Answer2) Obtain the code for SUCCESS

Step1 Probability of S → 3/7
  ,,   ,,   ,, U → 1/7
                 C → 2/7
                 E → 1/7

Total length of word = 7

Step2 Arrage symbol in decending acc.
      to probabity.

S → 3/7
C → 2/7
U → 1/7
E → 1/7

Step3 Constructing the Huffman tree
      of SUCCESS.
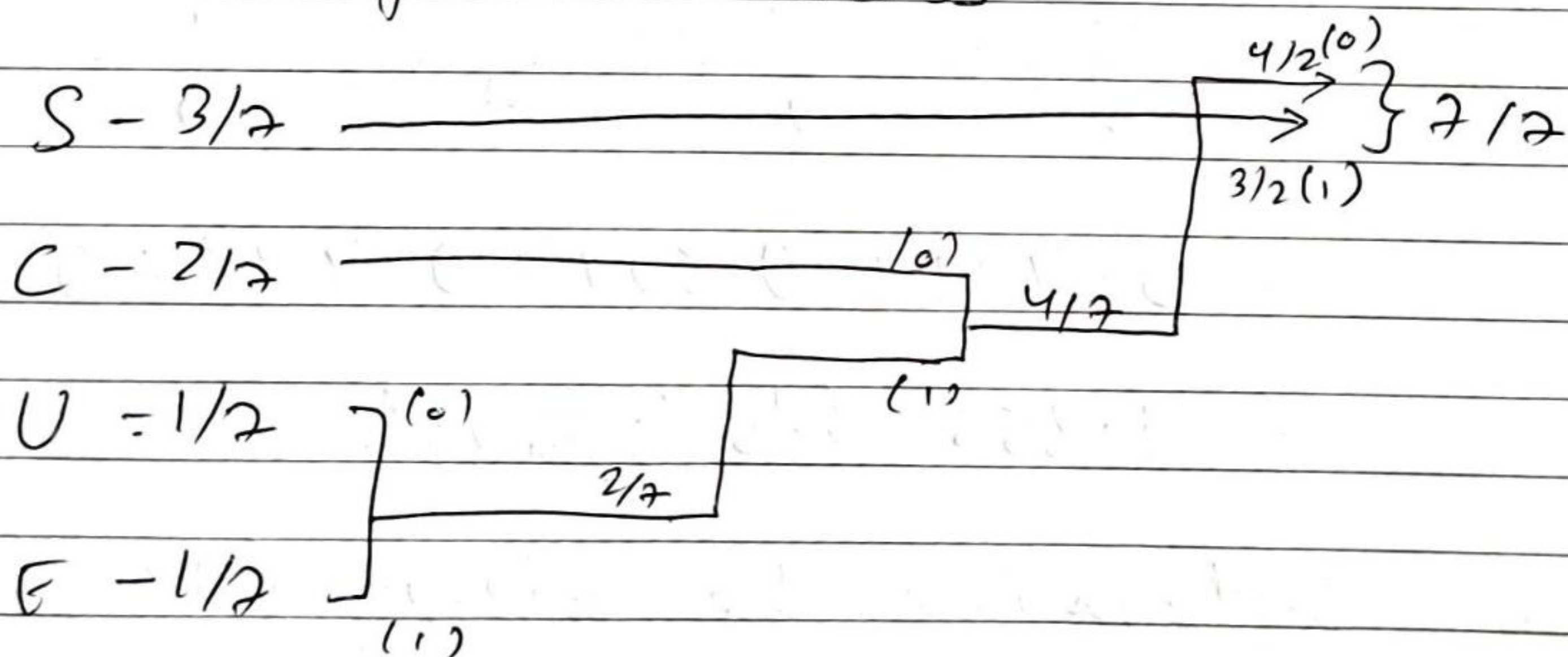
Step4: Code the word from Huffman tree

Symbol	Probability	Conduct	Word length
S	3/7	1	1
C	2/7	0 0	2
U	1/7	0 1 0	3
E	1/7	0 1 1	3

Step5: Determine the avg length

probability of Occur of Symbol

$$L = \sum_{k=0}^{N-1} P_k \, l_n$$

↳ length of each word

$$= \frac{3}{7} \times 1 + \frac{2}{7} \times 2 + \frac{1}{7} \times 3 + \frac{1}{7} \times 3$$

$$= 0.428 + 0.571 + 0.428 + 0.428$$

$$= 1.856 \ bits/symbol.$$

Step6: Determine the entropy (H(s))

$$H(S) = -\sum_{k=0}^{N-1} P_k \log_2 P_k$$

$$= \frac{-1}{0.310} \left\{ \frac{3}{7} \log_{10} \frac{3}{7} + \frac{2}{7} \log \frac{2}{7} + \right.$$

$$\frac{1}{7} \log \frac{7}{2} + \frac{1}{2} \log \frac{1}{2} \}$$

$$= \frac{-1}{0.3010} \left(\frac{3}{7}(-0.368) + \frac{2}{7}(-0.544) + \frac{1}{7}(0.845) \right.$$
$$\left. + \frac{1}{7}(-0.845) \right)$$

$$= \frac{1}{0.310} \left(0.1577 + 0.1554 + 0.1207 + 0.1207 \right)$$

$$= \frac{0.5545}{0.3010}$$

$$= 1.842.$$