COMP3311 Assignment 4

(Implementing a simple information system)

Spring 2018

Due date: 4th May 2018 (12 *noon*)

Assignment Rules:

1) This is an *individual* programming assignment; you are required to work on your own.

2) The assignment solution you submit must be solely your own work; copying or letting others to copy are both considered cheating.

3) **We will compile and test your codes by using Visual Studio 2015 on the machines in Lab 4210. Please configure your project according to the lab slides (Lab 7, and Lab9).**

****If there are any compiling errors during our testing and grading, you will receive 0 mark for this assignment.**

4) **No partial marks will be given for each TODO and no negotiation on partial marks will be handled.**

5) Late submission for the first day will have 25% deducted in total scores, for the second day will have 75% deducted, and for more than two days will have zero score.

Assignment Description:

You are required to build a simple information system for the University according to the database schema described below. The system is to allow professors to retrieve useful information. You are required to complete a program using the C++ language and the ODBC interface (a skeleton of the C++ program will be provided to you). For your easy reference, the demo of the full mark program is provided (the comp3311-assign4.exe file).

You are required to build the tables and insert the records to the Oracle server before you can run the information system. To do that you will need to log in Oracle using the SQLPlus client, and run the following three script files: drop_tables.sql, create_tables.sql, insert_records.sql at the SQLdeveloper. These files are available at the assignment page of the course website.

After running the script files, you should make sure the "commit;" command is executed at SQLdeveloper so that the data are physically written to the Oracle DBMS. You can then start your C++ program. It logs you into the Oracle server using *your own Oracle account (*i.e. comp3311stuxxx, xxx is from 001-125). This part has been done for you in the skeleton C++ program provided.

The system should allow a professor to log in with his/her password and perform queries regarding the following information:

1) Teaching information:

(a) display the course_ID, course_name, offering_no, classroom, and no_of_stds of all the courses he/she is teaching in the current semester (assume the current semester is 'Spring2018'),

(b) display the course_ID, course_name, offering_no, classroom, and no_of_stds of the course he/she is "leading" in the current semester (assume the current semester is 'Spring2018').

(c) group the prerequisites (course_IDs) by the course_IDs of the main courses and display the prerequisites (course_ID) *in a list*. See the screen shot in the *assignment output* section for the expected output.

Hint: you may find the aggregate function LISTAGG() function useful. You can also refer to the following web site at URL: http://www.oracle-developer.net/display.php?id=515 for consulting the exact syntax of LISTAGG().

2) Supervision information:

(a) display all the student_ID, last_name, first_name, phone of all the students he/she supervises.

(b) group the students (student_ID, last_name, first_name) according to the supervisors' staff_IDs, and display the student information *in a list* in ascending order of the student_IDs, see the screen shot for the exact output.

Hint: you may find the LISTAGG() function and the concatenation operator "||" useful.

3) Administrative information:

(a) change the login password for himself/herself,

(b) add a phone number for himself/herself (assume professors do not share phone numbers),

(c) displays the student_ID, last_name, first_name, and phone number for each TA of the course offerings he/she teaches in the current semester (assume that the current semester is 'Spring2018'),

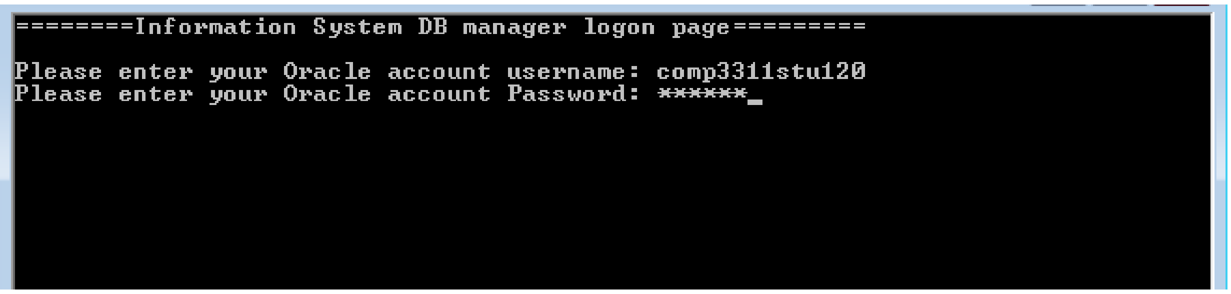
(d) display the lists of *all* the preferred offerings (course_ID, offering_no) for all the TAs, group the results by the TAs' student_IDs. **Hint:** you may find the aggregate function LISTAGG() function useful.

Assignment output

You are required to complete the assign4.cpp skeleton file provided at the assignment web page. You just need to fill out the ODBC code for the parts labeled TODO (i.e. the part “TODO: add your code here”). There are altogether nine TODOs. All the nine TODOs involve writing simple SQL statements using the ODBC functions. You can find everything needed in the note sets of Lab7 and Lab8. For simplicity, you could use the “Direct Execute” method discussed in Lab 7 (instead of the “Prepared Statement” method) for the assignment.

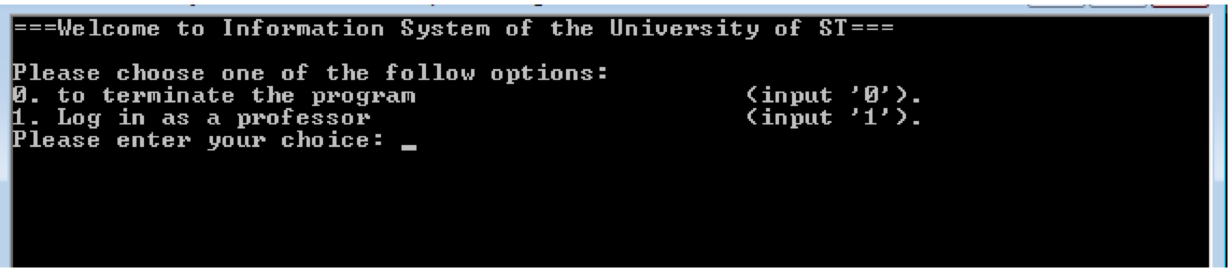
To stay focused on SQL/ODBC programming, we assume that users always enter valid inputs. You do not need to check for the correctness of the inputs in the C++ program.

You are the database manager and you need to log in the information system with your Comp3311 Oracle account (comp3311stuxxx, xxx=001 to 089) before the system is ready to be used by the professors.



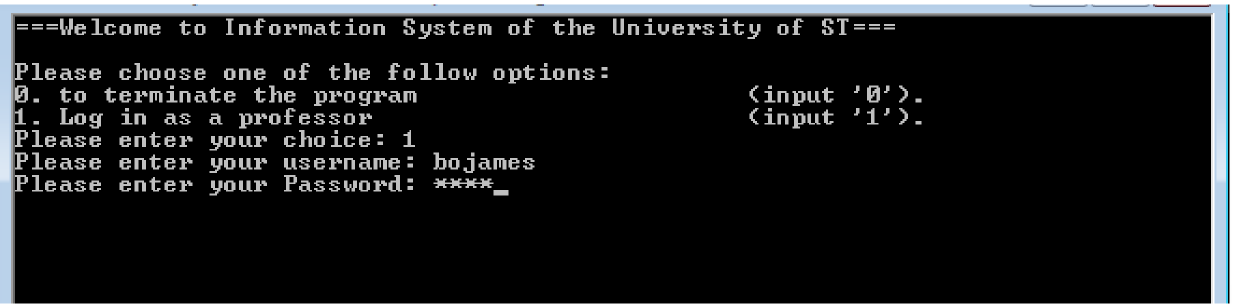
```
========Information System DB manager logon page=========

Please enter your Oracle account username: comp3311stu120
Please enter your Oracle account Password: ******_
```

Once the DB manager has logged in successfully, the professors can start to use the information system.



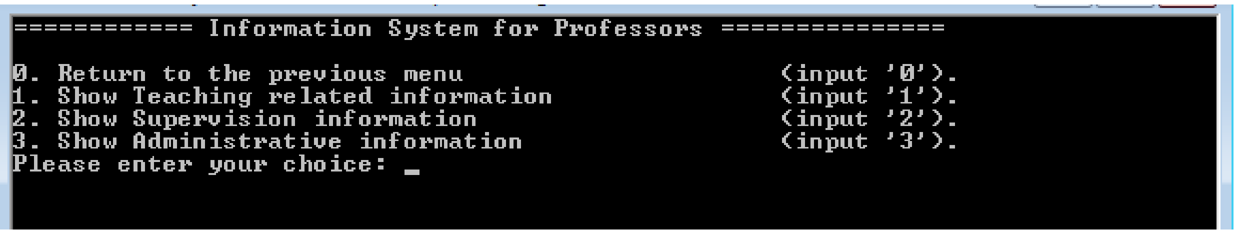
```
===Welcome to Information System of the University of ST===

Please choose one of the follow options:
0. to terminate the program                    (input '0').
1. Log in as a professor                       (input '1').
Please enter your choice: _
```

The following illustrates that a professor with the username “bojames” is trying to log in.



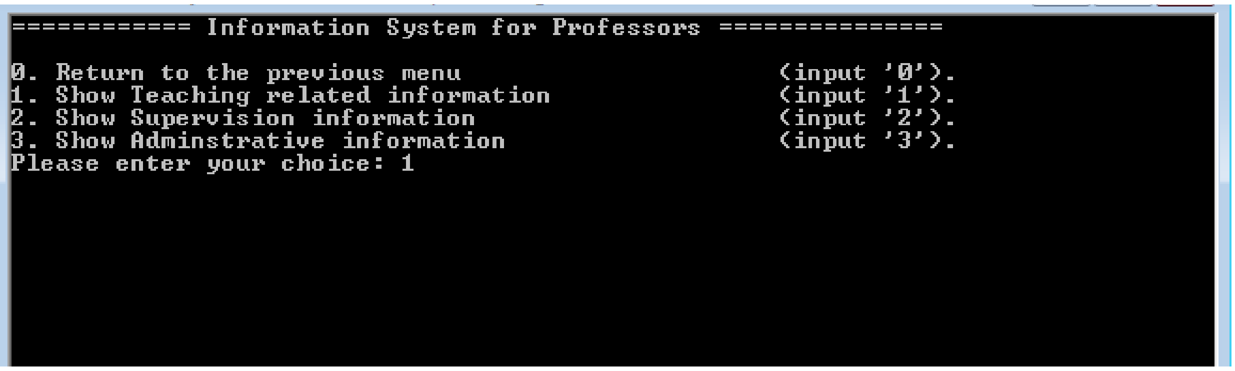
```
===Welcome to Information System of the University of ST===

Please choose one of the follow options:
0. to terminate the program                          (input '0').
1. Log in as a professor                             (input '1').
Please enter your choice: 1
Please enter your username: bojames
Please enter your Password: ****_
```

Once he has logged in successfully, he will see this main menu of the information system.



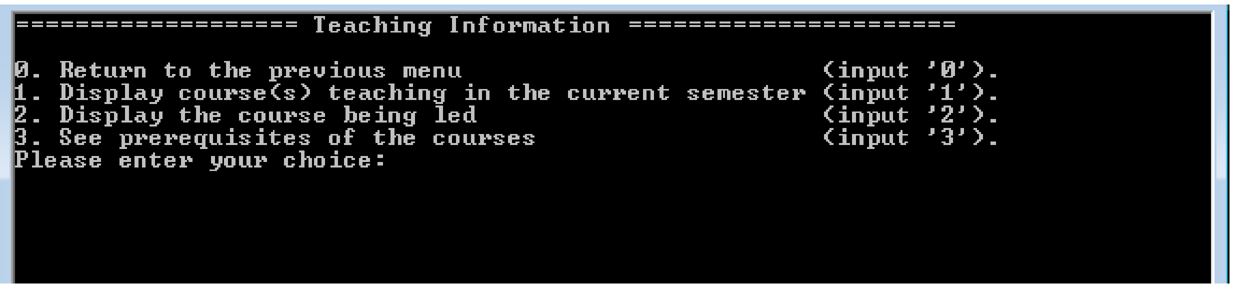
```
============ Information System for Professors ===============

0. Return to the previous menu                         (input '0').
1. Show Teaching related information                   (input '1').
2. Show Supervision information                        (input '2').
3. Show Administrative information                     (input '3').
Please enter your choice: _
```

If he selects option “1. Show Teaching related information”,



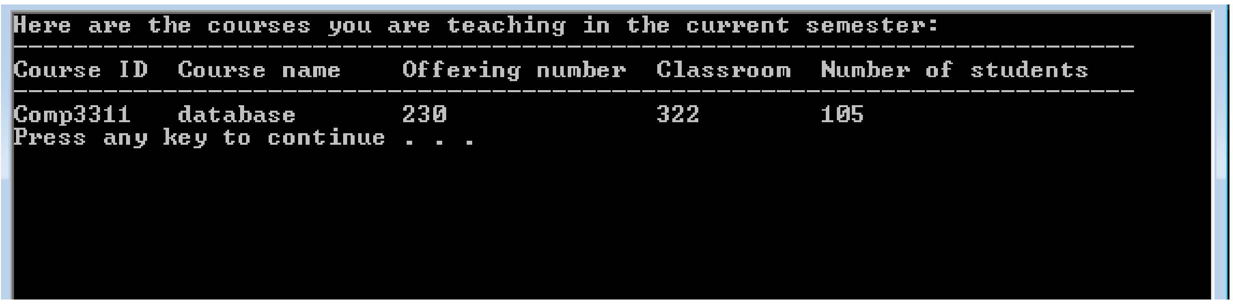
```
============ Information System for Professors ===============

0. Return to the previous menu                         (input '0').
1. Show Teaching related information                   (input '1').
2. Show Supervision information                        (input '2').
3. Show Adminstrative information                      (input '3').
Please enter your choice: 1
```

he will see the following sub-menu.



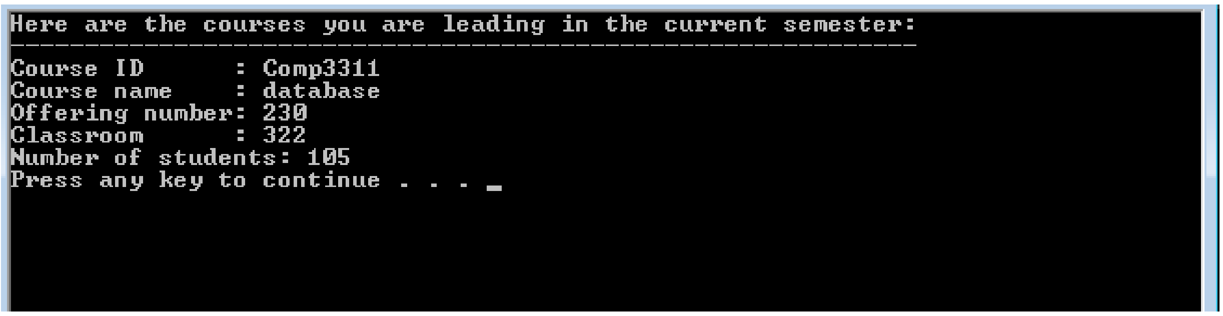
```
=================== Teaching Information ======================

0. Return to the previous menu                         (input '0').
1. Display course(s) teaching in the current semester (input '1').
2. Display the course being led                        (input '2').
3. See prerequisites of the courses                    (input '3').
Please enter your choice:
```

From there he can check the course(s) he is teaching.



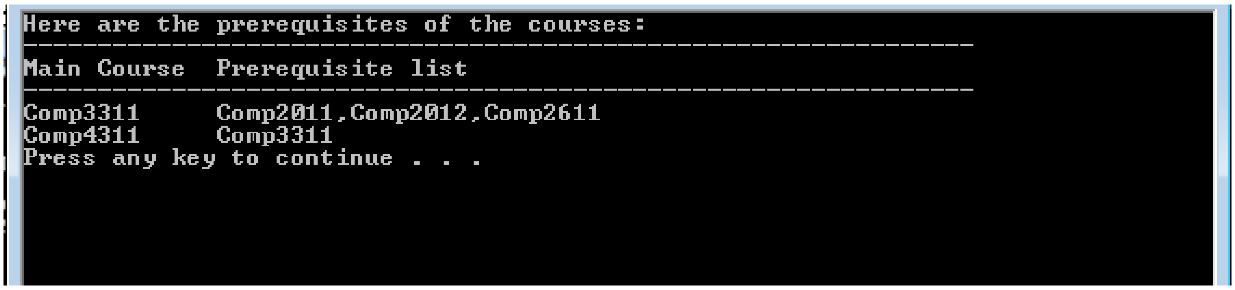
```
Here are the courses you are teaching in the current semester:
---------------------------------------------------------------------------
Course ID  Course name    Offering number  Classroom  Number of students
---------------------------------------------------------------------------
Comp3311   database       230              322        105
Press any key to continue . . .
```

He can check the course he is leading.



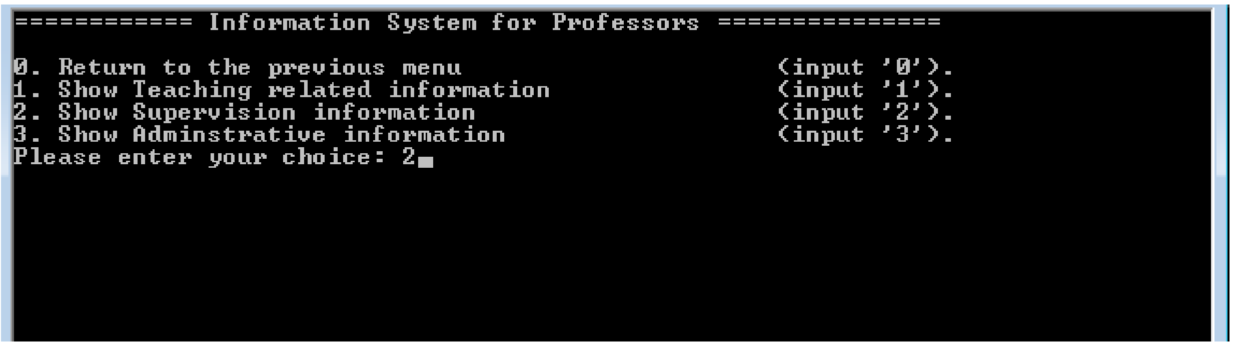
```
Here are the courses you are leading in the current semester:
-------------------------------------------------------------
Course ID      : Comp3311
Course name    : database
Offering number: 230
Classroom      : 322
Number of students: 105
Press any key to continue . . . _
```

He can also check the prerequisites of all the courses.



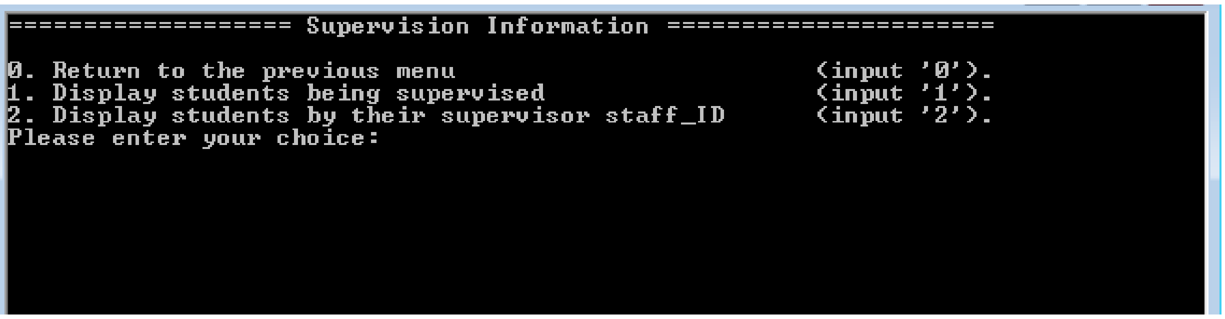
```
Here are the prerequisites of the courses:
----------------------------------------------------------------
Main Course  Prerequisite list
----------------------------------------------------------------
Comp3311     Comp2011,Comp2012,Comp2611
Comp4311     Comp3311
Press any key to continue . . .
```

If he selects “*2. Show Supervision information from the main menu*” from the main menu of the information system,



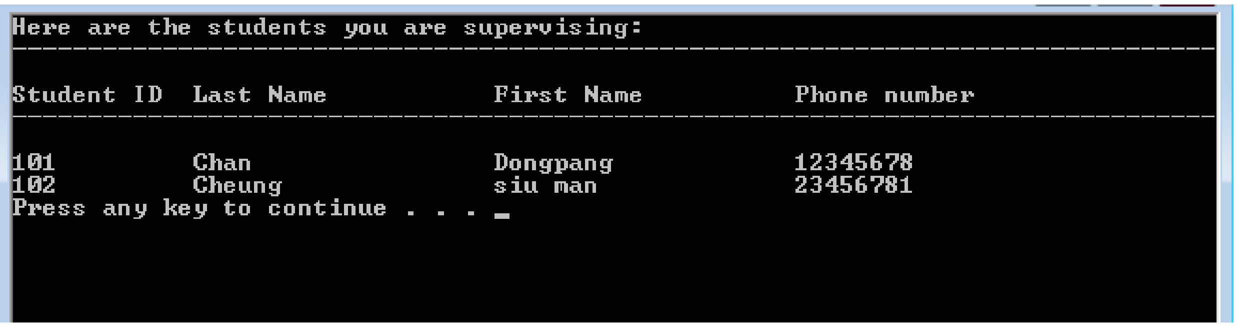
```
============ Information System for Professors ===============

0. Return to the previous menu                      (input '0').
1. Show Teaching related information                (input '1').
2. Show Supervision information                     (input '2').
3. Show Adminstrative information                   (input '3').
Please enter your choice: 2
```

he will see the following sub-menu.



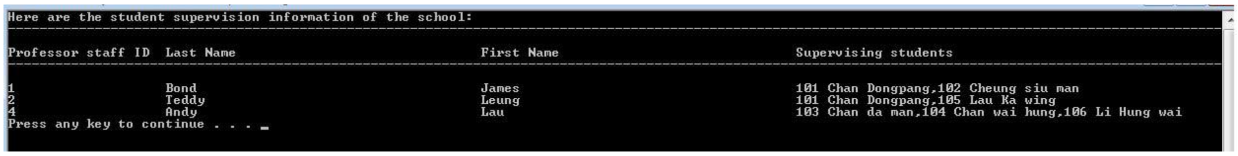
```
================== Supervision Information =====================

0. Return to the previous menu                          (input '0').
1. Display students being supervised                    (input '1').
2. Display students by their supervisor staff_ID        (input '2').
Please enter your choice:
```

From there he can retrieve all the students he is supervising.



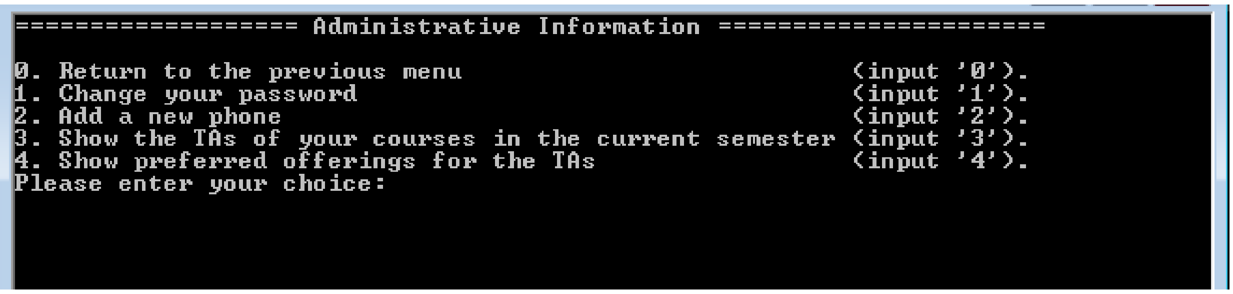
```
Here are the students you are supervising:
--------------------------------------------------------------------------------

Student ID  Last Name            First Name           Phone number
--------------------------------------------------------------------------------

101         Chan                 Dongpang             12345678
102         Cheung               siu man              23456781
Press any key to continue . . .
```

The supervising information of all the other professors.



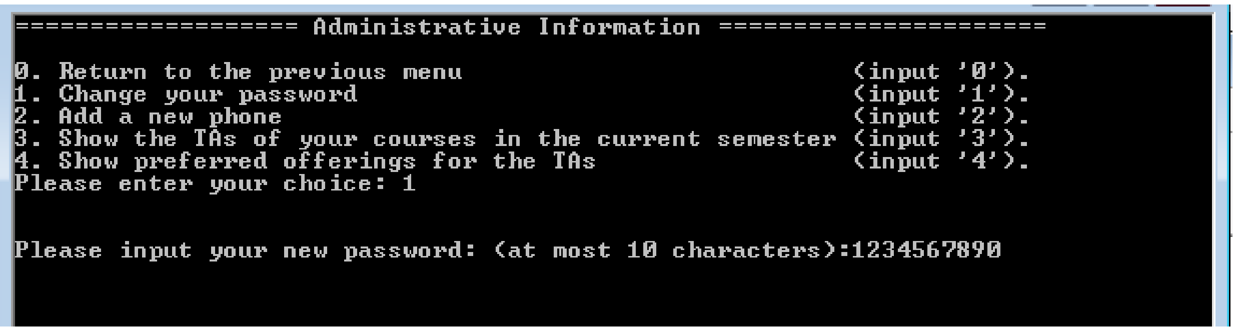
```
Here are the student supervision information of the school:
--------------------------------------------------------------------------------------------------------------------------

Professor staff ID  Last Name                    First Name                   Supervising students
--------------------------------------------------------------------------------------------------------------------------

1                   Bond                         James                        101 Chan Dongpang,102 Cheung siu man
2                   Teddy                        Leung                        101 Chan Dongpang,105 Lau Ka wing
4                   Andy                         Lau                          103 Chan da man,104 Chan wai hung,106 Li Hung wai
Press any key to continue . . .
```

If he selects "*3. Show Administrative information*" from the main menu, he will see the following sub-menu.



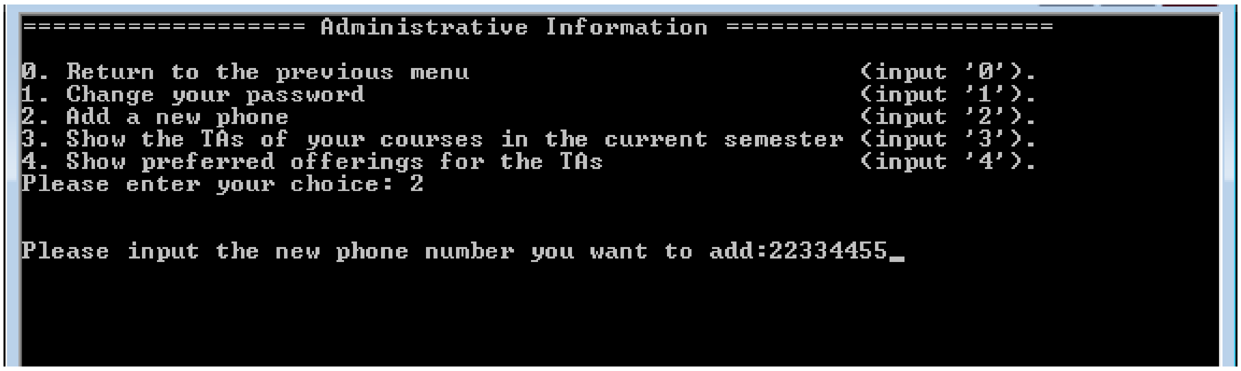
```
================== Administrative Information =====================

0. Return to the previous menu                              (input '0').
1. Change your password                                     (input '1').
2. Add a new phone                                          (input '2').
3. Show the TAs of your courses in the current semester     (input '3').
4. Show preferred offerings for the TAs                     (input '4').
Please enter your choice:
```

From there he can change his password.



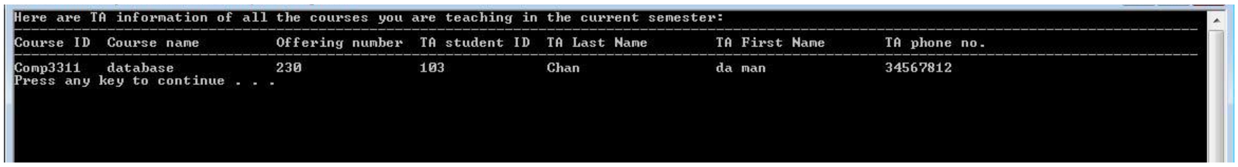
```
================== Administrative Information ======================

0. Return to the previous menu                             (input '0').
1. Change your password                                    (input '1').
2. Add a new phone                                         (input '2').
3. Show the TAs of your courses in the current semester   (input '3').
4. Show preferred offerings for the TAs                    (input '4').
Please enter your choice: 1


Please input your new password: (at most 10 characters):1234567890
```

He can add a new phone number.



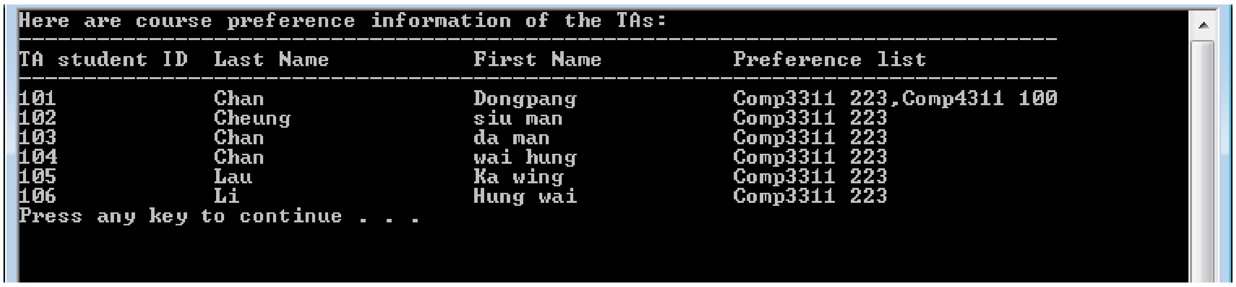
```
================== Administrative Information ======================

0. Return to the previous menu                             (input '0').
1. Change your password                                    (input '1').
2. Add a new phone                                         (input '2').
3. Show the TAs of your courses in the current semester   (input '3').
4. Show preferred offerings for the TAs                    (input '4').
Please enter your choice: 2


Please input the new phone number you want to add:22334455_
```

He can check all the TA(s) that is/are working with him in the current semester.



```
Here are TA information of all the courses you are teaching in the current semester:
-------------------------------------------------------------------------------------------------------------------
Course ID  Course name         Offering number  TA student ID  TA Last Name         TA First Name        TA phone no.
-------------------------------------------------------------------------------------------------------------------
Comp3311   database            230              103            Chan                 da man               34567812
Press any key to continue . . .
```

He can also check the offering preference information of all the TAs for offerings of all the semesters



```
Here are course preference information of the TAs:
---------------------------------------------------------------------------------
TA student ID  Last Name           First Name          Preference list
---------------------------------------------------------------------------------
101            Chan                Dongpang            Comp3311 223,Comp4311 100
102            Cheung              siu man             Comp3311 223
103            Chan                da man              Comp3311 223
104            Chan                wai hung            Comp3311 223
105            Lau                 Ka wing             Comp3311 223
106            Li                  Hung wai            Comp3311 223
Press any key to continue . . .
```

Disclaimer: The outputs in this section are merely showing some of the instances of the program. Please refer to the executable program provided at the assignment web page for the expected behaviors of the program under all the scenarios.

Further information/reminder about the assignment

1. A skeleton program will be provided to you, you need to complete it by filling all the “TODO” parts. For simplicity, you could use the “Direct Execute” method discussed in Lab 7 (instead of the “Prepared Statement” method) for the assignment.

2. You may assume the users always enter valid inputs so you do not need to check the correctness of the inputs. You can focus more on the SQL/ODBC codes you need to add.

3. The detailed steps for compiling and running C++/ODBC codes are available in Lab7, Lab8 and Lab9. Read also the appendices of Lab7 for setting up the data source and compiling the C++ program under Visual Studio.

4. We will compile and test your codes by using Visual Studio 2015 on the machines in Lab 4210. Refer to the note set of lab7 for the details of how this is done. Make sure that your code runs correctly on the Lab machines

in 4210, otherwise you receive no score for your submission.

5. As the demo program is provided, you need to make sure that your program gives exactly the same output as that of the demo program before the submission. If your program give different outputs as the demo program, **all** marks for the TODO will be deducted.

Submission

You are required to submit only the finished source code “**assign4.cpp**” to the CASS submission system. **Do not submit any other file(s) or you risk losing all the scores.**

The URL link for the submission is given as follows:

http://cssystem.cse.ust.hk/home.php?docbase=UGuides/cass&req_url=UGuides/cass/index.html

End-of-Assignment