Übung 1

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1. Suppose, the following joint probability distribution is given.
   The variables are P=Payment (good/bad) , T=Term of year (summer/winter), D=Delay of a train (no/low/high), S=Strike (yes/no)

	P=g						P=b					
	T=s			T=w			T=s			T=w		
	D=n	D=l	D=h	D=n	D=l	D=h	D=n	D=l	D=h	D=n	D=l	D=h
S=y	0.001	0.002	0.005	0.001	0.002	0.005	0.01	0.05	0.1	0.01	0.05	0.1
S=n	0.25	0.05	0.001	0.25	0.05	0.001	0.02	0.01	0.001	0.02	0.01	0.001

   Questions:

   (a) What is the marginal probability distribution of D? (2 points)

   (b) What is the marginal probability distribution of T? (2 points)

   (c) Is any of the variables conditionally independent from any other variable (or set of variables) conditioned by any variable (or set of variables)? Explain your answer. (6 points)

2. Suppose, that a doctor knows that stress causes asthma with a probability of 0.05, i.e. the conditional probability of asthma conditioned by stress is P(Asthma=YES | Stress=YES) = 0.005. Suppose, that the probability of stress is P(Stress = YES) = 0.3 and the probability of asthma is P (Asthma = YES) = 0.1 . If the doctor diagnoses that the patient has asthma, what is the probability that the patient has stress as well?
   (What is P(Stress = YES | Asthma = YES) ?) (5 points)