

COP3331 Final Project

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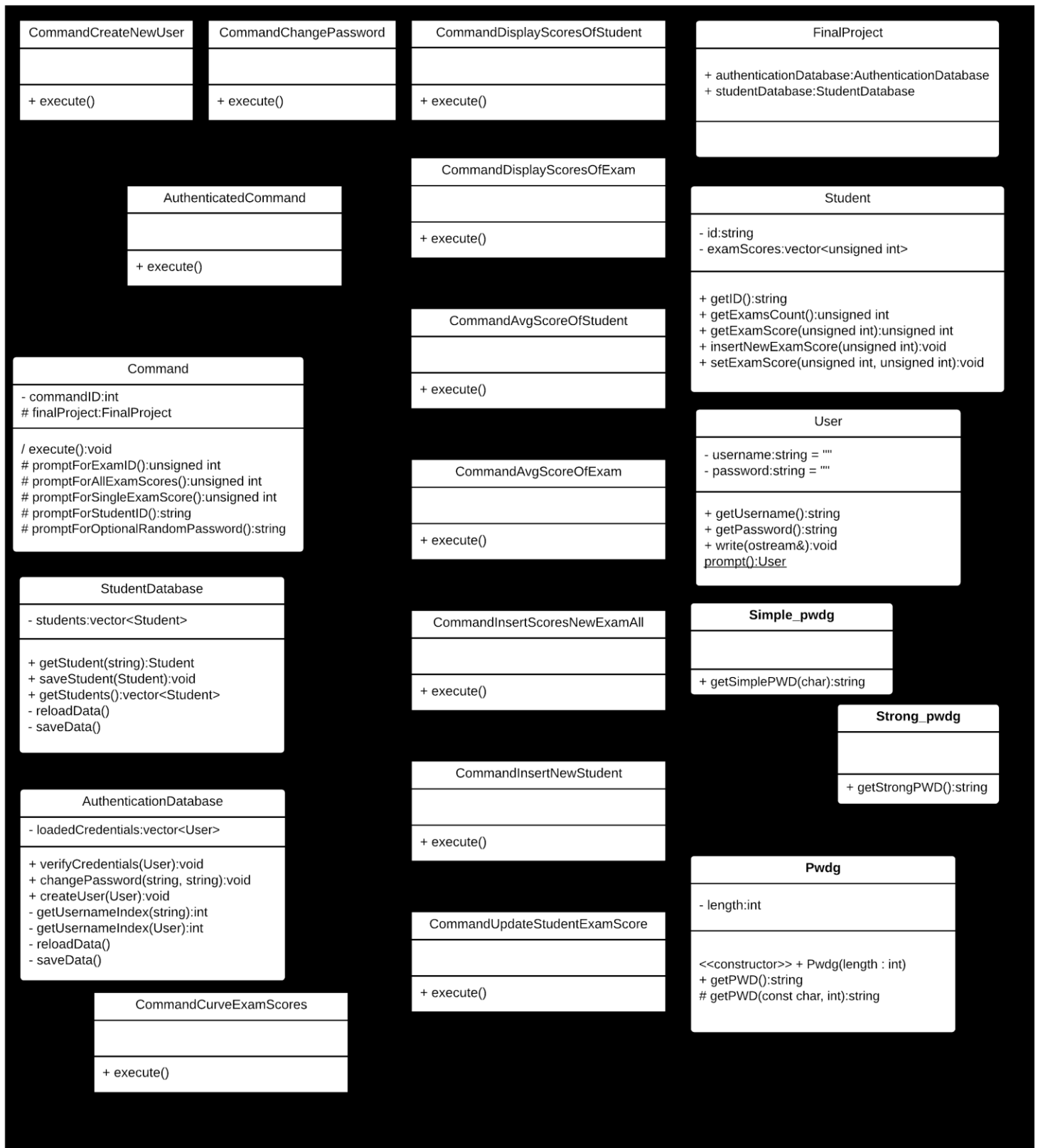
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## File Names

- src/
  - main.cpp
  - FinalProject.h
  - commands/
    - types/
      - AuthenticatedCommand.h
      - Command.h
    - CommandAvgScoreOfExam.h
    - CommandAvgScoreOfStudent.h
    - CommandChangePassword.h
    - CommandCreateNewUser.h
    - CommandCurveExamScores.h
    - CommandDisplayScoresOfExam.h
    - CommandDisplayScoresOfStudent.h
    - CommandInsertNewStudent.h
    - CommandInsertScoresNewExamAll.h
    - CommandUpdateStudentExamScore.h
  - databases/
    - AuthenticationDataBase.cpp
    - AuthenticationDataBase.h
    - StudentDatabase.cpp
    - StudentDatabase.h
  - objects/
    - Pwdg.h
    - Student.h
    - User.h
- Data/
  - scores.txt
- User/
  - passwords.txt

## UML Class Diagram



## Compilation commands

### Makefile

The Makefile is automatically generated by using CMake, which is a cross-platform free and open-source software for managing the build process of software using a compiler-independent method (g++ in this case).

<code>cd myprogram/</code>	<i>Switch to the directory of the program source code</i>
<code>cmake .</code>	<i>Generate the Makefile</i>
<code>make</code>	<i>Compile the program</i>
<code>./3331project</code>	<i>Execute the target</i>

### Additional Notes

This program was developed using the C++98 standard in order to maintain maximum compatibility.

## Screenshots

```
COP3331 Final Project

(1) Create a new user
(2) Change password
(3) Display scores of a student
(4) Display scores of an exam
(5) Display avg score of a student (in a form like 72.84)
(6) Display avg score of an exam (in a form like 69.33)
(7) Insert scores of a new exam to all students
(8) Insert scores of all exams of a student who is not in file
(9) Update an exam score of a student
(10) Update an exam score (with same amount such as 5 points or -3 points) of every student
(11) Exit

Choose an option: 11
Good bye
```

*Exiting the program, menu list displayed at start-up*

```
Choose an option: 3
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Error: Invalid password

(1) Create a new user
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(4) Display scores of an exam
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(7) Insert scores of a new exam to all students
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(9) Update an exam score of a student
(10) Update an exam score (with same amount such as 5 points or -3 points) of every student
(11) Exit

Choose an option: █
```

*Option 3 is selected. Authentication is required and prompts the user. In this case, the password is incorrect and an error is displayed to inform the user. It then returns to the state of displaying the menu and prompts for an option.*

```
admin 1a2b3c4d
█
```

*Contents of  
User/passwords.txt **before**  
execution of option 1*

```
Choose an option: 1
Enter the new username: prof
Do you want a randomly generated password? (Y/N): n
Enter password for the new user prof: cop3331

Successfully created user prof
```

*A new user, "prof", is created with the password  
"cop3331"*

```
admin 1a2b3c4d
prof cop3331
█
```

*Contents of  
User/passwords.txt **after**  
execution of option 1*

```

Choose an option: 3
Authentication is required for this command.
Enter username: prof
Enter password for prof: cop3331

Authentication attempt is successful.
Enter Student ID: U103
--- Exam Scores for U103 ---
Exam 1: 0
Exam 2: 0
Exam 3: 39
Exam 4: 55
---
```

*Authentication attempt was successful with the newly created user.  
Scores are displayed for a student.*

```

admin 1a2b3c4d
prof cop3331
```

*Contents of  
User/passwords.txt **before**  
execution of option 2*

```

Choose an option: 2
Authentication is required for this command.
Enter username: admin
Enter password for admin: 1a2b3c4d

Authentication attempt is successful.
Enter username to change password for: admin
Do you want a randomly generated password? (Y/N): n
Enter the new password for admin: password

Password successfully changed for user admin
```

```

admin password
prof cop3331
```

*Contents of  
User/passwords.txt **after**  
execution of option 2*

*The password for the admin user has been changed to  
just "password"*

```

Choose an option: 1
Enter the new username: rng
Do you want a randomly generated password? (Y/N): y
Enter length of password: 24
Want a strong password? (Y/N): y
Four mandatory random chars: 2 D o &
Generated password: &2EDe3Wl6hbU#^ccoqWJIbk*
Successfully created user rng
```

*Creating a new user named "rng" with a strong, randomly generated password*

```

Enter Student ID: O235
Error: Student ID must start with a 'U' character. (E.g. U103)
Enter Student ID: U-238
Error: Student ID must be only 4 characters in length. (E.g. U103)
Enter Student ID: UB01
Error: The last three characters of a Student ID must be digits. (E.g. U103)
```

*A group of screenshots showing the three possible input validation error messages upon entering a  
student ID when prompted*

```
Choose an option: 4
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: meow
Error: Input received was not an integer
```

```
Choose an option: 4
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: 5
Error: The requested exam is currently not on file.
```

```
Choose an option: 4
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: -1
Error: Exam IDs are sequential in order and starts at 1. (Expected ID > 0, got ID <= 0)
```

```
Choose an option: 4
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: 1
--- Scores for Exam 1 ---
U101: 77
U102: 73
U103: 0
U104: 84
U105: 93
---
```

```
Choose an option: 5
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U103
Average Exam Score for U103: 23.50
```

```
Choose an option: 6
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: 1
Average score for Exam 1: 65.40
```

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
```

Contents of  
Data/scores.txt *before*

```
Choose an option: 7
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter each exam score in one line, separated by a space:
80% 90.2 68 0% hi 92
Exam scores have been successfully added to all students in file.
```

```
U101 77 62 91 95 80
U102 73 0 100 62 90
U103 0 0 39 55 68
U104 84 69 70 100 0
U105 93 86 70 0 92
```

Contents of Data/scores.txt  
*after*

```
Choose an option: 8
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U103
Error: A student with that ID already exists on file.
```

```
Choose an option: 8
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U109
Enter each exam score in one line, separated by a space:
1
Error: Expected 4 exam scores to be entered, got 1 scores instead.
```

```
Choose an option: 8
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U109
Enter each exam score in one line, separated by a space:
100 105 99 100
Error: Exam score must be between 0-100, inclusive
```

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
```

Contents of  
Data/scores.txt *before*

```
Choose an option: 8
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U109
Enter each exam score in one line, separated by a space:
100 100 99 100
Exam scores for the new student have been saved successfully.
```

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
U109 100 100 99 100
```

Contents of Data/scores.txt  
*after*



```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
```

Contents of  
Data/scores.txt **before**

```
Choose an option: 9
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Student ID: U103
Enter Exam ID: 2
Enter Exam Score: 100
Exam 2 score for U103 has been successfully changed to 100.
```

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 100 39 55
U104 84 69 70 100
U105 93 86 70 0
```

Contents of Data/scores.txt  
**after**

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
```

```
Choose an option: 10
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: 2
Enter the score difference to update all exams with: 10
The Exam 2 score for all students have been successfully altered by 10.
```

```
U101 77 72 91 95
U102 73 10 100 62
U103 0 10 39 55
U104 84 79 70 100
U105 93 96 70 0
```

```
U101 77 62 91 95
U102 73 0 100 62
U103 0 0 39 55
U104 84 69 70 100
U105 93 86 70 0
```

```
Choose an option: 10
Authentication is required for this command.
Enter username: admin
Enter password for admin: password

Authentication attempt is successful.
Enter Exam ID: 1
Enter the score difference to update all exams with: -100
The Exam 1 score for all students have been successfully altered by -100.
```

```
U101 0 62 91 95
U102 0 0 100 62
U103 0 0 39 55
U104 0 69 70 100
U105 0 86 70 0
```