TITLE: Arithmetic coding and decoding.

clc;

clear all;

close all;

%str='bill\_gates';

str=input('enter any string:');

u=unique(str)

l=length(str);

l1=length(u);

format short

%probability

for i=1:l1

count=0;

for j=1:l

if u(i)==str(j)

count=count+1;

end

end

p(i)=count/l;

end

cpr=cumsum(p);

cpr=[0 cpr];

interval={};

for i=1:length(p)

interval{i,1}=u(i);

interval{i,2}=cpr(i);

interval{i,3}=cpr(i+1);

interval{i,4}=p(i);

end

disp('the range and probabilities of elements are given as:');

disp('elements low interval high interval probability');

disp(interval);

%tag calculation

format long;

low=0;

high=1;

range=high-low;

a={};

for i=1:l

count=1;

for j=1:l1

if str(i)~=u(j)

count=count+1;

else

high=low+range\*interval{count,3};

low=low+range\*interval{count,2};

range=high-low;

break;

end

end

a{i,1}=str(i);

a{i,2}=low;

a{i,3}=high;

end

disp('elements low high');

disp(a);

%decoding

so='';

lo=length(so);

tag=a{l,2};

i=1;

flag=0;

while i<=l1

if tag>=interval{i,2} && tag<interval{i,3}

so=strcat(so,interval{i,1});

lo=length(so);

tag=(tag-interval{i,2})/interval{i,4};

i=1;

flag=1;

end

if flag~=1

i=i+1;

end

flag=0;

if lo==l

break;

end

end

disp('the string obtained after decoding is:');

disp(so);

OUTPUT:

enter any string:'Aardvark'

u =

Aadkrv

the range and probabilities of elements are given as:

elements low interval high interval probability

'A' [ 0] [0.1250] [0.1250]

'a' [0.1250] [0.3750] [0.2500]

'd' [0.3750] [0.5000] [0.1250]

'k' [0.5000] [0.6250] [0.1250]

'r' [0.6250] [0.8750] [0.2500]

'v' [0.8750] [ 1] [0.1250]

elements low high

'A' [ 0] [0.125000000000000]

'a' [0.015625000000000] [0.046875000000000]

'r' [0.035156250000000] [0.042968750000000]

'd' [0.038085937500000] [0.039062500000000]

'v' [0.038940429687500] [0.039062500000000]

'a' [0.038955688476563] [0.038986206054688]

'r' [0.038974761962891] [0.038982391357422]

'k' [0.038978576660156] [0.038979530334473]

the string obtained after decoding is:

Aardvark