STA 198F, Fall 2020: Probabilities Everywhere – Week 1

Student Introductions: Each student please tell us the following information:

    1. Your surname (for attendance).

    2. Your usual first name (what I should call you).

    3. Where you are from.

    4. Where you are currently living (on campus, or in Toronto, or . . .).

    5. The math/stat course(s) you took in Grade 12.

    6. The math/stat course(s) you are taking this year (if any).

    7. Your intended field of study (if known).

    8. One hobby or interesting fact about yourself.

    9. One of your favourite foods.

Small Groups assignment:

You will be randomly assigned to a Breakout Room. (Please take not of your room number.) Introduce yourselves to each other. Find out each group member's name, and two facts about them.

Then, take some <u>NOTES</u> while all of you, discussing together as a group, answer the following questions as best as you can.

Note: It is okay if you're not sure of all the answers; just give your best guess and your reasons. Do <u>not</u> look anything up on the internet! We will discuss the answers later.

    1. Suppose you select a random twelve-digit number (like "553247562811"), and do a World Wide Web search in Google. Out of the hundreds of billions of Web pages around the world, about how many do you think will contain your number?

    2. Rank the following events, from most probable to least probable:
A. Your next choice of seven numbers will win the Lotto Max lottery jackpot.
B. The next time you drive across town, you will die in a traffic accident.
C. The next time you play poker, your first five cards will make a Royal Flush.
D. If you select a Canadian resident uniformly at random, you will choose the current Prime Minister.

    3. Rank the following causes of death in Canada, from most to least frequent:
A. Being murdered by a stranger.
B. Being murdered by your spouse.
C. Drowning.
D. Dying in an automobile accident.

    4. When I was a child and played basketball with my father, I would ALWAYS

score my last shot of the day. How was I able to achieve this? To what extent did this prove I was a great basketball player? What general lessons can we learn from this?

5. List some ways in which you have encountered randomness / uncertainty / probabilities / luck in your lives. (Try to come up with at least six in total, and provide some <u>details</u> about how you were affected.)

6. Think of a Yes-Or-No question that would be interesting to poll students about, i.e. that you would be curious to know what percentage of students would answer "Yes". (Try to come up with the most interesting question that you can.)

Polling Challenge:

Visit the sampling web page corresponding to your group's breakout room number: if you are in room 1 then go to `http://probability.ca/sample1` , or if you are in room 2 then go to `http://probability.ca/sample2` , etc.

Each time you <u>reload</u> that web page, you will get a fresh "response", that you should pretend is a student answering your above Yes-Or-No question. You may reload the page as many times as you like, to get fresh answers. Keep track of the total number of samples you took, and how many Yes answers you got.

Then, with your group, come up with an interval of possible values for what you think is the true probability of getting a Yes response. For example, you could write "70% to 80%", or "22.6% to 23.3%", etc. Your goal is to have the SMALLEST possible range which still DOES contain their true probability value. (Results will be announced next week.)

Final Discussion:

How confident are you that your group's interval from the class's polling challenge actually contains the true answer? Explain your reasons. How would additional samples affect your opinion? And, what upcoming event on November 3 will inspire lots of polls?

Homework assignment (upload to Quercus by 2:30 PM before the next class):

Buy the <u>textbook</u> (either hardcopy or electronic), and read Chapter 1 (pages 1–6). Make a brief point-form list of the 3–4 different kinds of randomness, among those mentioned in the chapter, that you found the most interesting (and why). Also, list 2–3 kinds of randomness (whether mentioned in the chapter or not) that have personally affected you in some way (and explain how). <u>Upload</u> a copy of your answers on the course's <u>Quercus</u> page's "Assignments" tab, any time before 2:30 PM on the day of next week's class. (If you have trouble uploading it, then you may <u>email</u> it to the professor instead.) Then, we will discuss your answers as a group in next week's class.