NCIS215

Object Oriented Programming

ASSIGNMENT 1

DUE DATE 12 FEB 2024

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CEAS – Computer Science

Individual Assignment

(a) Identify the inputs, process and output

**Inputs**

- 4-digit pin
- new pin
- Student identification

Process

- After the user enters the student identification and password, this is sent over to Africa University network and hashed on the server using a copy of the same hashing function. The resulting hash is compared to the hash stored on the password server and student server.
- The resulting hash will replace the hash stored on the password server, if the password has expired.

Output

- Only if they match will the user be granted access.
- If they don't match the user will not be granted access.
- Password has been changed successfully.
- Incorrect student number or password.
- You have entered the incorrect password too many times, you are now blocked (locked out, contact service provider).

(b) Draw the IPO chart (use draw IO)
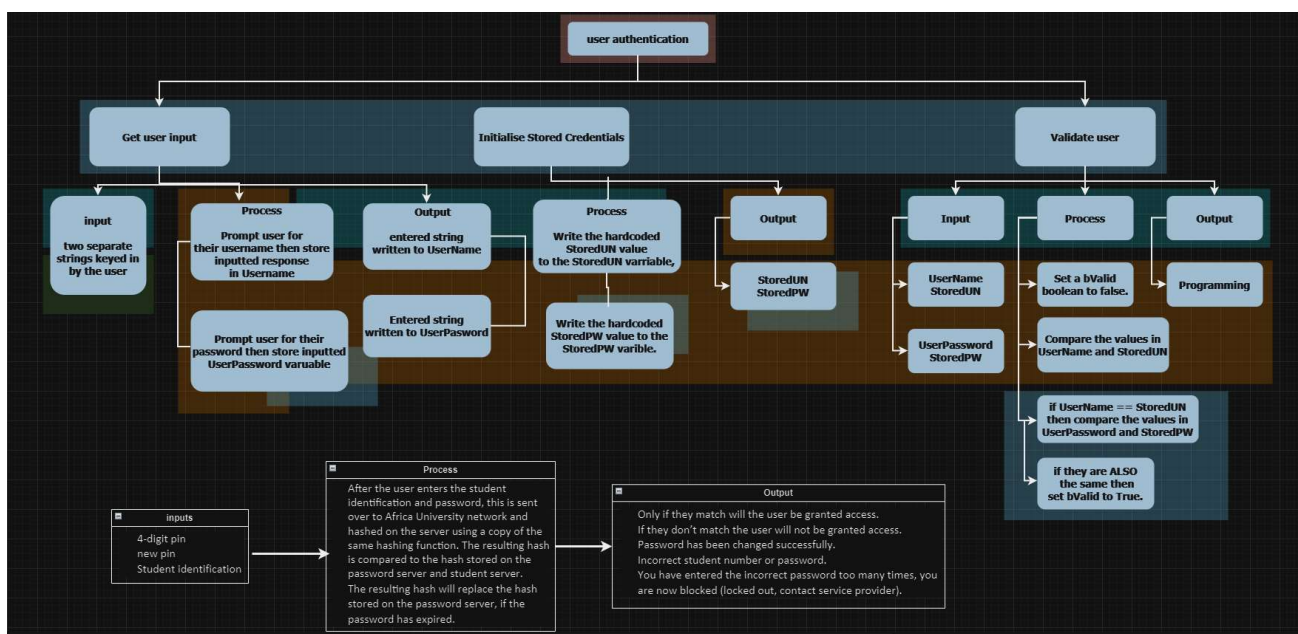
(c) Sketch the user interface (use draw IO) [5marks]

(d) Write the Algorithm in Ms word [5 marks]

Let's go over the criteria for the login page, which includes a 4-digit PIN number, the ability to modify the Password, account lockout after four failed tries, and the ability to add new users. I'll provide an algorithm and a flow diagram for each stage.

1. **Login Algorithm**:
    Input: User enters a 4-digit PIN.
    Steps:
        i. Retrieve the stored Password for the given student id.
        ii. Compare the entered Password with the stored Password.
        iii. If they match, grant access.
        iv. If not, increment the failed login attempts counter.
        v. If the counter reaches three, lock the account.
        vi. Display appropriate messages to the student.
2. **Change Password Algorithm**:
    Input: User provides the old Password and the new Password.
    Steps:
        i. Verify the old Password against the stored Password for the user.
        ii. If they match, update the stored Password with the new Password.
        iii. Display a success message.
        iv. If the old Password doesn't match, display an error message.
3. **Account Lockout Algorithm**:
    Input: Failed login attempts counter.
    Steps:

i. After each failed login attempt, increment the counter.
ii. If the counter reaches three, lock the account.
iii. Display a message indicating that the account is locked.
iv. Prevent further login attempts until the account is unlocked.
4. **Add New User Algorithm**:
   Input: Admin provides a new username and initial Password.
   Steps:
   i. Validate the uniqueness of the username (student id).
   ii. Hash and salt the initial Password.
   iii. Store the username and hashed Password in the database.
   iv. Display a success message.

(e) Design and code the program using the windows forms application [15 marks]

230378.zip/230378/Project/user_authentication/user_authentication.sln

(f) Write 6 test cases for the above program[5marks]

1. Verify that the application displays appropriate messages for successful login, empty components, failed login, blocked user, successful creation, successful password change and invalid credentials.

2. Verify the presence and visibility of login page elements: This test case checks that every component required for the login page is available and accessible to the user.

3. Entering a username that does not exist in the system.

4. Entering a password that does not meet password strength requirements.

5. Testing login after a password reset to ensure the new password works.

6. Conduct load testing to determine the maximum concurrent user logins the system can handle.

(g) Write the user manual for the application [5marks]

User Manual for Login Page

Logging In
- **Enter your 4-digit PIN**: On the login page, you'll see a field to enter your 4-digit PIN. Make sure to enter the PIN that you have set during the registration process.
- **Submit**: After entering your PIN, click on the 'Submit' button to log in.

Changing Your PIN

- **Go to settings**: Once you're logged in, navigate to the 'Settings' section of your account.
- **Select 'Change PIN'**: In the settings, you'll find an option to 'Change PIN'. Click on it.
- **Enter your new PIN**: You'll be prompted to enter a new 4-digit PIN. Make sure it's something you can remember but hard for others to guess.
- **Confirm your new PIN**: You'll need to enter your new PIN again to confirm it.
- **Save changes**: Click on the 'Save Changes' button to update your PIN.

Failed Login Attempts
- **Three attempts**: You have a maximum of three attempts to enter your PIN correctly.
- **Account lock**: If you enter a wrong PIN four times, your account will be locked as a security measure.

Adding a New User
- **Go to 'Add New User'**: Navigate to the 'Add New User' section.
- **Fill out the form**: You'll need to provide the new user's details, such as name, email, etc.
- **Set a PIN**: The new user will need to set a 4-digit PIN for their account.
- **Confirm and create**: After all the details are filled out and the PIN is set, click on 'Create User' to add the new user.

Remember, it's important to keep your PIN secure and not share it with anyone. If you forget your PIN or get locked out of your account, please contact customer support for assistance.

(h) Package and publish the program [5marks]

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