

STA371G Homework Assignment 2

(40 Points) Please write down the NAME and EID of each group member.

Each group consists of up to three members.

Problem 1 (15 points)

Suppose that 60% of the students at UT are football fans, 10% of the students at UT are from McCombs Business School, and 80% of the McCombs students are football fans.

- (a) If we choose a student at random from UT, what is the probability that this student is a football fan from McCombs Business School?
- (b) If we choose a student at random from UT, what is the probability that this student is from McCombs Business School but *not* a football fan?
- (c) If we choose a student at random from UT, what is the probability that this student is neither a football fan nor from McCombs Business School?
- (d) If we choose a football fan student at random from UT, what is the probability that this football fan student is from McCombs Business School?
- (e) If we choose a student who is *not* from McCombs Business School at random, what is the probability for this non-McCombs student to be a football fan?

Problem 2: Freemark Abbey Winery (I) (25 points)

This problem is based on the Freemark Abbey Winery case. Please read this case carefully before answering the following questions. You should assume that Freemark Abbey Winery sells the wine in bulk (\$1 per bottle) if the storm hits and there is no mold.

- (a) The payoff table below is filled using the information given in the case. Find the optimal action with the *maximin* rule, the optimal action with the *maximax* rule.

Table 1: Payoff Table

	Storm Botrytis	Storm No Botrytis	No Storm Sugar 25%	No Storm Sugre 20%	No Storm Acidity <0.7%
Harvest Now	2.85*12 =34.2	2.85*12 =34.2	2.85*12 =34.2	2.85*12 =34.2	2.85*12 =34.2
Harvest Later	8*12*0.7 =67.2	2*12/2 =12	3.5*12 =42	3.0*12 =36	2.5*12 =30

- (b) Create a loss table and find the optimal action with the *minimax loss* criterion.

- (c) Construct a decision tree using the information given in the case.
- (d) What is the probability distribution that represents the uncertainty regarding the possible outcomes if Jaeger decides to wait to see if the storm hits (rather than harvest immediately)? What is the mean of this distribution?
- (e) What decision would you recommend to Jaeger given the information you have?
- (f) Would your decision change if the probability changes from 0.4 to 0.2 that the botrytis mold forms given that the storm hits? Why or why not?
- (g) Suppose Jaeger's utility function for x thousand dollars is

$$U(x) = 1 - e^{-\frac{x}{100}}.$$

Find the optimal action in terms of expected utility.