```matlab
%Kaitlyn Kirt, CMOR220, Spring 2024, Cryptography project
%Project3.m
%This script is a project on decoding a text
%Last modified: February 12, 2024

%driver
function Project3
%upload file
disp('Original Text:')
text=fileread('encodedtext.txt');
text=strip(text);
disp(text)

%decodes original text
disp('Message:')
[message]=decoder(text,10.^5)
end

function [num]=downlow(text)
%inputs: text
%outputs: num
%description: this function swaps each character in the text with a number
num=double(text)-95; %switches from text to ASCII values then subtracts that
value by 95
end

function [text]=downlowinv(num)
%inputs: num
%outputs: text
%description: this function swaps each numerical value with a character
text=char(num+95); %adds 95 to the ASCII value then switches from values to
text
end

function [message]=decoder(text,maxiter)
%inputs: text,maxiter
%outputs: message
%description: this function tests loglike sums to find a decoding key
global letterprob
load('letterprob.mat')
M=letterprob;
y = randperm(27); %creates a random array of 27 numbers
    for i=1:maxiter %runs code 100,000 times
        ymaybe = y; %assigns random y as ymaybe
        loc=randperm(27,2); %takes to random numbers from permutation
        ymaybe(loc(2))=y(loc(1)); %swaps the value of loc(2) with loc(1)
        ymaybe(loc(1)) = y(loc(2)); %swaps the value of loc(1) with loc(2)
        if loglike(text,ymaybe,M)>loglike(text,y,M)
            y = ymaybe;
        end
    end
    message = downlowinv(y(downlow(text))); %decodes the text with best key
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    message = strrep(message,'`',' '); %changes apostrophes with spaces
end

function [value]=loglike(text,y,M)
%inputs: text,y,M
%outputs: value
%description: this function computes the value of the loglike function
value=0;
t = downlow(text); %changes text to values
    for k=1:length(text)-1 %runs code for length(text)-1 times
        value=value+log(M(y(t(k)),y(t(k+1)))); %computes value of summation
    end
end
```

Original Text:
gugyrtcgdxpwcfvdtbd`pqcowcodxpgdmtykidelxdctdtcgdxpwcfvdtbd`pqcowcodpwhvgkbdqd
hqcdwvdkwfgdqdbyq`xwtcdmptvgdclhgyqxtydwvdmpqxdpgdwvdqcidmptvgdigcthwcqxtydwvd
mpqxdpgdxpwcfvdtbdpwhvgkbdxpgdkqyogydxpgdigcthwcqxtydxpgdvhqkkgydxpgdbyq`xwtcd
mpqxdwvdwhntyxqcxdwvdctxdxpgdalqcxwxrdtbdrtlydfctmkgiogdelxdwxvdalqkwxrdrtld`q
cdfctmdhqcrdxpwcovdmwxptlxdfctmwcodxpgdhtvxdwhntyxqcx
Message:

message =

*   'everyone thinks of changing the world qut no one thinks of changing*
himself a man is like a fraction whose numerator is what he is and whose
denominator is what he thinks of himself the larger the denominator the
smaller the fraction what is important is not the buantity of your knowledge
qut its buality you can know many things without knowing the most important'

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