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function decoderdrive
%Alison Felix de Araujo Maia, CAAM 210, Fall 2015, Lab X
%decoderdrive.m
%Description: This function decode encoded messages using the
    Metropolis
%Algorithm.
for i = 1:3 %The for-loop is to make sure that all 3 messages appear
    well decoded at least once.
text1 = decoder('encodedtext1.txt');
text2 = decoder('encodedtext2.txt');
text3 = decoder('encodedtext3.txt');
disp('Text 1:');
disp(text1);
disp(' ');
disp('Text 2:');
disp(text2);
disp(' ');
disp('Text 3:');
disp(text3);
disp(' ');
end
return

function text = decoder(filename)
T = fileread(filename);
T = double(T);
for j = 1:length(T)%for-loop to change the ascii index numbers in
    numbers from 1 to 27 (a-z + space).
    T(j) = downlow(T(j));
end
y = randperm(27);%Random initial guess.
for j = 1:10000
    k1 = randi(27);
    k2 = randi(27);
    ymaybe = y;
    ymaybe([k1,k2]) = ymaybe([k2,k1]); %Here is generated the ymaybe
    by switching two random elements picked with the 'randi' function
    above.
    l1 = loglike(T, y);
    l2 = loglike(T, ymaybe);
    if l1 < l2 %Conditions to replace the first guess (y) by the new
    guess (ymaybe) based on the log-likelihood calculated above.
        y = ymaybe;
    elseif rand < exp(-l1+l2)
        y = ymaybe;
    end
end
for j = 1:length(T) %for-loop to change the numbers inside the array
    (1 through 27) back to ascii index numbers.
    T(j) = y(T(j));
    T(j) = downlowinv(T(j));
end

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text = char(T);%change the vector from ascii index numbers back to
    characters.
return

function x = downlow(n)%Function used to turn the ascii index numbers
    into numbers from 1 through 27
if n == 96
    x = 27;
else
    x = n-96;
end
return

function c = downlowinv(n)%Function used to turn the numbers from 1
    through 27 into ascii index numbers
if n == 27
    c = 32;
else
    c = n+96;
end
return

function x = loglike(T, y)%Function used to calculate the log-
    liklihood
x = 0; M = textread('letterprob.mat');
for j = 1:(length(T)-1)
    x = x + log(M(y(T(j)),y(T(j+1))));
end
return

```

Text 1:

*ever since computers there have always been ghosts in the machine  
 random segments of code that have grouped together to form unexpected  
 protocols unanticipated these free radicals engender questions of  
 free will creativity and even the nature of what we might call the  
 soul why is it that when some robots are left in darkness they will  
 seek out the light why is it that when robots are stored in an empty  
 space they will group together rather than stand alone how do we  
 explain this behavior random segments of code or is it something more  
 when does a perceptual schematic become consciousness when does a  
 difference engine become the search for truth when does a personality  
 simulation become the bitter mote of a soul*

Text 2:

*there is no strife no prejudice no national conflict in outer space  
 as yet its hazards are hostile to us all its conquest deserves the  
 best of all mankind and its opportunity for peaceful cooperation  
 many never come again but why some say the moon why choose this as  
 our goal and they may well ask why climb the highest mountain why  
 thirtyfive years ago fly the atlantic why does rice play texas we  
 choose to go to the moon we choose to go to the moon in this decade  
 and do the other things not because they are easy but because they  
 are hard because that goal will serve to organize and measure the  
 best of our energies and skills because that challenge is one that we*

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are willing to accept one we are unwilling to postpone and one which we intend to win and the others too

Text 3:

once upon a midnight dreary while i pondered weak and weary over many a quaint and curious volume of forgotten lore while i nodded nearly napping suddenly there came a tapping as of some one gently rapping rapping at my chamber door tis some visitor i muttered tapping at my chamber door only this and nothing more ah distinctly i remember it was in the bleak december and each separate dying ember wrought its ghost upon the floor eagerly i wished the morrow vainly i had sought to borrow from my books surcease of sorrow sorrow for the lost lenore for the rare and radiant maiden whom the angels name lenore nameless here for evermore and the silken sad uncertain rustling of each purple curtain thrilled me filled me with fantastic terrors never felt before so that now to still the beating of my heart i stood repeating tis some visitor entreating entrance at my chamber door some late visitor entreating entrance at my chamber door this it is and nothing more presently my soul grew stronger hesitating then no longer sir said i or madam truly your forgiveness i implore but the fact is i was napping and so gently you came rapping and so faintly you came tapping tapping at my chamber door that i scarce was sure i heard you here i opened wide the door darkness there and nothing more deep into that darkness peering long i stood there wondering fearing doubting dreaming dreams no mortal ever dared to dream before but the silence was unbroken and the darkness gave no token and the only word there spoken was the whispered word lenore this i whispered and an echo murmured back the word lenore merely this and nothing more back into the chamber turning all my soul within me burning soon again i heard a tapping somewhat louder than before surely said i surely that is something at my window lattice let me see then what thereat is and this mystery explore let my heart be still a moment and this mystery explore tis the wind and nothing more open here i flung the shutter when with many a flirt and flutter in there stepped a stately raven of the saintly days of yore not the least obeisance made he not a minute stopped or stayed he but with mien of lord or lady perched above my chamber door perched upon a bust of pallas just above my chamber door perched and sat and nothing more then this ebony bird beguiling my sad fancy into smiling by the grave and stern decorum of the countenance it wore though thy crest be shorn and shaven thou i said art sure no craven ghastly grim and ancient raven wandering from the nightly shore tell me what thy lordly name is on the nights plutonian shore quoth the raven nevermore much i marvelled this ungainly fowl to hear discourse so plainly though its answer little meaning little relevancy bore for we cannot help agreeing that no living human being ever yet was blessed with seeing bird above his chamber door bird or beast above the sculptured bust above his chamber door with such name as nevermore but the raven sitting lonely on the placid bust spoke only that one word as if his soul in that one word he did outpour nothing further then he uttered not a feather then he fluttered till i scarcely more than muttered other friends have flown before on the morrow he will leave me as my hopes have flown before then the bird said nevermore startled at the stillness broken by reply so aptly spoken doubtless said i what it

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utters is its only stock and store caught from some unhappy master  
whom unmerciful disaster followed fast and followed faster till his  
songs one burden bore till the dirges of his hope that melancholy  
burden bore of nevernevermore but the raven still beguiling all my  
sad soul into smiling straight i wheeled a cushioned seat in front  
of bird and bust and door then upon the velvet sinking i betook  
myself to linking fancy unto fancy thinking what this ominous bird  
of yore what this grim ungainly ghastly gaunt and ominous bird of  
yore meant in croaking nevermore this i sat engaged in guessing but  
no syllable expressing to the fowl whose fiery eyes now burned into  
my bosoms core this and more i sat divining with my head at ease  
reclining on the cushions velvet lining that the lamplight gloated  
oer but whose velvet violet lining with the lamplight gloating oer  
she shall press ah nevermore then methought the air grew denser  
perfumed from an unseen censer swung by seraphim whose footfalls  
tinkled on the tufted floor wretch i cried thy god hath lent thee  
by these angels he has sent thee respite respite and nepenthe from  
thy memories of lenore quaff oh quaff this kind nepenthe and forget  
this lost lenore quoth the raven nevermore prophet said i thing of  
evil prophet still if bird or devil whether tempter sent or whether  
tempest tossed thee here ashore desolate yet all undaunted on this  
desert land enchanted on this home by horror haunted tell me truly  
i implore is there is there balm in gilead tell me tell me i implore  
quoth the raven nevermore prophet said i thing of evil prophet  
still if bird or devil by that heaven that bends above us by that god  
we both adore tell this soul with sorrow laden if within the distant  
aidenn it shall clasp a sainted maiden whom the angels name lenore  
clasp a rare and radiant maiden whom the angels name lenore quoth  
the raven nevermore be that word our sign of parting bird or fiend  
i shrieked upstarting get thee back into the tempest and the nights  
plutonian shore leave no black plume as a token of that lie thy soul  
hath spoken leave my loneliness unbroken quit the bust above my  
door take thy beak from out my heart and take thy form from off my  
door quoth the raven nevermore and the raven never flitting still  
is sitting still is sitting on the pallid bust of pallas just above  
my chamber door and his eyes have all the seeming of a demons that  
is dreaming and the lamplight oer him streaming throws his shadow on  
the floor and my soul from out that shadow that lies floating on the  
floor shall be lifted nevermore

Text 1:

rkra suepr pighntras torar olkr lfblys wrre coists ue tor glpouer  
aledig srcgrets im pidr tolt olkr cainhrd ticrtora ti miag nerzhrptrd  
haitipifs neletupuhltrd torsr marr alduplfs recredra qnrstuies im  
marr buff parltukuty led rkre tor eltnar im bolt br gucot plff tor  
sinf boy us ut tolt bore sigr aiwits lar frmt ue dlaverss tory buff  
srrv int tor fucot boy us ut tolt bore aiwits lar stiard ue le rghty  
shlpr tory buff cainh ticrtora altora tole stled lfier oib di br  
rzhflue tous wrolkuia aledig srcgrets im pidr ia us ut sigrtouec giar  
bore dirs 1 hraprhtnlf sporgltup wrpigr piespuinserss bore dirs 1  
dummrarepr recuer wrpigr tor srlapo mia tanto bore dirs 1 hrasielfuty  
sugnfltuie wrpigr tor wuttra gitr im 1 sinf

Text 2:

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rsicieoteuletrcobieuleyciqaponieuleu rolu  
fenlubfonreouelaricety nie tehireortes w cpte ciesltrofierleate  
ffeortenlujaitrepitickitersievitrelbe ffed uzoupe  
upeortelyylcraurheblceyi nibafenllyic rolued uheuikicenldie  
g ouevaremshetldiet hersiedlluemshenslltiersote telacegl  
fe upersihed hemiffe tzemshenfodversiesogsitredlaur  
ouemshersocrhbokiehi cte glebfhersie rf uronemshepliteconieyf herix  
temienslltierleglerlersiedlluemienslltierleglerlersiedllueouersotepin  
pie upeplersielrsicersougteulrevin atiersihe ciei thevarevin  
atiersihe cies cpevin atiers regl femoffetickierlelclg uowie  
upedi taciarsievitrelbelaceiuicgoite upetzofftevin atiers  
rens ffiugieoteluiers remie ciemoffougerle nniyreluemie  
cieaumoffougerleyltryluie upeluiemsonsemieouriuperlemoue  
upersielrsicterll

Text 3:

once upon a midnight dreary while i pondered weak and weary over many  
a quaint and curious volume of forgotten lore while i nodded nearly  
napping suddenly there came a tapping as of some one gently rapping  
rapping at my chamber door tis some visitor i muttered tapping at my  
chamber door only this and nothing more ah distinctly i remember it  
was in the bleak december and each separate dying ember wrought its  
ghost upon the floor eagerly i wished the morrow vainly i had sought  
to borrow from my books surcease of sorrow sorrow for the lost lenore  
for the rare and radiant maiden whom the angels name lenore nameless  
here for evermore and the silken sad uncertain rustling of each  
purple curtain thrilled me filled me with fantastic terrors never  
felt before so that now to still the beating of my heart i stood  
repeating tis some visitor entreating entrance at my chamber door  
some late visitor entreating entrance at my chamber door this it is  
and nothing more presently my soul grew stronger hesitating then no  
longer sir said i or madam truly your forgiveness i implore but the  
fact is i was napping and so gently you came rapping and so faintly  
you came tapping tapping at my chamber door that i scarce was sure i  
heard you here i opened wide the door darkness there and nothing more  
deep into that darkness peering long i stood there wondering fearing  
doubting dreaming dreams no mortal ever dared to dream before but  
the silence was unbroken and the darkness gave no token and the only  
word there spoken was the whispered word lenore this i whispered  
and an echo murmured back the word lenore merely this and nothing  
more back into the chamber turning all my soul within me burning soon  
again i heard a tapping somewhat louder than before surely said i  
surely that is something at my window lattice let me see then what  
thereat is and this mystery explore let my heart be still a moment  
and this mystery explore tis the wind and nothing more open here i  
flung the shutter when with many a flirt and flutter in there stepped  
a stately raven of the saintly days of yore not the least obeisance  
made he not a minute stopped or stayed he but with mien of lord or  
lady perched above my chamber door perched upon a bust of pallas  
just above my chamber door perched and sat and nothing more then  
this ebony bird beguiling my sad fancy into smiling by the grave and  
stern decorum of the countenance it wore though thy crest be shorn  
and shaven thou i said art sure no craven ghastly grim and ancient  
raven wandering from the nightly shore tell me what thy lordly name

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is on the nights plutonian shore quoth the raven nevermore much  
i marvelled this ungainly fowl to hear discourse so plainly though  
its answer little meaning little relevancy bore for we cannot help  
agreeing that no living human being ever yet was blessed with seeing  
bird above his chamber door bird or beast above the sculptured bust  
above his chamber door with such name as nevermore but the raven  
sitting lonely on the placid bust spoke only that one word as if his  
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when does a perceptual schematic become consciousness when does a  
difference engine become the search for truth when does a personality  
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Text 2:

to m aisaelastmik aelaym quvic aelaertilerfaclekfictaiealut masyrc  
arsaw taitsaorzrmvsarm aolstif atlausarffaitsacleju stav s mx  
sato ag stalkarffadrehievarevaitsalyylmtueitwaklmay rc kufacilly  
mrtileadrewae x macld arprieagutanowasld asrwato adlleanowacolls  
atoisarsalumaplrfarevato wadrwan ffarshanowacfidgato aoipo  
stadluetrieianowatoimtwkix aw rmsarplakfwato artfreticanowavl samic  
ayfrwat brsan acolls atlaplatlato adllean acolls atlaplatlato  
adlleaieatoisav crv arevavlato alto matoiepsaeltag crus ato  
warm a rswagutag crus ato warm aormvag crus atortaplrfaniffas mx  
atlalmpreiz arevad rsum ato ag stalkaluma e mpi sarevashiffsag  
crus atortacorff ep aisale atortan arm aniffiepatlarcc ytale an arm  
aueniffiepatlaylstyle arevale anoicoan aiet evatlaniearevato alto  
msatll

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