Final Exam

Your name:

Problem 1

Find $\mathbf{P}^{100}$, where $\mathbf{P}$ is given as below.[10pts]

$$\mathbf{P} = \begin{bmatrix} .7 & .3 & 0 & 0 \\ .5 & .5 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & .5 & .5 \end{bmatrix}$$
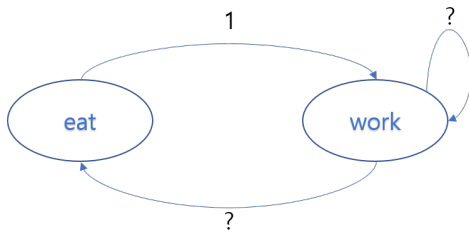
Problem 2

Markov property는 stochastic process의 future evolution이 present state에만 dependent한다는 성질이다. 만약에 future evolution이 present 뿐만 아니라 past에도 dependent하는 경우에는 어떤 방식으로 Markov property가 적용될 수 있도록 모델링해야 하는가? [10pts]

Problem 3

Consider a DTMC whose transition diagram is given as below. Transition occurs in every hour.
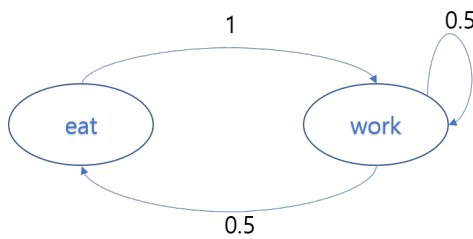

Write its transition matrix so that this person regulary eat 30% of her time and work 70% of her time.[10pts]

Problem 4

Consider a DTMC whose transition diagram is given as below. Transition occurs in every hour.

For every hour she eats, she spends 10$. For every hour she work, she earns 10$. If her hourly interest rate is .9. Then, what is her discounted sum of reward for infinite time horizon? Set up a Bellman equation and solve it. (If you are unsure of how to invert a matrix, then you can look up online.)[20pts]

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"Exams are formiddable even for the best prepared, for the greatest fool may ask more than the wisest man can answer. - Charles Caleb Colton"