Part 2 – Experiment and metrics design

1. What would you choose as the key measure of success of this experiment in encouraging driver partners to serve both cities, and why would you choose this metric?

   I would use the **average number of drivers using the toll bridge over a set period of time** as the key measure of success. I will compare this key measure before and after the toll reimbursement implementation, if the average number of drivers is significantly larger after the toll reimbursement, then we can say that the toll reimbursement strategy is successful.

2. Describe a practical experiment you would design to compare the effectiveness of the proposed change in relation to the key measure of success. Please provide details on:
   a. How you will implement the experiment

      I will measure the number of drivers using the toll bridge over a week and calculate a daily average. For the following week, I will implement the toll reimbursement strategy and measure the number of drivers using the toll bridge and calculate a daily average as before. I will compare these two values and test for statistical significance in order to draw a conclusion.

   b. What statistical test(s) you will conduct to verify the significance of the observation

      I will use a one tail z-test to verify the significance of the observation. My hypothesis will be as below:

      μ_0 : Average number of drivers using toll bridge before reimbursement implementation

      μ_1 : Average number of drivers using toll bridge after reimbursement implementation

      H0: $\mu_0 = \mu_1$

      The average number of drivers using the toll bridge is the same before and after reimbursement implementation

      H1: $\mu_1 > \mu_0$

      The average number of drivers using the toll bridge after the reimbursement implementation is larger than before.

   c. How you would interpret the results and provide recommendations to the city operations team along with any caveats

      If the p-value of the test is < 0.05, we can reject the null hypothesis and say that the toll reimbursement strategy has succeeded. If this is the case, I would recommend an analysis on toll reimbursement costs to determine if Ultimate is still profiting after reimbursing all the toll costs. If further analysis suggests that Ultimate is still profiting, I recommend the city operations team to permanently implement the toll reimbursement strategy. If the p-value of the test is above 0.05, I would suggest the city operations team to look for another strategy.