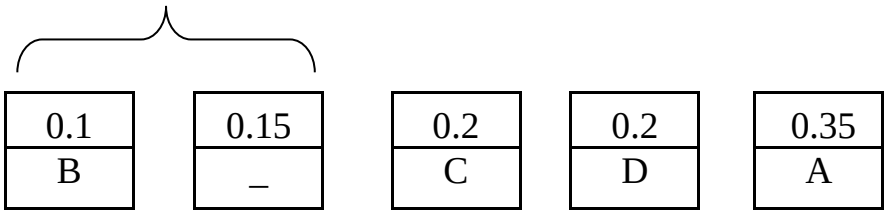
0.35	0.1	0.2	0.2	0.15
A	B	C	D	_

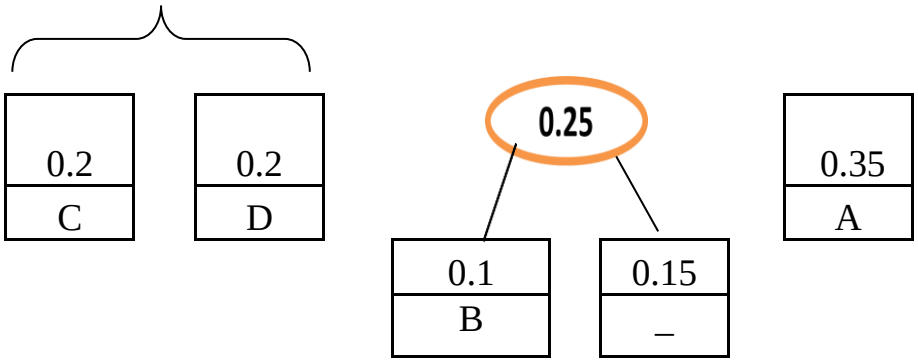
Step 2: Arrange the above nodes in ascending order of their weights

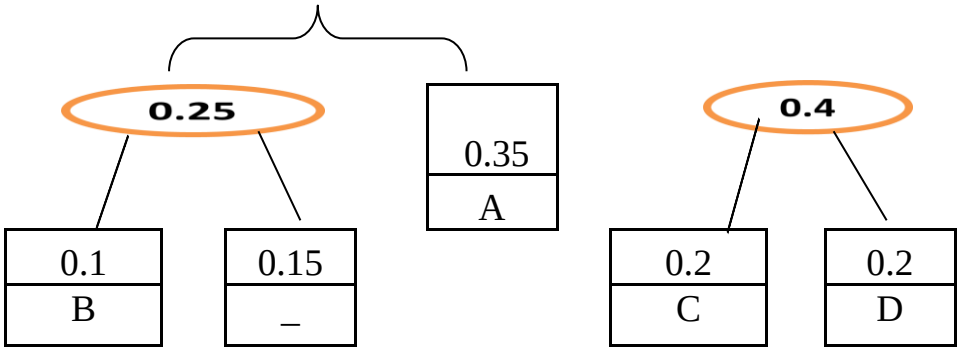
0.1	0.15	0.2	0.2	0.35
B	_	C	D	A

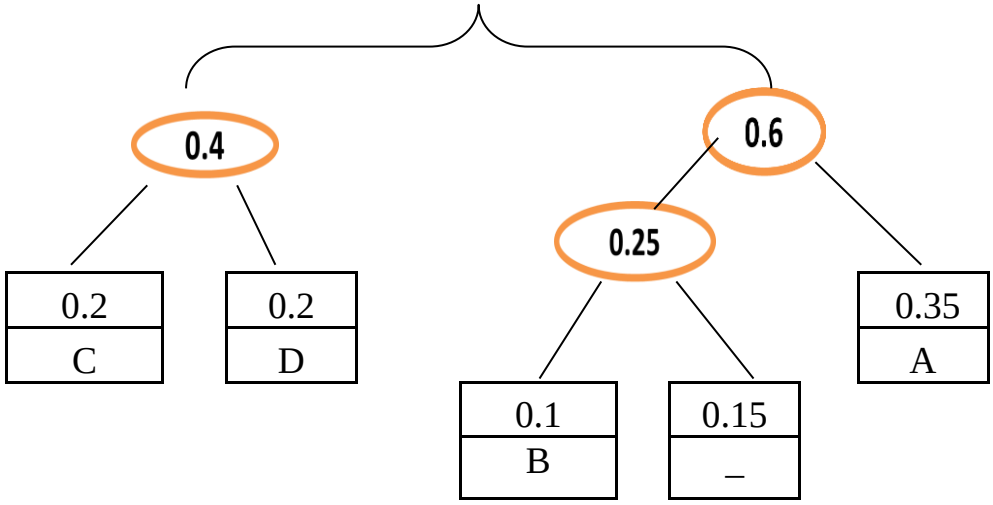
Step 3: Construct the Huffman tree by repeating the following operation until a single tree is obtained.

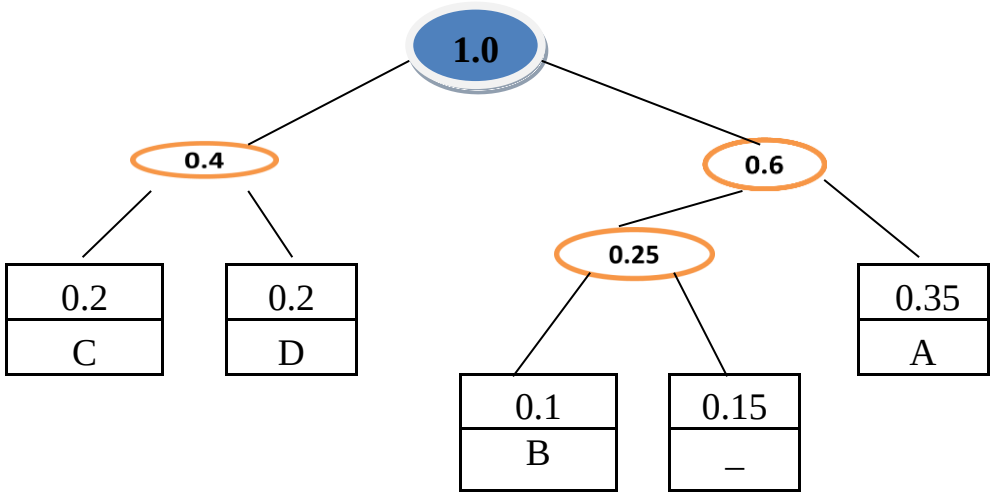
→ Find two trees with the smallest weight.
→ Make them the left and right subtree of a new tree and record the sum of their weights in the root of the new tree as its weight.
→ Rearrange the nodes again in ascending order of weights


0.1
B
0.15
_
0.2
C
0.2
D
0.35
A

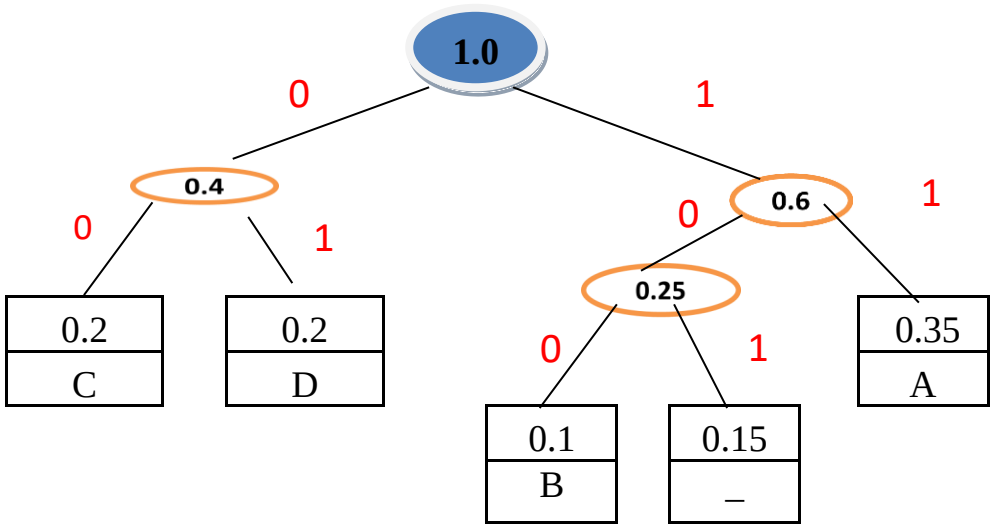

0.2
C
0.2
D
0.25
0.1
B
0.15
_
0.35
A


0.25
0.1
B
0.15
_
0.35
A
0.4
0.2
C
0.2
D


0.4
0.2
C
0.2
D
0.6
0.25
0.1
B
0.15
_
0.35
A



Now, Assign the label **0** to left edges and label **1** to right edges to the above Huffman tree to generate codeword.



✓ The codeword for the given symbol is as follows

Symbol	A	B	C	D	_
Codeword	11	100	00	01	101

✓ Encode the text **DAD**, the bit string is **011101**

- ✓ **Decode the string 10011011011101**

100	11	01	101	11	01
B	A	D	_	A	D

The text for the above string BAD_AD