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BENG 100 HW 3
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a).
function E=expectedvalue (pmf, indices)
E=sum(pmf.*indices);
end

b).
function V=variance(pmf,indices)
E=sum(pmf.*indices);
gk=(indices-E).^2;
V=sum(pmf.*gk);
end

c).
X=[.4;.2;.3;.1];
Y=[.3,.2,.3,.2;.2,.3,.2,.3;.3,.2,.3,.2;.2,.3,.2,.3];
A=X(1)*Y(1,:);
B=X(2)*Y(2,:);
C=X(3)*Y(3,:);
D=X(4)*Y(4,:);
jointPMFXY=[A;B;C;D]


d).
function [PX,PY]=marginalizeJointPMF(jointPMFXY)
j1=sum(jointPMFXY(1,:));
j2=sum(jointPMFXY(2,:));
j3=sum(jointPMFXY(3,:));
j4=sum(jointPMFXY(4,:));
PX=[j1;j2;j3;j4];
k1=sum(jointPMFXY(:,1));
k2=sum(jointPMFXY(:,2));
k3=sum(jointPMFXY(:,3));
k4=sum(jointPMFXY(:,4));
PY=[k1;k2;k3;k4];
end

e).
function PXgivenY=conditionalPMFk(jointPMFXY,k)
PY=[.27;.23;.27;.23];
PXgivenY=jointPMFXY(:,k)/PY(k);
end

function PYgivenX=conditionalPMFi(jointPMFXY,i)
PX=[0.4;0.2;0.3;0.1];
PYgivenX=jointPMFXY(:,i)./PX
end

f).
k=1;
pmf=conditionalPMFk(jointPMFXY,k);
indices=[1;2;3;4];
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varXgivenY1=variance(pmf,indices)

k=2;
pmf=conditionalPMFk(jointPMFXY,k);
EXgivenY2=expectedvalue(pmf,indices)
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