

A-2 Implementation of the ICGP Algorithm

Choose “PyCharm” from Programs. The first interface that appears looks like Figure (A-13).

1. Opening PyCharm.
2. Click open the ICGP Application Form for **Registration Process**.

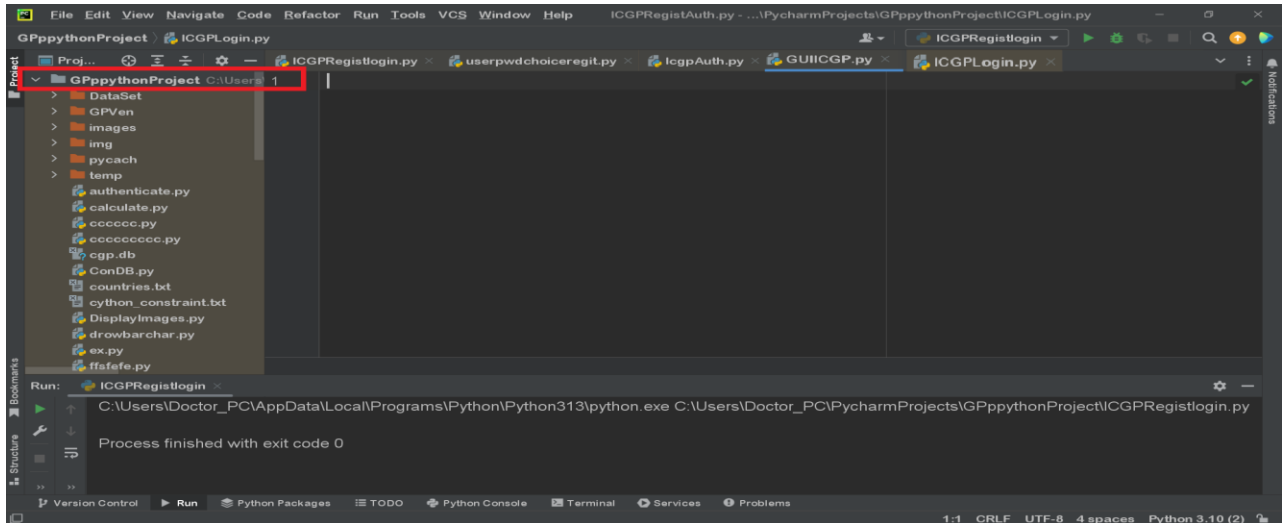


Figure A-13 The First Interface of ICGP Form PyCharm

The second step: involves the user selecting a preferred category from the ICGP dataset to display images from on the registration grid so that the user can remember the image password at the login stage as represented in Figure (A-14).

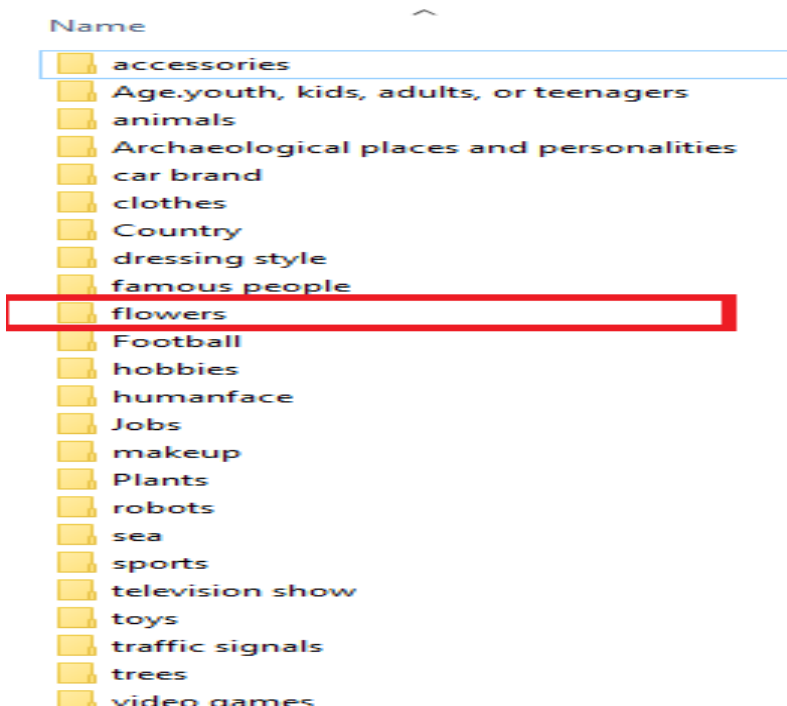


Figure A-14 The First Interface of PyCharm

The third step: Presenting data, the user's data file needs to be loaded first, as represented in Figure (A-15). The user provides an index number to select an authenticated password image from the logging grid. It is the adjacent image of the registered image location, plus that number.

1. Enter the username.
2. Enter an index number "IN".
3. Choose an image from a grid of images, then called the user image "UI".

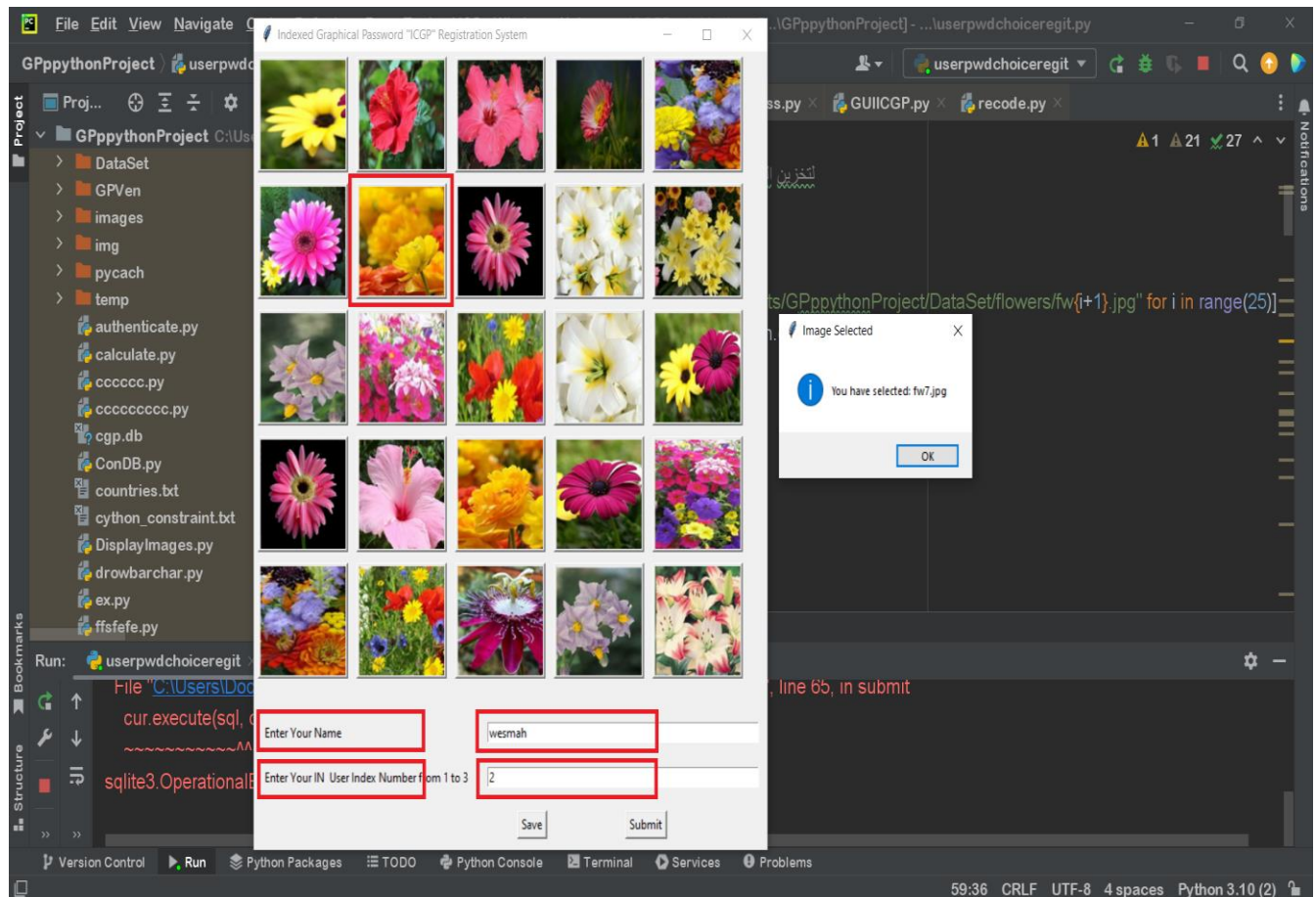


Figure A-15 The First Interface of PyCharm

The fourth step will be saving the user's data as represented in Figure (A-16).

1. Click save button.
 2. Click Submit Button.
- If any record has been missing, the user must re-enter to complete the ICGP registration process.

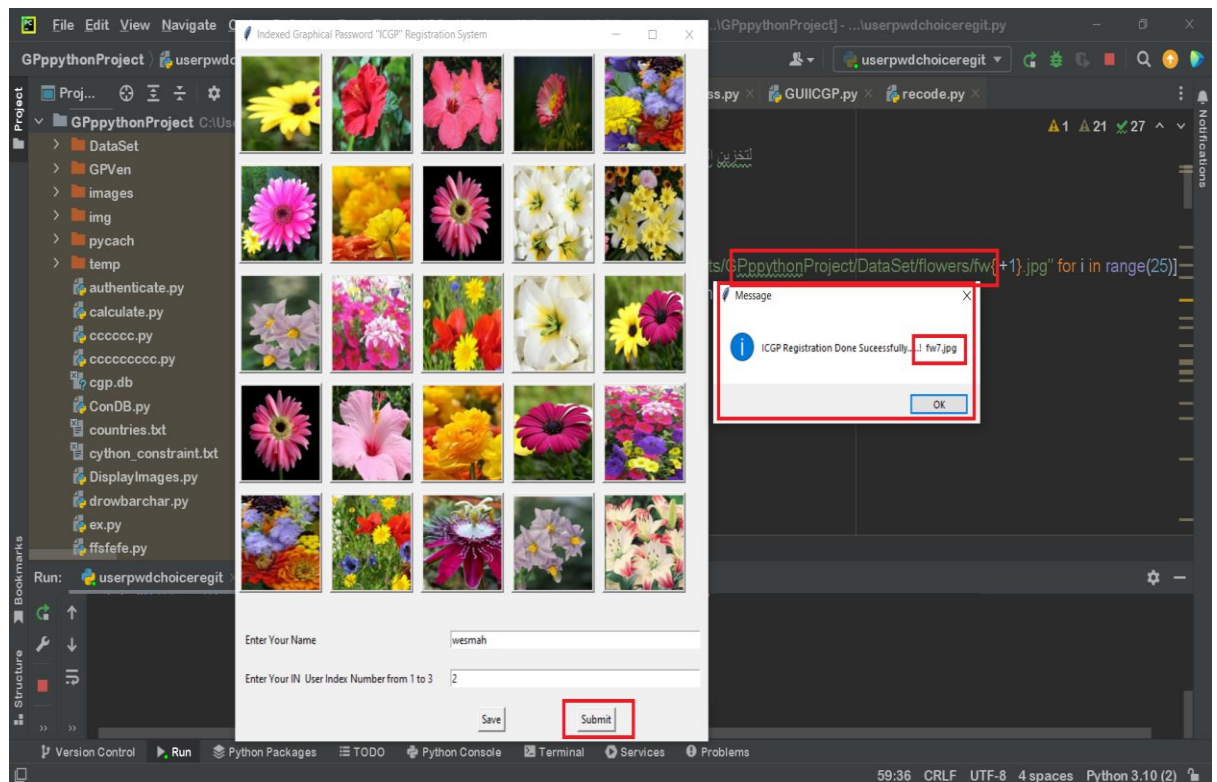


Figure A-16 The First Interface of PyCharm

The fifth step: the ICGP system will save the user's data, and then generates a unique random number for user after registration to be a part of the ICGP password image as represented in Figure (A-17).

4. Save user's data in the SQLite database.
5. Generate a Unique Random Number for the registered user called "UNO".

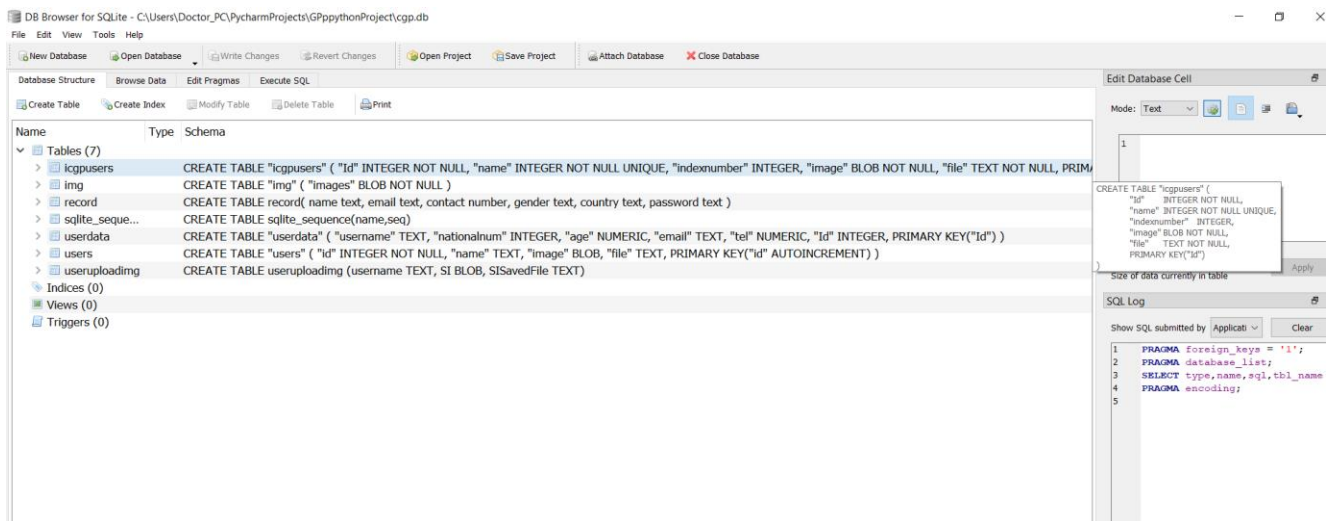


Figure A-17 The First Interface of PyCharm

- The user password record will be the username, random user number and the registered image after resizing, blurring as represented in figure (A-18).

The final format of the password wouldn't be one element, but it was a combination of three factors (user name, user number, and his/her registered image), making it difficult to guess and resistant to several attacks.

The screenshot shows the PyCharm DB Browser for SQLite interface. The main window displays a table named 'icgpusers' with the following data:

Id	name	indexnumber	image	file
1	2	ahm	1	BLOB a24.jpg
2	3	w	2	BLOB a15.jpg
3	4	aa	1	BLOB a24.jpg
4	5	aaa	2	BLOB a25.jpg
5	6	ayse	1	BLOB a8.jpg
6	7	aysel	1	BLOB a2.jpg
7	8	1	1	BLOB a3.jpg
8	9	ibrahem	2	BLOB r5.jpg
9	10	ahmed	3	BLOB r22.jpg
10	11	moh	2	BLOB r5.jpg
11	12	tayseer	3	BLOB fw19.jpg
12	13	hoda	1	BLOB fw9.jpg
13	14	dey	3	BLOB fw18.jpg
14	15	aym	3	BLOB fw18.jpg
15	16	hayam	2	BLOB fw23.jpg
16	17	nag	2	BLOB fw18.jpg
17	18	hagar	1	BLOB fw17.jpg
18	19	ss	1	BLOB fw22.jpg
19	20	wes	1	BLOB fw20.jpg
20	21	wesmoh	1	BLOB fw9.jpg
21	22	wesmah	2	BLOB fw7.jpg

The table is filtered by 'Filter' in any column. The right sidebar shows the 'Edit Database Cell' window with a text input field containing '1'. Below it, the 'SQL Log' window displays the following SQL statements:

```

1  RELEASE "RESTOREPOINT";
2  PRAGMA foreign_keys = '1';
3  PRAGMA database_list;
4  SELECT type,name,sql,tbl_name
5  PRAGMA encoding;
6  PRAGMA database_list;
7  SELECT type,name,sql,tbl_name
8  SELECT COUNT(*) FROM "main"."i
9  SELECT "_rowid_",* FROM "main"
10 PRAGMA database_list;
11 SELECT type,name,sql,tbl_name
12 SELECT COUNT(*) FROM "main"."i
13 SELECT "_rowid_",* FROM "main"
14

```

Figure A-18 The First Interface of PyCharm

- **In the ICGP Authentication step**, users need to be authenticated to log into the system. First open the login form.

1. Click open the ICGP Application for **Authentication Process**.

The second step: receiving data; The user's data file needs to be uploaded, user will enter his/her user name, user number and upload the image he previously choiced at the registration step with the same name and size as represented in Figure (A-10).

1. Enter the user name "UI".
2. Enter the user system number "Uno".
3. Choose an image from the grid.
4. Click login.

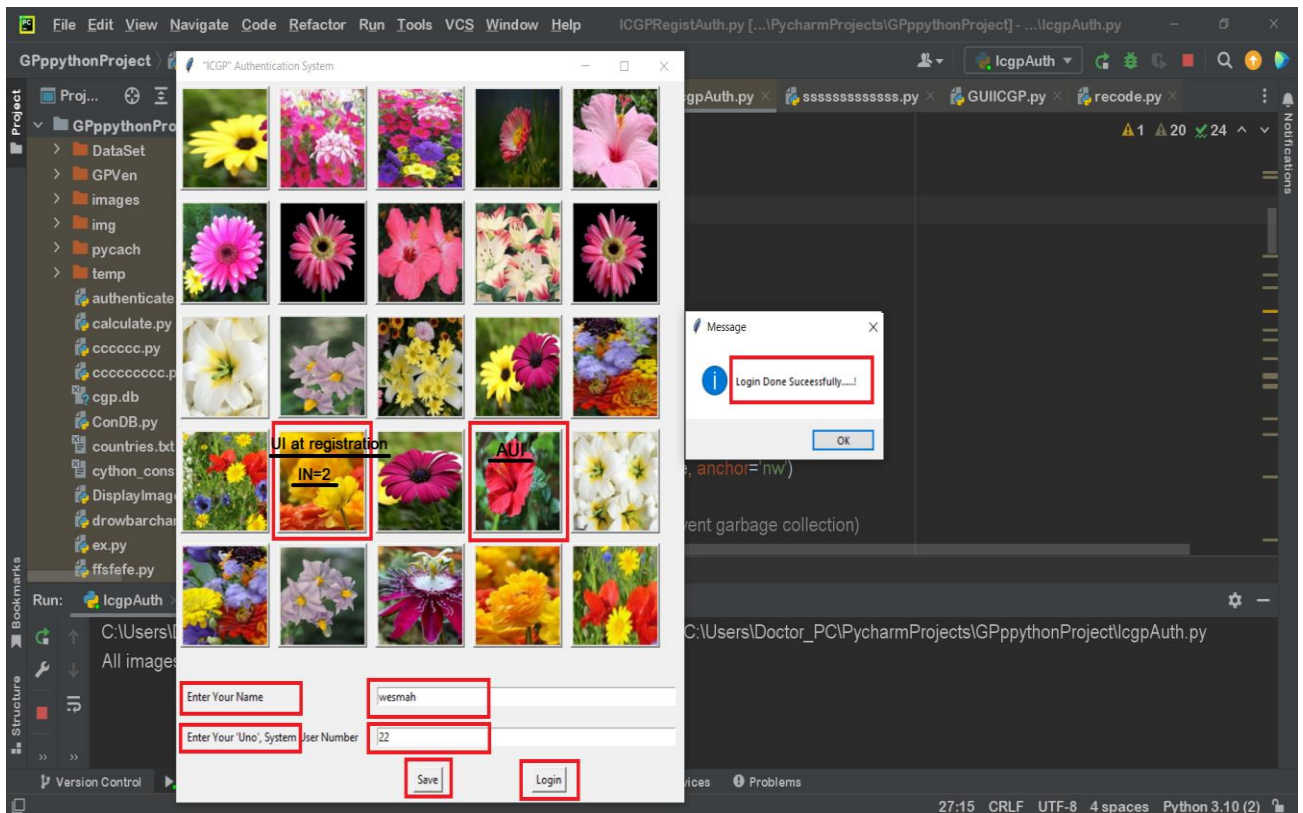


Figure A-10 The Data File Needs to be loaded

- Finally, if the user input all of the registration data correctly, he or she can access the system or web application that used the ICGP graphical password to verify that he or she was the authorized user.