

**FACULTY OF COMPUTERS AND ARTIFICIAL  
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**CS112: Structured Programming**  
**Year 2021 - 2022**  
**Second Semester**

**Assignment 4 – Login Application Description**  
**Version 2.0**

**Deliver ONE fully integrated program with all parts**

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**Revision History**

<b>Version 1.0</b>	By Dr Mohammed El-Ramly	20 April 2022	Main Doc
<b>Version 2.0</b>	By Dr Mohammed El-Ramly	28 April 2022	Removed old pass

# CS112: Structured Programming

## Assignment 4 – Login Application Description



### Detailed Description of the Login Application Program

Most applications have some way for registering new users and for permitting only registered users with valid credentials to log into the application. You team together will create system for registering new users. It will have an initial menu that asks the user if he wants to (1) Register, (2) Login, (3) Change Password, (4) Exit. The team should **divide the work equally** between them and **MUST use GitHub private project** for collaborative development. **All team members must participate** in developing the project and deliver one integrated and working program. The system should allow the user to:

#### User Registration

- 1- A new user can register and add his profile (with personal information) to the system and select a username and a password.
- 2- New user's email and email should not be previously registered in the system by other users
  - If either of them is registered, the system refuses them and ask user to enter new ones
- 3- Ensure email follows proper email format and contains @ followed by dot. (Search for what valid email formats are. For example email cannot start with dot or end with dot or contain two dots in a row. See <https://snov.io/knowledgebase/what-is-a-valid-email-address-format/>)
- 4- Verify mobile format by checking it has the required number and type of digits and starts with 01. Search for valid mobile number formats for Egyptian mobile numbers.
- 5- Ensure that the name follows proper format. For examples names can contain – or letters but not digits or other special characters.
- 6- Display a message to the user of what letters are allowed/required and conditions that must apply to the password.
- 7- Ask the user to repeat the password and make sure it was entered the same twice.
- 8- Verify that the password is a strong one. If not, display to the user a message and ask him for another password. **Search for rules of strong password.**
- 9- Cover the password with \*\*\*\*\* while the user is entering it.
- 10- If registration is valid, the user profile, ID and password are added to the list of system users and stored in the user file.
- 11- Passwords are stored encrypted. Use a suitable encryption algorithm from the ones that you created that works well on **all characters that are allowed in the password.**

#### User Login

- 12- To login, a user enters his ID and password. Password is covered with \*\*\*\*\* while being entered. If the ID matches an ID of a register user, and the password is correct, a message is displayed saying something like "Successful login, welcome xxx his name xxx."
- 13- If login fails, a message is displayed that says "Failed login. Try again."
- 14- The user is given three trials in total, after them, a message is displayed that informs him that he is denied من محروم access to the system. Then he returns to the main menu.

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### Change Password

15-If the user wants to change the password,

- S/he should choose this option and then login.
- Enter his old password.
- Enter the newly desired password.
- Then enter the new password again and it should match the first time he entered it
- The same message, rules, etc. of entering a new **strong** password should apply.
- Then his profile is updated with the new password and it stored encrypted

### BONUS – Forgot Password

16-If the user forgot his password, he can request an email sent to his registered email or phone with an OTP (One Time Password). This allows him to login for once and then he must supply a new password.

- Search of how to send an email from gmail account or an SMS to a mobile number

17-When the user receives the OTP by email or by phone, he uses it to login and the system allows him to do so. Then it welcomes him and asks him to enter a new password. He is NOT asked to enter the old password like in change password option.

- Search of how to send an email from gmail account or an SMS to a mobile number

### C++ Concepts Used:

- 1- Create a suitable **struct** to store the user information / profile, including password.
- 2- Create an array of this **struct** (or map with the **struct** as the value and user ID as the key in order to search for IDs quickly) to load all the profiles from a file at the start of the program and store them at the end of the program and after each change.
- 3- Decide on suitable file format for storing the profiles of the user
- 4- Use **regex** library to verify the correct format of the inputs. It is much easier than other ways.
- 5- Use a suitable encryption algorithm from the ones you created for A2 to
- 6- Use **structured programming** by decomposing the system to multiple functions, each does a specific job and has a specific interface (prototype) to use its services. Then compose the functionality of the system in the main function by calling appropriate functions as needed.
- 7- You can **Overload** << and >> operators to be able to read and a print profile in one step