

DIGITAL VIDEO CODING

TEST # 1

DATE :- 6/25/02

INSTRUCTOR :- Prof. K.R.RAO
(OPEN BOOKS & NOTES)

All problems are equally weighted.
(No solution Manual is allowed.)

1 a) Determine whether the following codes are uniquely decodable. Justify your answer.

- 1) {0,01,11,111}
- 2) {0,01,110,111}
- 3) {0,10,110,111}
- 4) {1,10,110,111}

b) Of the following codes, find which are Prefix codes. Justify your answers.

Symbol	Code 1	Code 2	Code 3	Code 4
S_0	0	0	0	00
S_1	10	01	01	01
S_2	110	001	011	10
S_3	1110	0010	110	110
S_4	1111	0010	111	111

2 Symbol Probability

S_0	0.4
S_1	0.2
S_2	0.2
S_3	0.1
S_4	0.1

- a) Find Huffman Code and get its average code length.
- b) Find Minimum Variance Huffman Code and get its average code length.
- c) Find the Redundancy.
- d) Encode the sequence: - $S_2S_1S_3S_2S_1S_2$
 Using Huffman and Minimum Variance Huffman Code.
 Now, suppose the first bit is received in error at the receiver.
 Decode using both Huffman and Minimum Variance Huffman Code.
 How many characters are received in error before the first correctly decoded character in each case?

3 Given the probability model in the following table, find the real valued tag for the Sequence

$S_1 S_1 S_3 S_2 S_3 S_1$

Letter	Probability
S_1	0.2
S_2	0.3
S_3	0.5

4 Given an initial dictionary consisting of letters "a b r y ~~ϕ~~", encode the following message using LZW algorithm: - a ~~ϕ~~ b a r ~~ϕ~~ a r r a y ~~ϕ~~ b y ~~ϕ~~ b a r r a y a r ~~ϕ~~ b a y

Index	Entry
1	a
2	b
3	r
4	y
5	ϕ