# Homework 1: Firebase

## DSCI 551 – Fall 2023

## Due: 11:59pm, September 15, 2023

## Points: 100

In this homework assignment, you are asked to create an app for managing courses. You are required to use Firebase real-time database to store and manage the data of the app. The database should store the following information about students, instructors, courses, and their relationships.

* Student: id (e.g., “s100”), name (e.g., “John Smith”), and program (e.g., “Applied Data Science”).
* Instructor: id (e.g., “i100”), name (e.g., “Bill Gates”), and department (e.g., "Computer Science”).
* Course: number (e.g., “DSCI 551”), title (e.g., “Foundations of Data Management”), and semester (e.g., “Fall 2023”).
* Relationships: students **take** courses, and instructors **teach** courses.

Please complete the following tasks.

1. [50 points] Write the following Python programs for adding data into the database:
   1. add\_student.py:

Execution format: python3 add\_student.py “s100” “John Smith” “Applied Data Science”

* 1. add\_instructor.py:

Execution format: python3 add\_instructor.py “i100” “Bill Gate” “Computer Science”

* 1. add\_course.py:

Execution format: python3 add\_course.py “DSCI 551” “Foundations of Data Management” “Fall 2023”

python3 add\_course.py "FBE 310" "Business Statistics" "Summer 2023"

python3 add\_course.py "DSCI 551" "Foundations of Data Management" "Fall 2023"

* 1. take\_course.py: which student takes which course in which semester. Note that your program needs to check the validity of input. That is, student id, course number, and semester indeed exist in the database. Report an error otherwise.

Execution format: python3 take\_course.py “s100” “DSCI 551” “Fall 2023”.

python3 take\_course.py "s100" "DSCI 551" "Fall 2023"

Do we need to check if the course number and semester correspond to each other?

* 1. teach\_course.py, which instructor teaches which course in which semester. Similarly, you need to check the validity of input based on the data in your database; and report error otherwise.

Execution format: python3 teach\_course.py “i100” “DSCI 551” “Fall 2023”

If semester exist for different course number?

1. [50 points] Write Python programs for the following queries.
   1. [25 points] find\_student\_courses.py: it takes a student id and returns student name and a list of courses taken by the student. For each course, report its course number and semester when the course was offered. Return the output as a JSON object.

Execution format: python3 find\_student\_courses.py “s100”.

Note that your program can only submit one request to Firebase server, and its response should contain only the information about the given student.

* 1. [25 points] find\_instructor\_courses.py: it takes an instructor id and returns **instructor** name and a list of courses **taught** by the student. For each course, report its course number and semester when the course was offered. Return the output as a JSON object.  
       
     Execution format: python3 find\_instructor\_courses.py “i100”.

Note that your program can only submit one request to Firebase server, and its response should contain only the information about the given instructor.

Permitted libraries: requests, json, sys, pandas.

Submission Instructions:

1. Please submit 7 .py files, no .ipynb files
2. Please do not submit any other files except the 7 .py files
3. If your code does not run, you will get 0 points
4. Please use one firebase url at the top of your work in every .py file.