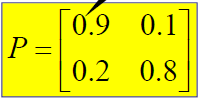
**[201533661 이승수’s Machine Learning Homework#8]**

If Given that 90% of person who purchase Coke will buy Coke again and 80% of those who purchase Pepsi buy Pepsi again.

We will regard Coke as 0 and Pepsi as 1, then we can get probability matrix P as below.



**Q1. Given that a person is currently a Pepsi purchaser, what is the probability that she will purchase Coke two purchases from now?**

A1) P(Pepsi->Coke)\*P(Coke->Pepsi)=P10\*P00=0.2\*0.9=0.18

**Q2. Given that a person is currently a Coke drinker, what is the probability that she will purchase Pepsi three purchases from now?**

A2) P(Coke->Pepsi)\*P(Pepsi->Pepsi)\* P(Pepsi->Pepsi)=P01\*P11\*P11=0.1\*0.8\*0.8=0.064

**Q3. Assume each person makes one cola purchase per week. Suppose 60% of all people now drink Coke, and 40% drink Pepsi.**

**What fraction of people will be drinking Coke three weeks from now?**

A3) Let (Q0,Q1)=(0.6,0.4) be the initial probabilities. We want to find P(X3=0).

P^3= [0.781 0.219

0.438 0.562]

If people drink Coke now, fraction of people drinking Coke three weeks from now is

0.6\*P^3(00)=0.6\*0.781=0.4686

If people drink Pepsi now, fraction of people drinking Coke three weeks from now is

0.4\*P^3(10)=0.4\*0.438=0.1752

Fraction=0.4686+0.1752=about 0.6xx.