

Exercise 4.3 (2)

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%%Exercise 4.3(2) part
pp=[8.4,1.5,2.2,4.2,11,2.2,2.0,6,7.4,0.1,1.3,4,2.4,
6.7,7.4,1.9,0.1,7.5,6.2,9.2,2.7,0.9,2.5,0.1,2,0.1];
A='a':'z';
AA=mat2cell(A,1,ones(26,1));
AAA=[];
%sort probabilities and record the index
[pp0,pindex]=sort(pp,'descend');
%generate codewords
code={'0','1','00','01','10','000','11','001','010',
'100','0000','011','101','110','0001','0010','0100',
'1000','00000','111','0011','0101','0110','1001',
'1010','1110'};
%combine symbols and codewords
for i=1:26
    AA(2,pindex(i))=cellstr([cell2mat(code(i)),'_']);
end
%expected length
Sum=0;
for i=1:26
    Sum=Sum+pp(i)*length(cell2mat(AA(2,i)));
end
Sum=Sum/100;
%expected time
time=0;
for i=1:26
    t0=2*length(find(cell2mat(AA(2,i))=='0'));
    t1=4*length(find(cell2mat(AA(2,i))=='1'));
    time=time+pp(i)/100*(t0+t1);
end
time=time+3
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Exercise 4.3 (3)

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pp=[8.4,1.5,2.2,4.2,11,2.2,2.0,6,7.4,0.1,1.3,4,2.4,
6.7,7.4,1.9,0.1,7.5,6.2,9.2,2.7,0.9,2.5,0.1,2,0.1];
Sum=0;
for i=1:26
    p=pp(i)/100;
    Sum=Sum+p*log(1/p);
end
Sum
```