

Homework Assignment #6

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Instructions: This assignment is due in class on Wednesday, October 15th. You are encouraged to work together on the problems but the final write-up that you submit must be done individually.

1. In your text, *Introduction to Stochastic Processes*, by Hoel, Port, and Stone, read Sections 2.6-2.8 and solve the following exercises in Chapter 2:
 - (a) Exercise 15
 - (b) Exercise 16
 - (c) Exercise 18
 - (d) Exercise 20
 - (e) Exercise 22
 - (f) Exercise 23
2. Harry grows grapes on the outskirts of the city with the intention of starting a winery. Summer weather in his area follows a daily pattern which can be modelled as a four-state Markov chain with states 0 (sunny, clear), 1 (cool, muggy), 2 (gray, dreary), and 3 (raining). The transition probability matrix for this chain is

$$\begin{bmatrix} .4 & .2 & .1 & .3 \\ .4 & .3 & .2 & .1 \\ .6 & .1 & .1 & .2 \\ .2 & .4 & .3 & .1 \end{bmatrix}.$$

It is now gray and dreary. The grapes are not quite ready for picking. Another sunny spell would bring them to perfection but rain would ruin them. Harry must decide whether to pick somewhat immature grapes or risk waiting for a sunny spell.

- (a) To help him decide, compute the probability that a sunny day will occur before rain.
- (b) What is the long run proportion of days which are gray and dreary?