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Tutorial 3

ITL

An event has 4 possible outcomes with probability of occurrence

- Q1) Encode the message "PROOF" using arithmetic encoding
- Q2) Encode the message "banana-badadaa" using LZ4 coding
- Q3) Encode the following using run length coding.
S = 1111111111111111000000000000000000001111
Q4) Find compression ratio

Ans(2) banana - badadaa

Dictionary	Index
1	ob
2	ob
3	n
4	-
5	d
6	ba
7	an
8	na
9	ana
10	a-
11	-b
12	bad
13	da
14	ad
15	daa

The output in LZ7r encoding is
1 2 3 7 2 4 6 5 2 13 2

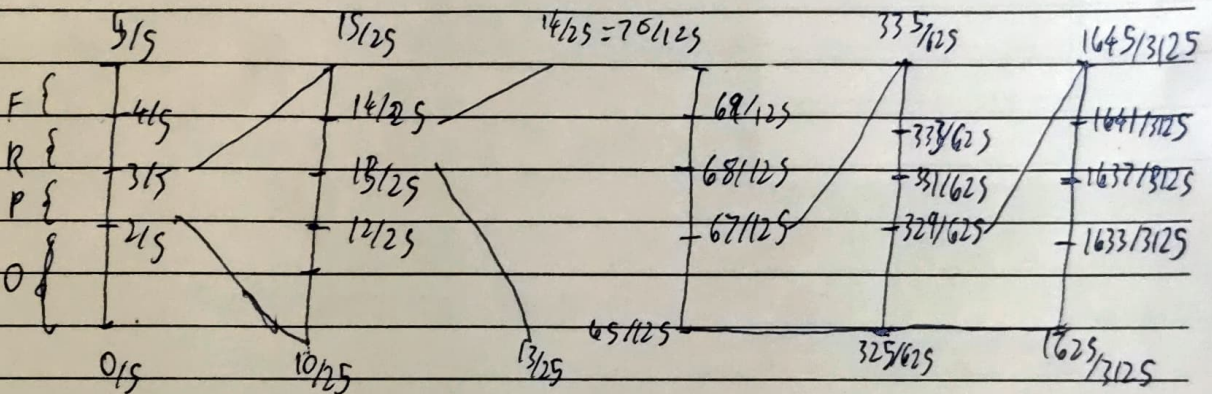
Ans Q1) "PROOF"

$$P(P) = \frac{1}{5}$$

$$P(R) = \frac{1}{5}$$

$$P(O) = \frac{2}{5}$$

$$P(F) = \frac{1}{5}$$



1645/3125, 8225/15625, 7641/1125, 8221/15625, 1637/3125, 8217/15625, 1633/3125, 8213/15625, 1625/3125, 8205/15625

within this range any number can be sent

Answer = 0.525888

1645 3125
8225 15625

Ans. Q3) $S = 11111111111111110000000000000000000000001111$

Representing in binary
 $(1111, 1), (10011, 0), (100, 1)$

total no. of bits originally = $15 + 19 + 4$
 $= 38$ bits

total no. of bits after grouping = $(4+1) + (5+1) + (3+1)$
 $= 15$ bits

compression ratio = $\frac{\text{no. of bits after grouping}}{\text{no. of bits before grouping}}$

$$= \frac{15}{38}$$

compression ratio = 0.394