

Huffman Coding explained

For discrete source with six symbols in problem 1, the sorted probabilities are $p = \{0.3, 0.25, 0.21, 0.1, 0.09, 0.05\}$.

1) For the first part of your function, write a code to produce the following matrix based on the given probability vector.

$$m = \begin{bmatrix} 6 & 5 & 4 & 3 & 2 & 1 \\ 2 & 1 & 3 & 4 & 5 & 0 \\ 2 & 1 & 3 & 4 & 0 & 0 \\ 2 & 3 & 1 & 0 & 0 & 0 \\ 2 & 1 & 0 & 0 & 0 & 0 \end{bmatrix}$$

2) Apply this matrix to the following code (n is the length of p).

```
for i=1:n-1
    c(i,:) = blanks(n*n);
end
c(n-1,n) = '0';
c(n-1,2*n) = '1';
for i=2:n-1
    c(n-i,1:n-1) = c(n-i+1,n*(find(m(n-i+1,:) == 1)) ...
        - (n-2):n*(find(m(n-i+1,:) == 1)));
    c(n-i,n) = '0';
    c(n-i,n+1:2*n-1) = c(n-i,1:n-1);
    c(n-i,2*n) = '1';
    for j=1:i-1
        c(n-i,(j+1)*n+1:(j+2)*n) = c(n-i+1,...
            n*(find(m(n-i+1,:) == j+1)-1)+1:n*find(m(n-
i+1,:) == j+1));
    end
end
for i=1:n
    h(i,1:n) = c(1,n*(find(m(1,:) == i)-1)+1:find(m(1,:) == i)*n);
    ll(i) = length(find(abs(h(i,:)) ~ 32));
end
```

3) Answer the following:

- What is the importance of matrix m ? What does it represent? Explain.
- Explain in detail, the code snippet in section two. How does it assign codewords to each symbol?