SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECE351 – IMAGE PROCESSING AND COMPUTER VISION

III B.E. ECE / V SEMESTER

UNIT 3 – IMAGE COMPRESSION AND IMAGE SEGMENTATION

TOPIC – INTRODUCTION

HUFFMAN CODING

- The most popular technique for removing coding redundancy is due to Huffman (1952)
- When coding the symbols of an information source individually, Huffman coding yields the smallest possible number of code symbols per source symbol
- In terms of the noiseless coding theorem, the resulting code is optimal for a fixed value of n, subject to the constraint that the source symbols be coded one at a time

HUFFMAN CODING

The first step in Huffman's approach is

- To create a series of source reductions by ordering the probabilities of the symbols under consideration
- Combining the lowest probability symbols into a single symbol that replaces them in the next source reduction

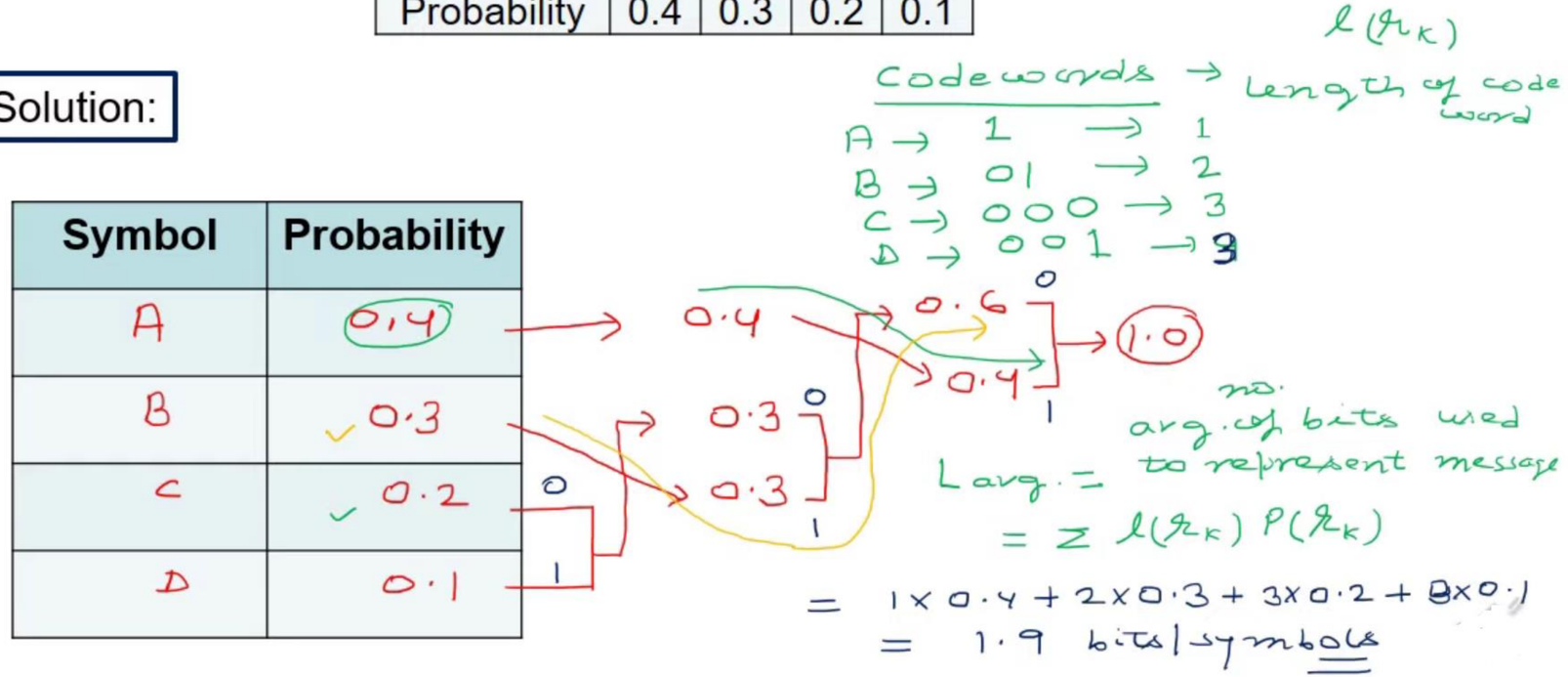
Huffman Coding

Example: Calculate the Huffman Codes for the set of symbols as shown in table.

Symbols	A	B	C	D
Probability	0.4	0.3	0.2	0.1

Solution:

Symbol	Probability
A	0.4
B	0.3
C	0.2
D	0.1



$l(x_k)$

Codewords → Length of code word

A → 1 → 1
B → 01 → 2
C → 000 → 3
D → 001 → 3

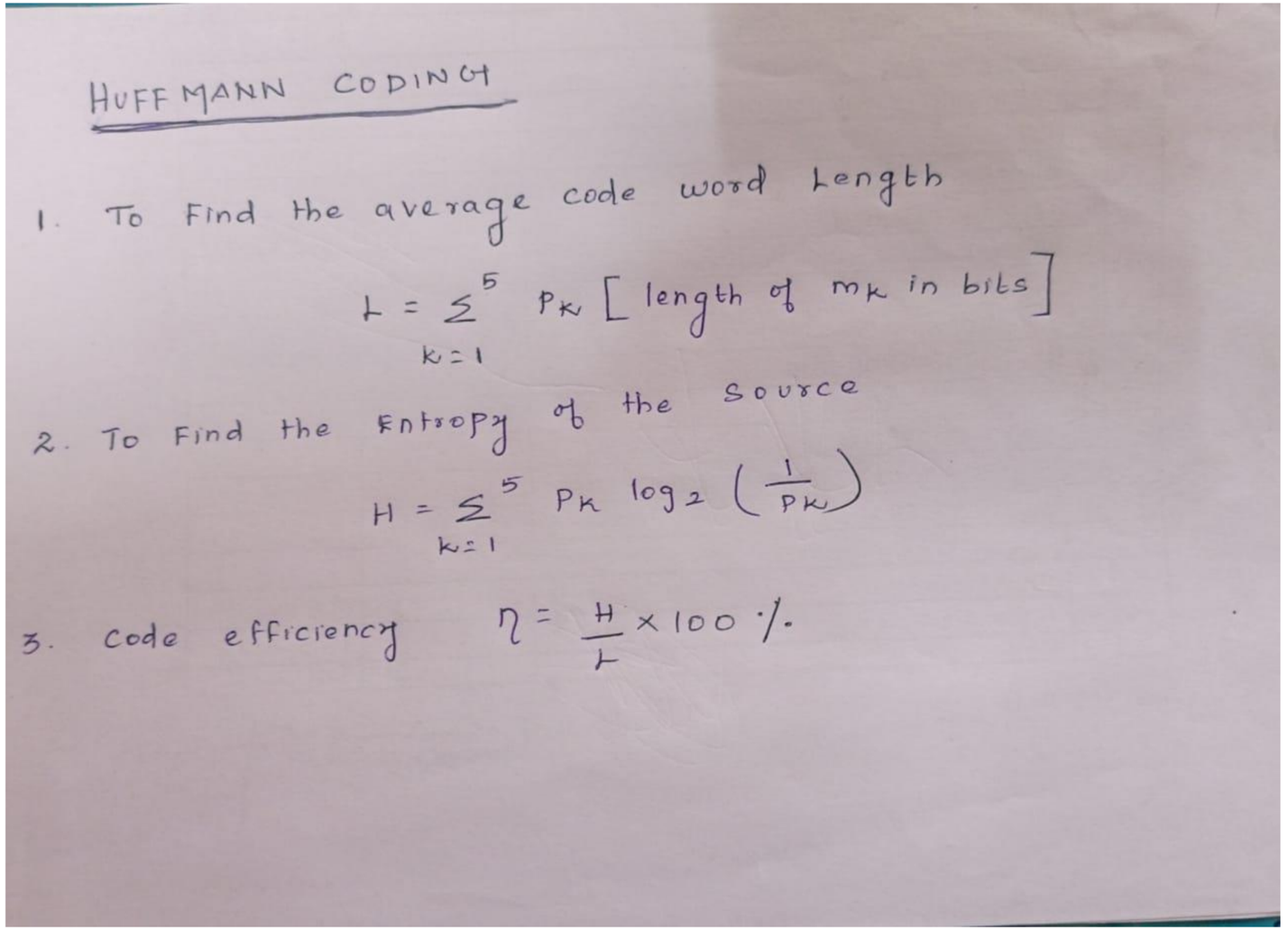
no. of bits used to represent message

$L_{avg.} = \sum l(x_k) P(x_k)$

$= 1 \times 0.4 + 2 \times 0.3 + 3 \times 0.2 + 3 \times 0.1$

$= 1.9$ bits/symbols

HUFFMAN CODING




Thank
you!