**CS590 DSP: Data Security and Privacy** **Spring 2022**

# Homework #4

**Due date & time:** 11:59pm on March 25, 2022. Please hand in your homework on Brightspace.

**Late Policy:** You have three extra days in total for all your homeworks and projects. Any portion of a day used counts as one day; that is, you have to use integer number of late days each time. If you exhaust your three late days, any late homework won't be graded.

**Submission Instructions:** (1) This assignment has some programming tasks. The submitted homework must be a Jupyter notebook file with your code/answers filled in.

**Tasks:** This homework consists of implementing Exponential mechanism, Gaussian mechanism and LDP frequency oracles.

**Where to get the assignment?** You can download the Jupyter Notebook from https://github.com/SkinfaxiL/public_CS590DSP/blob/main/clean_dp_hw2.ipynb. Notice that we are using Python3 in this course.

**How to do the assignment?** This assignment consists of programming tasks and some questions to answer.

1. Fill in the missing code in the code block (usually commented with "`# YOUR CODE HERE`") with specific requirements, and modify the return values of the functions if needed. You need to make sure your code is correct without execution errors. Run your code in the notebook and show the results.
2. Type your answers to the questions and create markdown blocks in the notebook if needed. Markdown supports most of the math expression functions similarly to latex.