

## Some Practical Problems that STAT 270 can solve

1. If all teams in a certain league have the same chance of winning any game, how much variation in the league standings would we still expect to see? How can we tell if a team at the top of the league is really better than a team at the bottom?
2. How much can an airline overbook a flight and still avoid paying penalties to unsatisfied customers so they will give up their reservation? What is the optimal overbooking rate?
3. How do auto insurance companies set premiums that clients are willing to pay and yet will still provide a profit each year?
4. If I get a B average on each component of my course, will I get a B average for the course? (Assume each letter grade is assigned to a certain proportion of students.) (NO)
5. How many lottery tickets would I have to buy to have a reasonable chance of winning a major prize? If I buy this many tickets in several lotteries, will I profit from the exercise? (NOT likely)
6. A portfolio of stocks has the property that the future price of one stock is not much correlated with the future price of the other stocks (i.e. a diversified portfolio). If each stock has a better than even chance of losing money over the next year, is it possible that the portfolio will make a profit with high probability? (YES)
7. If I measure my car's gas consumption rate at each fill-up over a five year period, would there be any pattern to the series? (YES)
8. In golf I tend to hit a bad shot one fifth of the time. Without any "bad" shots I hit par. What is the chance that I can par the next two holes, where one is par 3 and the next one is par 4?
9. In a certain tourist area, destructive earthquakes occur at an average rate of one every three years. If I am assigned to be hotel manager in the area for a six month term, what is my chance of experiencing such an earthquake?
10. My drive to SFU can be either of two routes. It is difficult to determine which route is faster since there are so many factors that change day-to-day. How can I determine which route is faster?
11. My doctor says my blood pressure is 30 mmHg too high, based on his measurement at my annual check-up. But he admits that the measurement error is typically about  $\pm 20$  mm Hg, I want to believe that my blood pressure is normal – is my hope unreasonable in view of the data? (NO)

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