SOFE 4790U : Distributed Systems

Individual Programming Assignment #2

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Due Date: Nov 10, 2021

Link to GitHub:

Assignment (clone) : https://github.com/UOITEngineering2/assignment2fall2020-OwaisQuadri/
Personal (original): https://github.com/OwaisQuadri/DSYS_A2

## A. Application Description: Academic Testing Application

This application is based on Assignment 1 where the program was to be made using multithreading. In this assignment, Java RMI was used to connect the clients to the server's functions to complete a certain task. My program is an academic testing system where a supervisor/teacher can hold multiple choice tests for a group of students. For the first assignment, the functions in my application are: testing students and displaying the scores to the students who are all simultaneously taking the exam and that the supervisors/admins will be able to create custom tests with multiple answers by using the '!' key at the beginning of correct answer entries. One novel feature from Assignment 1 was saving the tests and the test results to a file so that the class scores could be recorded and displayed to the administrators, and so that a certain test could be run at a separate time than immediately after creation. The other novel feature from assignment 1 was using certain credentials (username/password) for logging into both the supervisor and student side of the application. This way, only verified individuals are accessing the application. The first function that I added onto this application is a user interface for the students and teachers to enter their username and password instead of writing it on the command line. I also created a navigable user interface for the students so that they can take any available actions and then be returned back to the main menu. The next function that was added to the application is a password feature where the supervisors can set a password for a certain test as well as setting a retake value where the supervisor also sets the amount of tries that a student can get for a test. One novel feature I added was the ability for a student to view their highest scoring result on each test, and compare it to the rest of the class results. Another novel feature that I added was that the supervisor can set a specific timeframe for the test to be taken. For example, I could set the test to be taken for only today, from 12:30-1:00 and nobody would be able to submit at any other time. Also, I added a feature where different students can take a different test at the same time.

Challenges that I faced during this project were: In the beginning, I had a very difficult time connecting my RMI sockets together with the interfaces. I solved this problem by referring back to my lab 2 notes where I realized that I need to remove the package declarations from the files and compile/run from the server and client directories directly. Another challenge I faced was creating a system where the student would not have access to test template files and so I realized that if I wanted the students to select the test to be taken, the server would need to send all the questions to the client. Therefore, I pre-parsed the files and sent a 2-d arraylist to the client so that the students running the application could not see any of the answers.

The 5 remote function added to the interface are:

1. getQuestions: a function where the client can receive questions from the server to run a certain test.
2. StudentStats: return a certain student's statistics compared to the rest of the class, also shows the due date of available tests and availability dates for unavailable tests.
3. takeTest: returns the status number when the test is loaded and verified (test password and time availability).
4. testList: List the available tests on the network.
5. uploadResults: upload student's supplied test result to file for given test.

## B. Functionality Testing (with screenshots)

Testing Added Functionalities:
- User interface for the Students and Supervisors to enter their username and password instead of writing it on the command line: PASS
  - Supervisors: PASS

```
Usage: java -Djava.security.policy=policy.txt Supervisor
[owaisquadri@Owaiss-MacBook-Pro Server % java -Djava.security.policy=policy.txt Supervisor          ]
Username: admin
Password: admin

Welcome, admin!
1. Create New Test
2. Accept Test Submissions
3. Review Test Stats
4. Delete a Test (and its stats)
5. Exit
please enter a number from the above selection
```

  - Students: PASS

```
[owaisquadri@Owaiss-MacBook-Pro client % java Student                                               ]
Username: john
Password: john
Welcome john!
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
2
```

- A navigable user interface for the students so that they can take any available actions and then be returned back to the main menu: PASS

```
[owaisquadri@Owaiss-MacBook-Pro client % java Student                    ]
Username: john
Password: john
Welcome john!
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
2

Test: how to use airpods
There are no statistics for this test yet
Available on: 2021-11-09 1:18


Test: Capital Cities of Canada
There are no statistics for this test yet
Available on: 2021-11-08 10:00


Test: DMS Q1
john's Score: test not taken yet
Available on: 2021-11-7 20:30
Due on: 2021-11-7 20:55

Average Class Score: 62.50 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
```

- A test password feature where the supervisors can set a password for a certain test as well as setting a retake value where the supervisor also sets the amount of tries that a student can get for a test: PASS
  - User interface to set tries: PASS

```
Welcome, admin!
1. Create New Test
2. Accept Test Submissions
3. Review Test Stats
4. Delete a Test (and its stats)
5. Exit
please enter a number from the above selection
1

What would you like to name the Test? how to use airpods
Please enter a password for the test: pro
Would you like to add a question? (y/n) y
when do you turn on noise cancellation?
Would you like to add an answer to this question? (y/n) y
please add a '!' to the beginning if this is the correct answer
!while grinding
Would you like to add an answer to this question? (y/n) y
please add a '!' to the beginning if this is the correct answer
always
Would you like to add an answer to this question? (y/n) n
Would you like to add a question? (y/n) y
when should you turn on transparency mode?
Would you like to add an answer to this question? (y/n) y
please add a '!' to the beginning if this is the correct answer
!always
Would you like to add an answer to this question? (y/n) y
please add a '!' to the beginning if this is the correct answer
while grinding
Would you like to add an answer to this question? (y/n) n
Would you like to add a question? (y/n) n
Please enter the number of retakes for the test (blank means infinite): 1
```

  - Student denied when more than specified number of attempts: PASS

```
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
1
Which test would you like to take?
exampleTest2
how to use airpods
Capital Cities of Canada
DMS Q1
exampleTest2
DMS Q1

Test Name: how to use airpods
Test Password: pro
the test will begin shortly
Test how to use airpods is starting now:
when do you turn on noise cancellation?
1. while grinding
2. always
1
when should you turn on transparency mode?
1. always
2. while grinding
1
Your score was : 100.00 %

1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
1
Which test would you like to take?
exampleTest2
how to use airpods
Capital Cities of Canada
DMS Q1
exampleTest2
DMS Q1

Test Name: how to use airpods
Test Password: pro
This user has reached the maximum amount of tries for this test
```

Testing Added Novel Features:
- Students can view their highest scoring result on each test, and compare it to the rest of the class results: PASS

```
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
2

Test: exampleTest2
owais's Score: 100.00 %
Available on: 2021-11-09 20:05
Due on: 2021-11-09 20:10

Average Class Score: 50.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


Test: how to use airpods
owais's Score: test not taken yet
Available on: 2021-11-09 13:18
Due on: 2021-11-09 13:25

Average Class Score: 50.00 %
Highest Class Score: 50.00 %
Lowest Class Score: 50.00 %


Test: Capital Cities of Canada
There are no statistics for this test yet
Available on: 2021-11-08 10:00


Test: DMS Q1
owais's Score: 100.00 %
Available on: 2021-11-7 20:30
Due on: 2021-11-10 20:55

Average Class Score: 55.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


Test: exampleTest2
owais's Score: 100.00 %
Available on: 2021-11-09 20:05
Due on: 2021-11-09 20:10

Average Class Score: 50.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %
```

```
Test: how to use airpods
owais's Score: test not taken yet
Available on: 2021-11-09 13:18
Due on: 2021-11-09 13:25

Average Class Score: 50.00 %
Highest Class Score: 50.00 %
Lowest Class Score: 50.00 %


Test: Capital Cities of Canada
There are no statistics for this test yet
Available on: 2021-11-08 10:00


Test: DMS Q1
owais's Score: 100.00 %
Available on: 2021-11-7 20:30
Due on: 2021-11-10 20:55

Average Class Score: 55.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


Test: exampleTest2
owais's Score: 100.00 %
Available on: 2021-11-09 20:05
Due on: 2021-11-09 20:10

Average Class Score: 50.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


Test: DMS Q1
owais's Score: 100.00 %
Available on: 2021-11-7 20:30
Due on: 2021-11-10 20:55

Average Class Score: 55.00 %
Highest Class Score: 100.00 %
Lowest Class Score: 0.00 %


1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
```
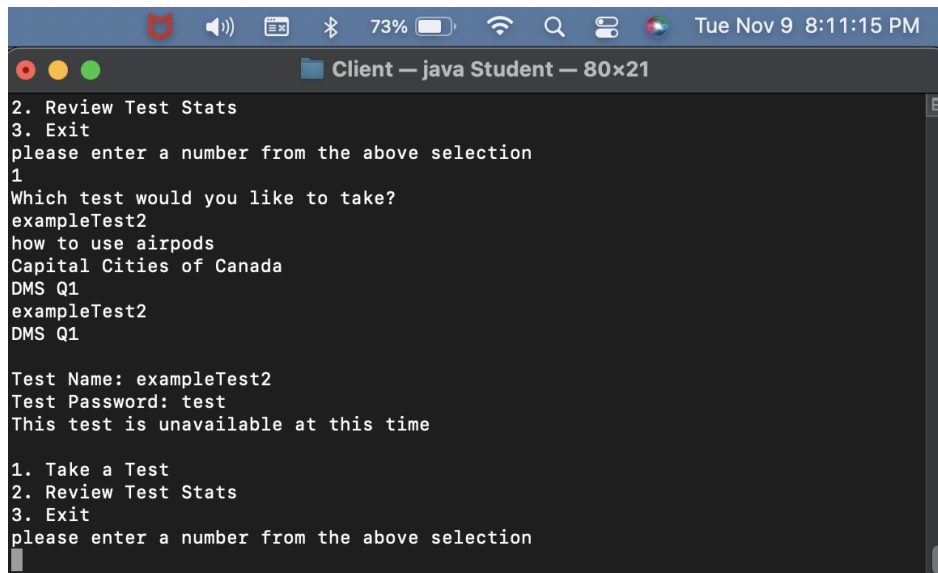
- Supervisors can set a specific timeframe for the test to be taken: PASS
  - Timeframe gets added to save file from user interface: PASS

```
exampleTest2.txt — dsys_a2

Student.java 1, M     DMS Q1.txt        Server — java -Djava.security.policy=policy.txt Supervisor — 99×2

Content > exampleTest2.txt
  1   test                   Would you like to add an answer to this question? (y/n) y
  2   3                      please add a '!' to the beginning if this is the correct answer
  3   2021-11-09 20:05       !also yes
  4   2021-11-09 20:10       Would you like to add an answer to this question? (y/n) y
  5   Is this a test?        please add a '!' to the beginning if this is the correct answer
  6   3                      no
  7   !yes                   Would you like to add an answer to this question? (y/n) n
  8   !also yes              Would you like to add a question? (y/n) n
  9   no                     Please enter the number of retakes for the test (blank means infinite): 3
 10                          Is there a specified time frame for this test? (Y/n)y
                             what is the start date and time (yyyy-mm-dd hh:mm): 2021-11-09 20:05
                             what is the end date and time (yyyy-mm-dd hh:mm): 2021-11-09 20:10
                             Test Created : exampleTest2
```

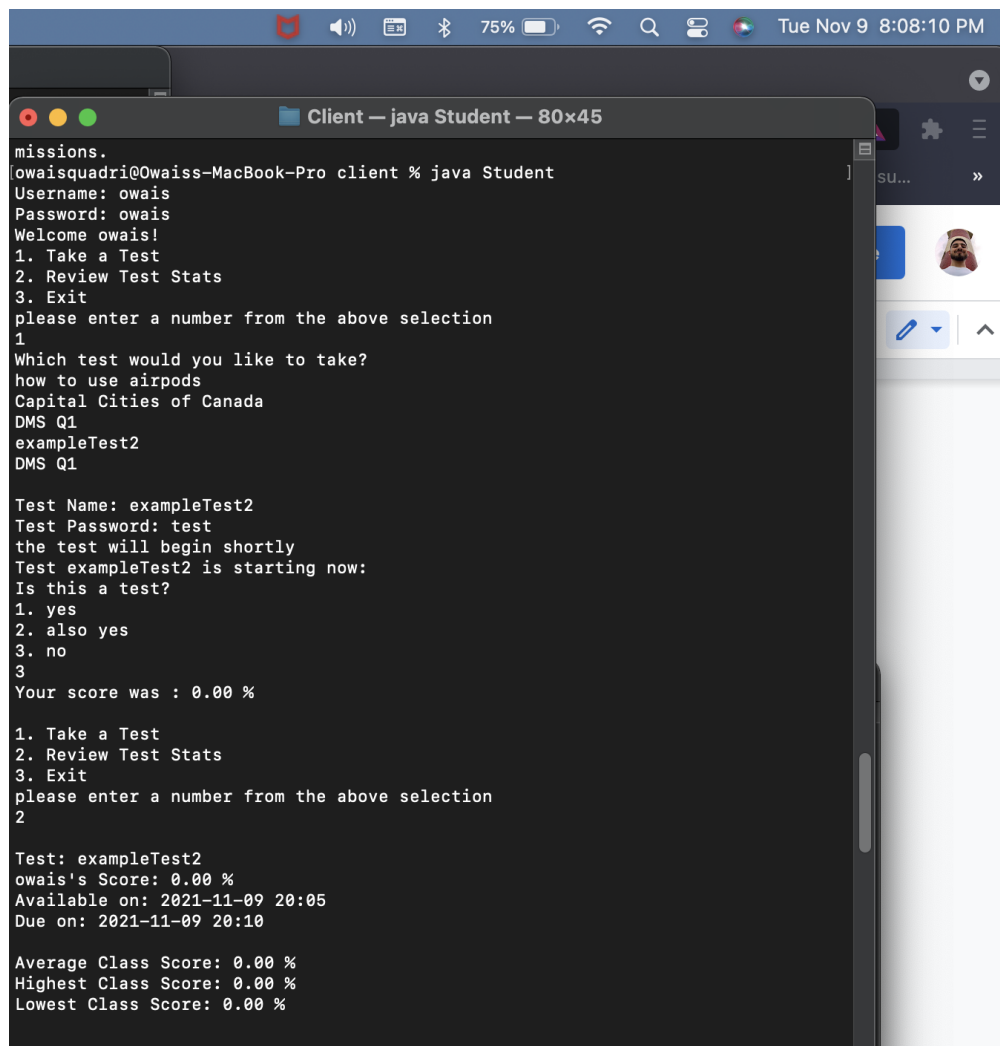- Students can not take tests outside the set timeframe: PASS



- Students can take the tests within the timeframe: PASS

● Different students can take a different test at the same time: PASS



**Left terminal window (Client — java Student — 80×28):**

```
3
owaisquadri@Owaiss-MacBook-Pro Client % java Student
Username: john
Password: john
Welcome john!
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
1
Which test would you like to take?
exampleTest2
how to use airpods
Capital Cities of Canada
DMS Q1
exampleTest2
DMS Q1

Test Name: Capital Cities of Canada
Test Password: Ottawa
the test will begin shortly
Test Capital Cities of Canada is starting now:
Ontario
1. Ottawa
2. Peterborough
3. Mississauga
4. Toronto

OUTLINE
TIMELINE
JAVA PROJECTS
```

**Top-right terminal window:**

```
taketest: test dne
Test exampleTest2: owais Attempt 2/3
loadtest: This test does not exist.
 try again
taketest: test dne
student has already taken this test 2 time(s).
loadtest: This test does not exist.
 try again
taketest: test dne
Test DMS Q1: owais Attempt 3/5
takentest: nobody has taken this test before
Test Capital Cities of Canada: john Attempt 1/5
```

**Bottom-right terminal window:**

```
Username: owais
Password: owais
Welcome owais!
1. Take a Test
2. Review Test Stats
3. Exit
please enter a number from the above selection
1
Which test would you like to take?
exampleTest2
how to use airpods
Capital Cities of Canada
DMS Q1
exampleTest2
DMS Q1

Test Name: DMS Q1
Test Password: quiz1
the test will begin shortly
Test DMS Q1 is starting now:
A _ is a general purpose software system that facilitates the process of defining, constru
cting, manmipulating and sharing databases among vairous users and applications.
1. Meta-Database System
2. Database Application
3. Data Store Manager
4. Database Management System
```