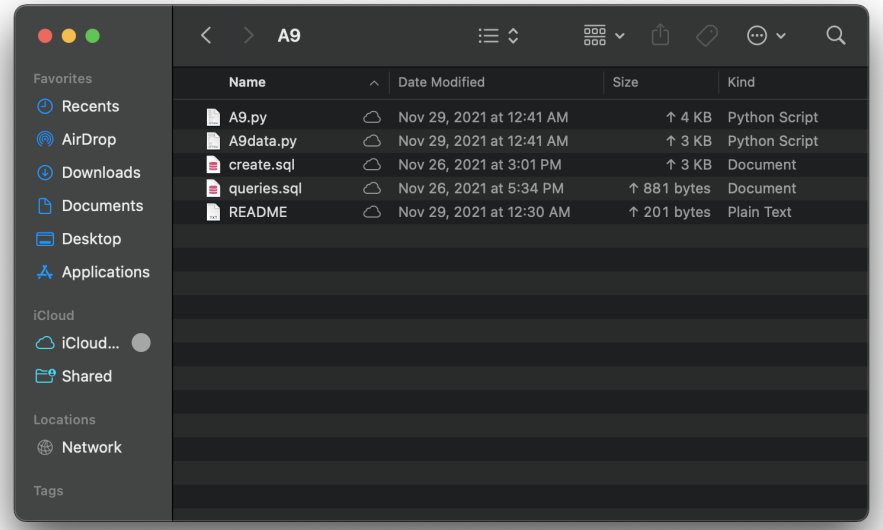
Installation instructions

1. Follow steps 1, 3, and 4 from the Oracle Knowledge Base to install all dependencies needed to run the database UI. Choose your operating system from the top tabs.
    a. For step 1, follow the instructions for **"if you already have a database but it is on a remote computer"** in order to install Oracle Instant Client.

2. Extract A9.zip into the desired location. The zip should contain the following files:

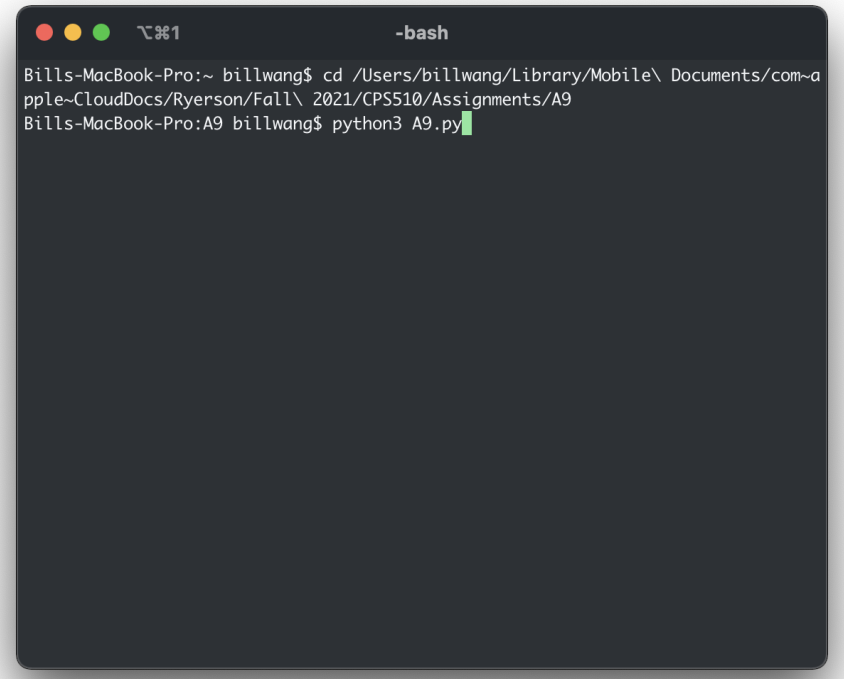


How to use

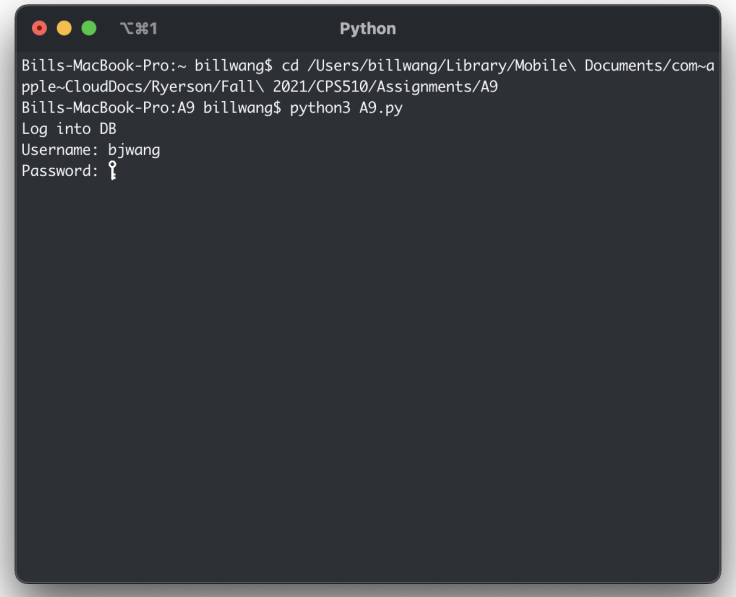
The following instructions are based on use on macOS.

Before use, please ensure that you have access and are connected to the Ryerson DCS VPN network. More information on how to connect to the VPN can be found on the CPS510 course shell on D2L.

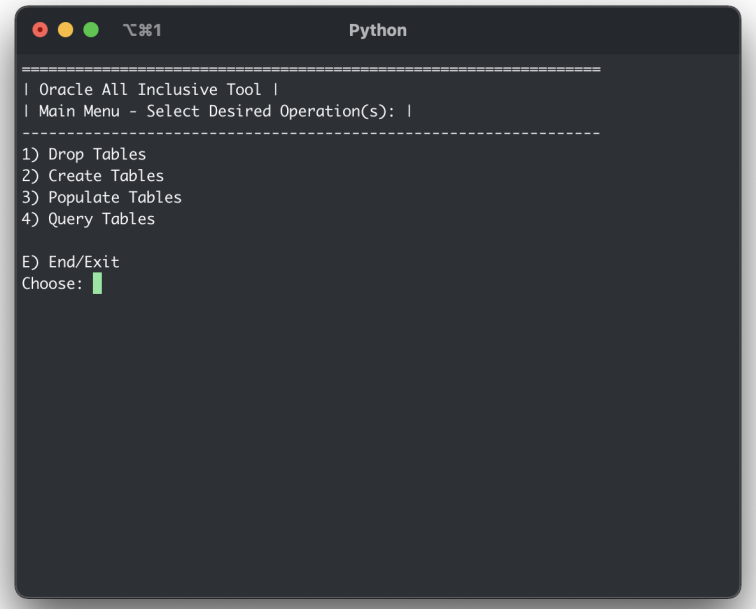
Once you have followed the installation instructions, ensure that you are situated in the directory where you have extracted the application files. Then, run the database application in a terminal window by typing in "`python A9.py`". Depending on your operating system or Python installation, you may need to use "`python3`" instead of "`python`".



On start, the application will prompt for your CS username and password in order to connect to the Ryerson Oracle 11g database:

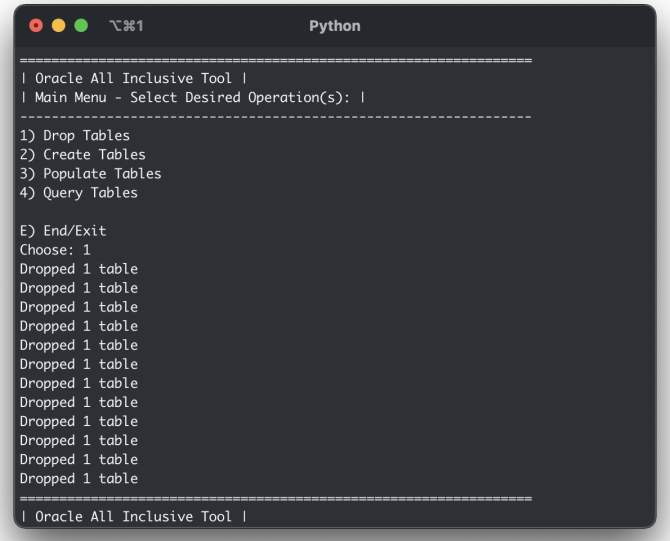


Once connected, the application will give options to interact with the database:



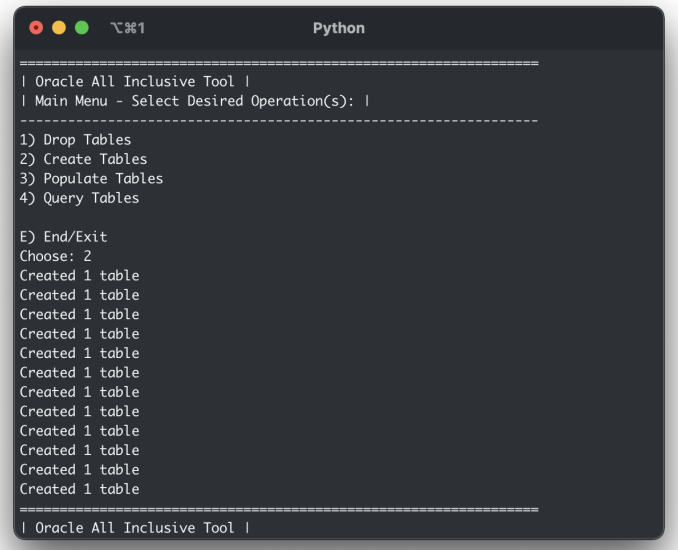
Each option can be selected by typing the corresponding letter and pressing Enter. The options are described as follows:

1) Drop tables
Drops all tables from the current database.

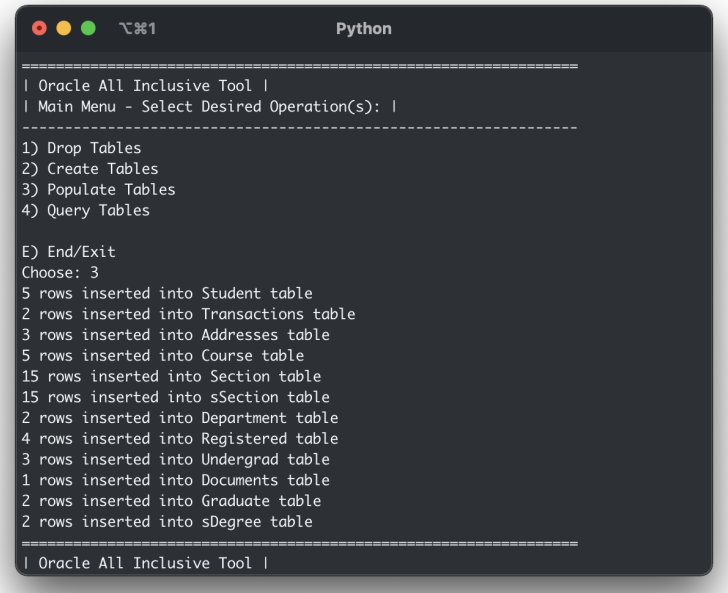


2) Create tables

Creates all tables necessary for the functioning of the university online student registration system.

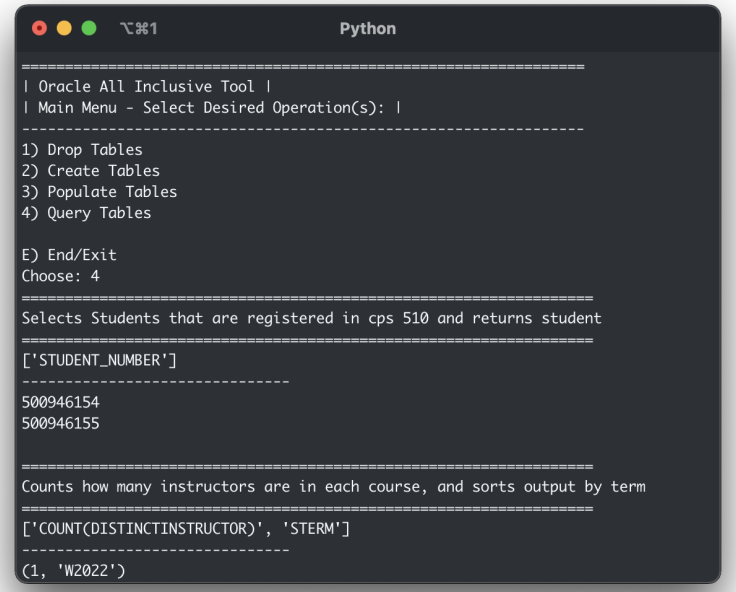


3) Populate tables
Populates all tables generated from 2) with dummy data.



4) Query tables

Runs queries with specific applications using the tables with data generated from 3).



e) End/exit
Ends the program and database connection.

Queries in relational algebra

1) List student numbers of students who are enrolled in CPS 510

$$\pi_{Student\_number}(\sigma_{Course\_number = `510'}(Student \triangleright\!\triangleleft Registered))$$

2) Count number of instructors in each course, sorted by term

$$result(Sterm, Instructor) \leftarrow {}_{Sterm}F_{COUNT\ Instructor}(sSection)$$

3) Count students with each citizenship and list the citizenships with more than 3 students

$$cStudents(Citizenship, Student\_count) \leftarrow {}_{Citizenship}F_{COUNT\ Student\_number}(Student)$$

$$result \leftarrow \sigma_{Student\_count\ >\ 2}(cStudents)$$

4) List of undergrad or graduate students in Ryerson currently studying Computer Science

$$CSgrad \leftarrow \pi_{Student\_number}(\sigma_{GDegree = `COMPUTER\ SCIENCE'}(Graduate))$$

$$CSundergrad \leftarrow \pi_{Student\_number}(\sigma_{GDegree = \text{'COMPUTER SCIENCE'}}(Undergraduate))$$

$$result \leftarrow CSgrad \cup CSundergrad$$