Module Title

Fundamentals of Data Science

Assessment Weightage & Type

50% Individual Coursework

Year

2023-24

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Assignment Due Date: April 6th, 2024

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1. Introduction

In this report, we will discuss the implementation of a student management system using Python. The system allows both administrators and students to perform various tasks such as adding,modifying,deleting student records, viewing grades, and managing ECA. In this report we will be exploring the methodology used in building the system, review the technologies utilized, and reflect on the project's goals, collaboration aspects, and final conclusions.

2. Methodology

- **Requirement Analysis:** We carefully identified what the system needed to do (functional requirements) and how it should perform (non-functional requirements), including defining user roles, features, and how data would be managed.

- **Design:** We created a plan for how the system would be structured, including the classes it would contain, how files would be handled, and how users would interact with it.

- **Implementation:** We wrote the actual code in Python and made sure the code was organized, easy to read, and could handle errors gracefully.

- **Testing:** We thoroughly tested the system to ensure it worked as intended, was robust enough to handle different scenarios, and was secure from potential threats.

- **Maintenance:** We committed to providing ongoing support, fixing any bugs that arose, and updating the system as needed to keep it running smoothly.

3. Review of the Technology

The student management system was implemented using Python, and the help of its simplicity, readability, and extensive standard library. The following technologies and concepts were utilized:

- **File Handling:** Python's file handling capabilities were utilized to store and manage student records, grades, ECAs, and passwords in separate text files.
- **Object-Oriented Programming (OOP):** The system was designed using OOP principles, with classes such as Student representing entities and encapsulating related functionality.
- **Error Handling:** Python's exception handling mechanisms were used to peacefully handle errors and exceptions that may occur during program execution.
- **User Input Handling:** Input functions were utilized to interact with users, allowing them to input data for various operations such as adding,modifying and deleting student records.

4. Reflection

Reflecting on our project journey with the Student Management System, we can't help but feel a sense of pride and accomplishment in what we have achieved together as a team. From the initial conceptualization to the final implementation, our collaboration and dedication have been key in bringing this project to fruition.

One of the most rewarding aspects of working on this project was the opportunity to apply our Python programming skills in a real-world scenario. Developing a system capable of managing both academic and extracurricular records required us to delve deep into various Python libraries and frameworks, honing our technical abilities along the way. It was satisfying to see how our collective knowledge and expertise evolved throughout the development process.

Collaborating as a team of three presented its own set of challenges, but it also fostered a strong sense of camaraderie and mutual support. We effectively leveraged our individual strengths and expertise, with each member contributing unique insights and solutions to different aspects of the project. Regular communication and coordination were essential in ensuring that everyone stayed aligned with the project goals and timelines.

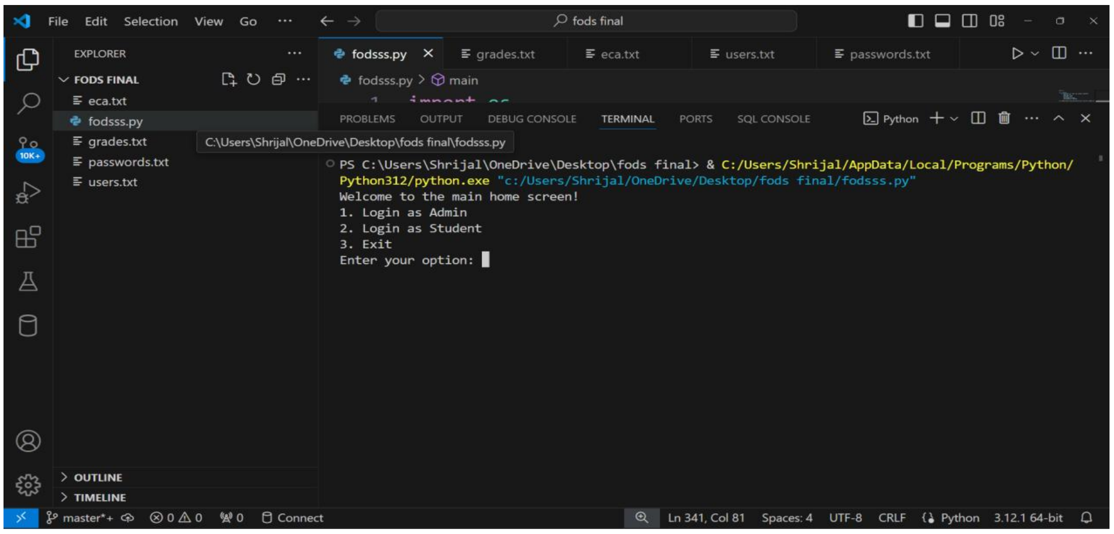
One of the highlights of our project was the iterative development approach we adopted. By breaking down the project into smaller, manageable tasks and conducting frequent reviews and iterations, we were able to make steady progress while continuously refining and improving the system. This iterative process not only helped us stay focused and organized but also allowed us to adapt to any unforeseen challenges or requirements that arose along the way.

Looking back, we believe that one of the key lessons learned from this project was the importance of effective project management and planning. From defining clear objectives and requirements to establishing a realistic timeline and allocating tasks efficiently, proper planning was crucial in keeping the project on track and ensuring its successful completion.

In conclusion, working on the Student Management System project has been a valuable learning experience that has not only enhanced our technical skills but also taught us the importance of teamwork, communication, and effective project management. We are proud of what we have accomplished together, and We're confident that the knowledge and insights gained from this project will serve us well in our future endeavors.

Output:

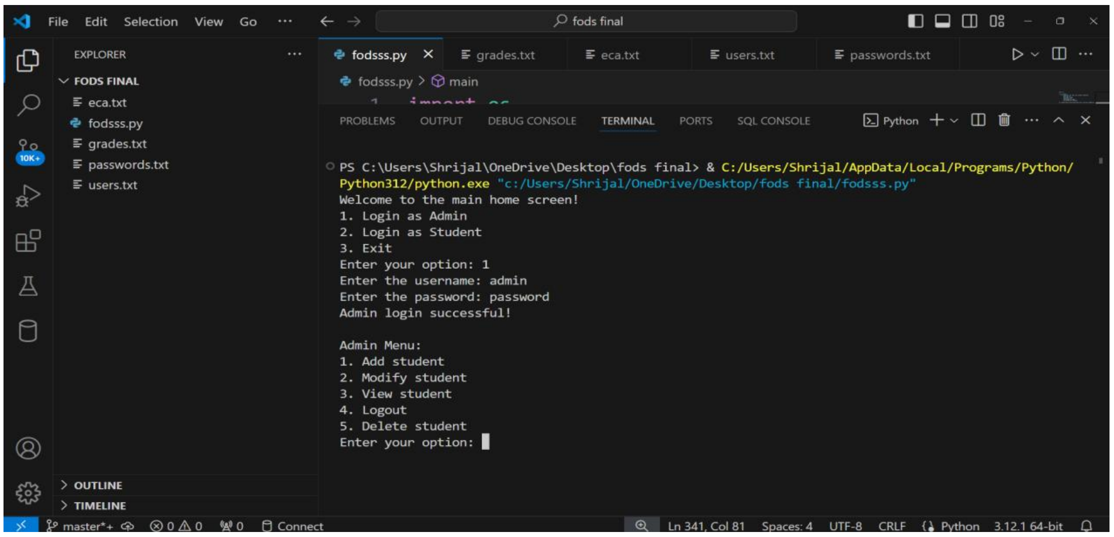
Home screen:



```
PS C:\Users\Shrijal\OneDrive\Desktop\fods final> & C:/Users/Shrijal/AppData/Local/Programs/Python/
Python312/python.exe "c:/Users/Shrijal/OneDrive/Desktop/fods final/fodsss.py"
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option:
```

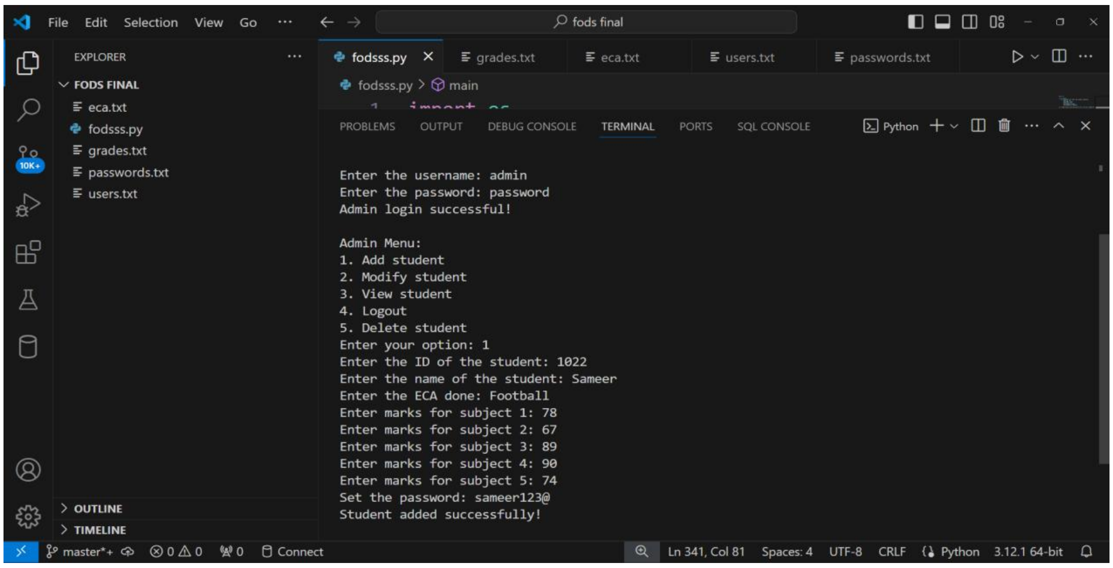
FOR THE ADMIN:

When we enter 1, it asks for the admin username and password. Then the admin menu appears.

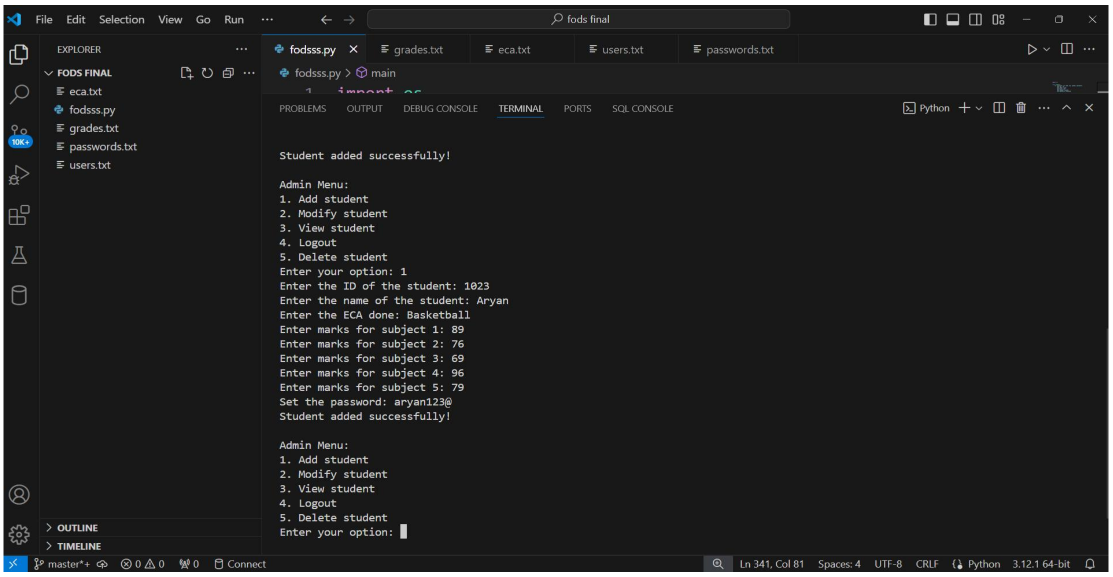


```
PS C:\Users\Shrijal\OneDrive\Desktop\fods final> & C:/Users/Shrijal/AppData/Local/Programs/Python/
Python312/python.exe "c:/Users/Shrijal/OneDrive/Desktop/fods final/fodsss.py"
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option: 1
Enter the username: admin
Enter the password: password
Admin login successful!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option:
```

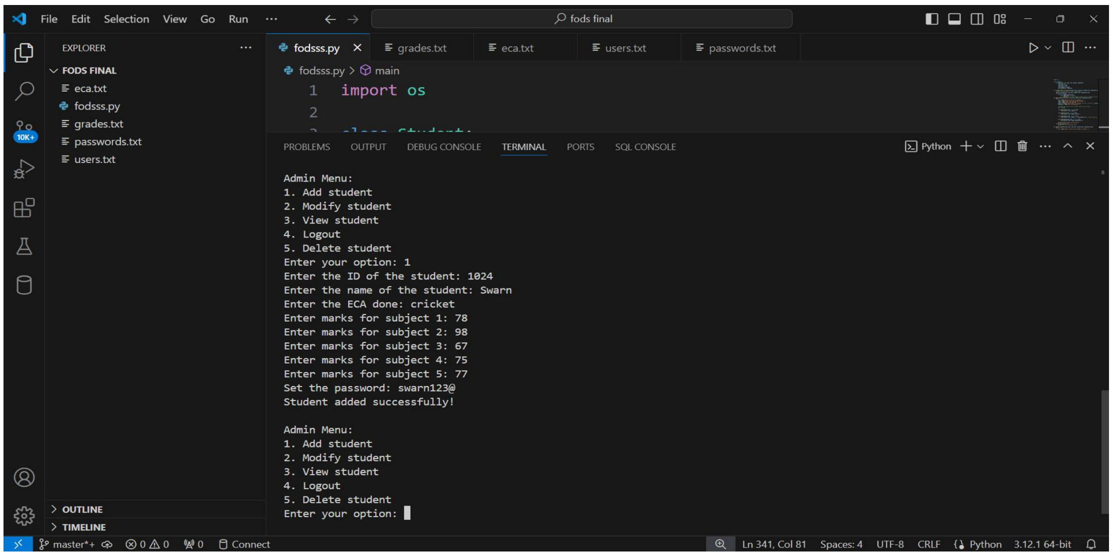
The details of three students have been added: id, name, ECA, marks in 5 subjects and password



```
Enter the username: admin
Enter the password: password
Admin login successful!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 1
Enter the ID of the student: 1022
Enter the name of the student: Sameer
Enter the ECA done: Football
Enter marks for subject 1: 78
Enter marks for subject 2: 67
Enter marks for subject 3: 89
Enter marks for subject 4: 90
Enter marks for subject 5: 74
Set the password: sameer123@
Student added successfully!
```



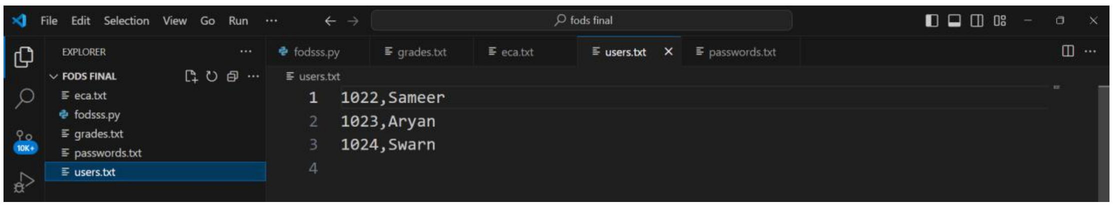
```
Student added successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 1
Enter the ID of the student: 1023
Enter the name of the student: Aryan
Enter the ECA done: Basketball
Enter marks for subject 1: 89
Enter marks for subject 2: 76
Enter marks for subject 3: 69
Enter marks for subject 4: 96
Enter marks for subject 5: 79
Set the password: aryan123@
Student added successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option:
```



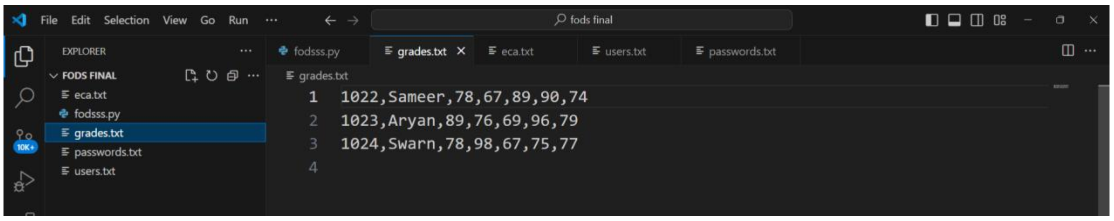
```
import os
```

```
Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 1
Enter the ID of the student: 1024
Enter the name of the student: Swarn
Enter the ECA done: cricket
Enter marks for subject 1: 78
Enter marks for subject 2: 98
Enter marks for subject 3: 67
Enter marks for subject 4: 75
Enter marks for subject 5: 77
Set the password: swarn123@
Student added successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option:
```

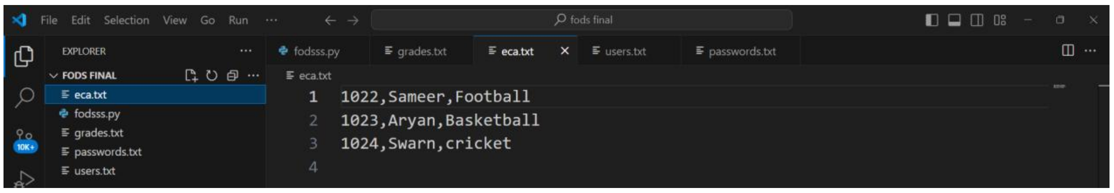
We can see that the records have been added in the respective txt files:



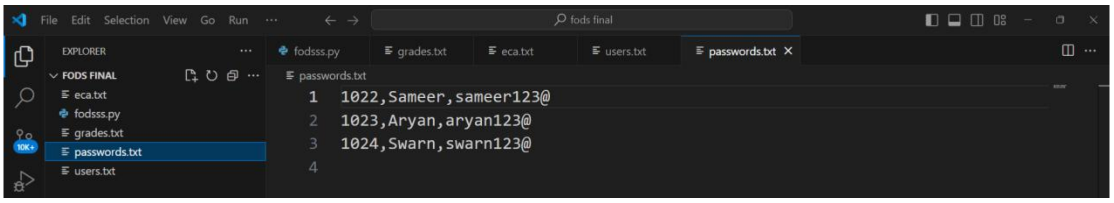
```
1022,Sameer
1023,Aryan
1024,Swarn
```



```
1022,Sameer,78,67,89,90,74
1023,Aryan,89,76,69,96,79
1024,Swarn,78,98,67,75,77
```

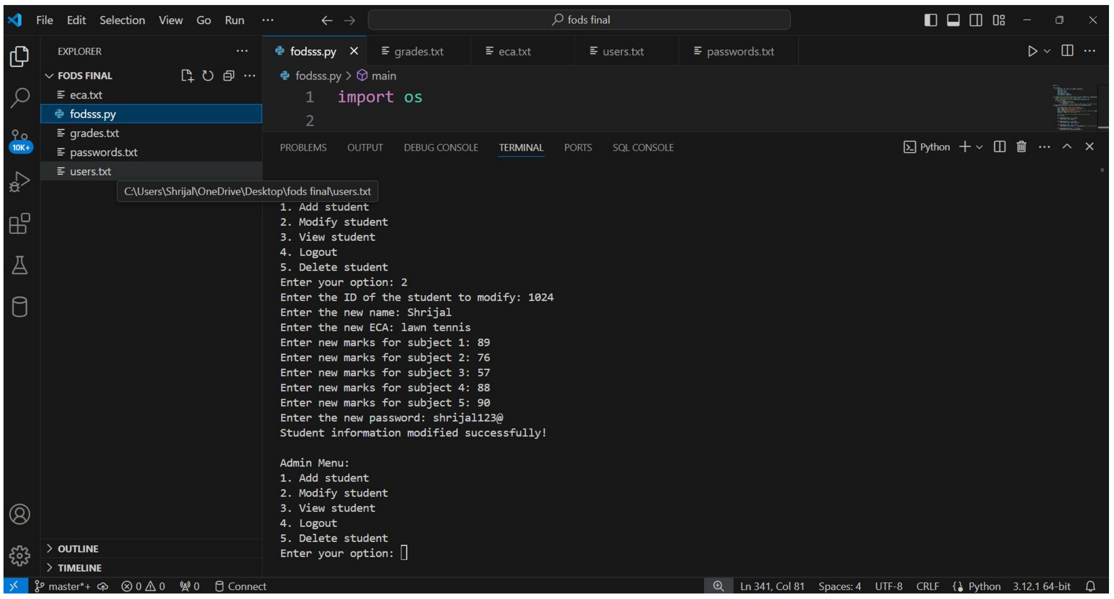


```
1022,Sameer,Football
1023,Aryan,Basketball
1024,Swarn,cricket
```



```
1022,Sameer,sameer123@
1023,Aryan,aryan123@
1024,Swarn,swarn123@
```

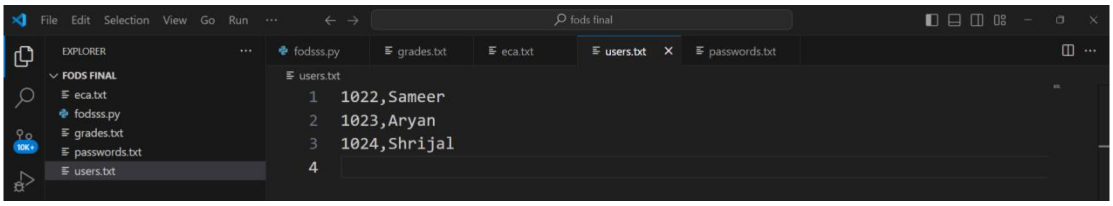
When we enter 2 for modifying students it asks for the details of the new student:



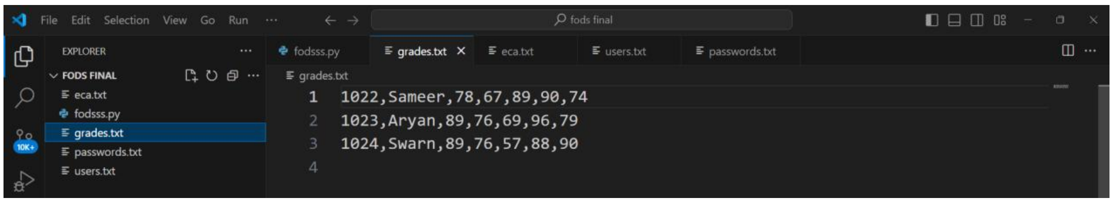
```
import os
```

```
C:\Users\Shrijal\OneDrive\Desktop\fods final\users.txt
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 2
Enter the ID of the student to modify: 1024
Enter the new name: Shrijal
Enter the new ECA: lawn tennis
Enter new marks for subject 1: 89
Enter new marks for subject 2: 76
Enter new marks for subject 3: 57
Enter new marks for subject 4: 88
Enter new marks for subject 5: 90
Enter the new password: shrijal123@
Student information modified successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 
```

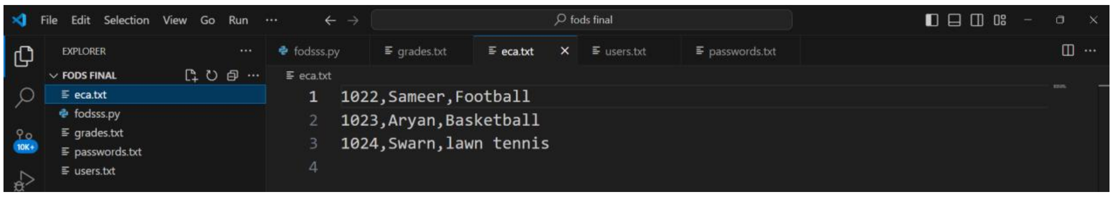
When we check the txt files, it shows with the changes:



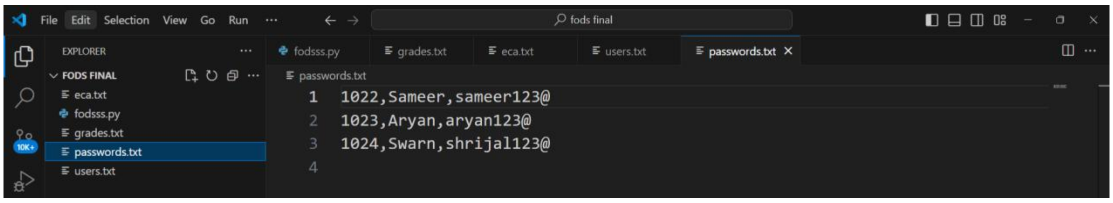
```
1022,Sameer
1023,Aryan
1024,Shrijal
```



```
1022,Sameer,78,67,89,90,74
1023,Aryan,89,76,69,96,79
1024,Swarn,89,76,57,88,90
```

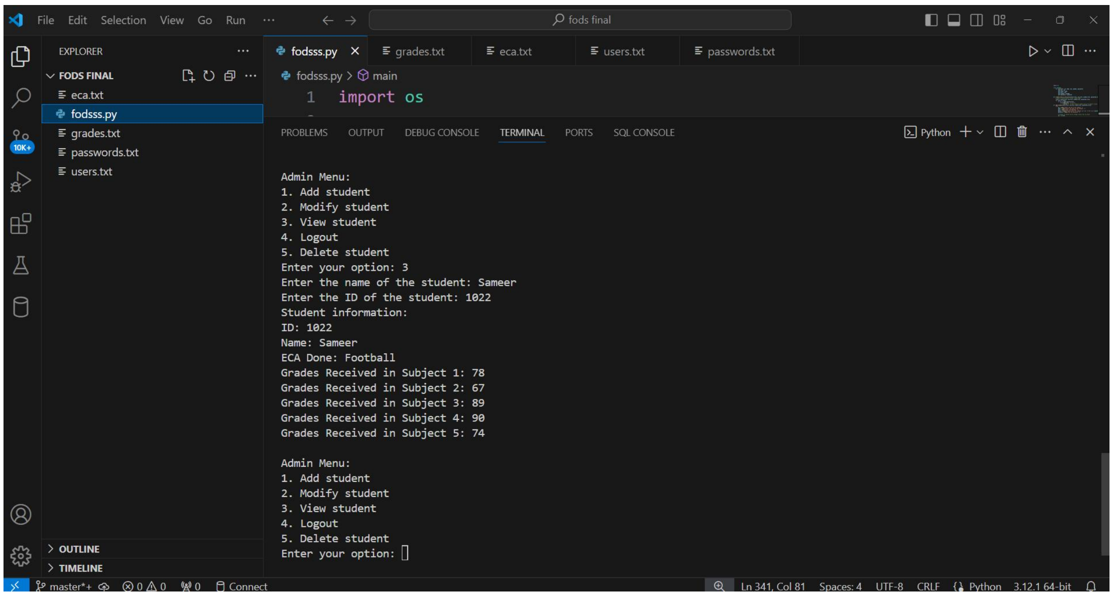


```
1022,Sameer,Football
1023,Aryan,Basketball
1024,Swarn,lawn tennis
```



```
1022,Sameer,sameer123@
1023,Aryan,aryan123@
1024,Swarn,shrijal123@
```

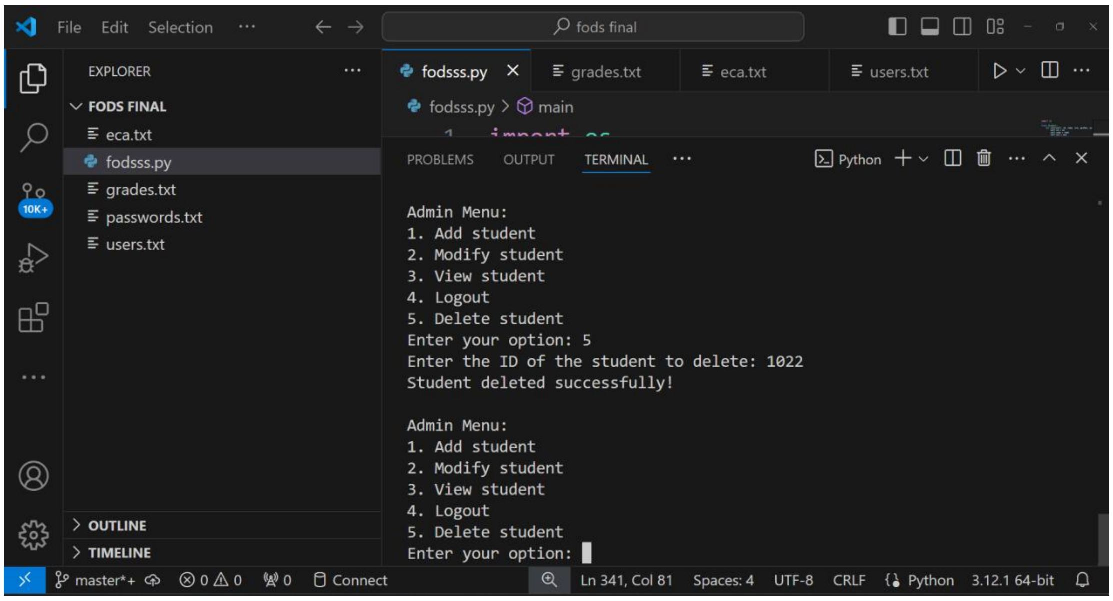
When we view students, it shows all the reocrds of the student



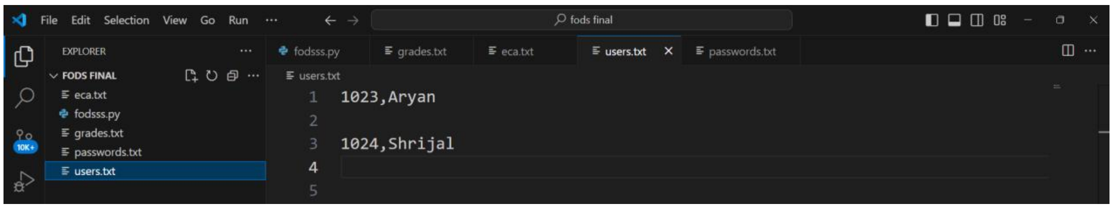
```
import os
```

```
Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 3
Enter the name of the student: Sameer
Enter the ID of the student: 1022
Student information:
ID: 1022
Name: Sameer
ECA Done: Football
Grades Received in Subject 1: 78
Grades Received in Subject 2: 67
Grades Received in Subject 3: 89
Grades Received in Subject 4: 90
Grades Received in Subject 5: 74

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 
```

When we delete student, the data gets deleted from all the txt files:

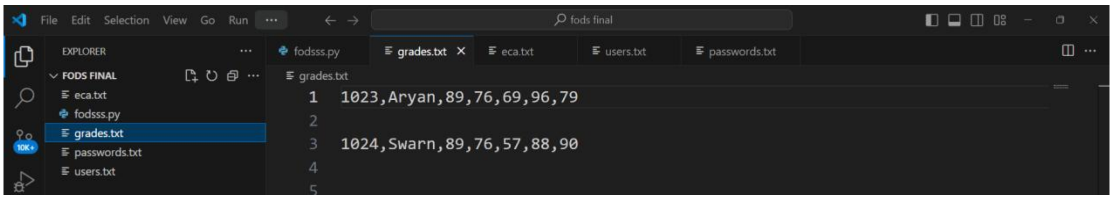


```
Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 5
Enter the ID of the student to delete: 1022
Student deleted successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option:
```



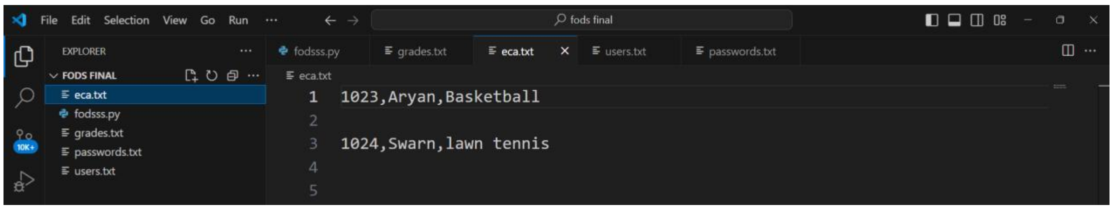
users.txt

```
1023,Aryan

1024,Shrijal
```



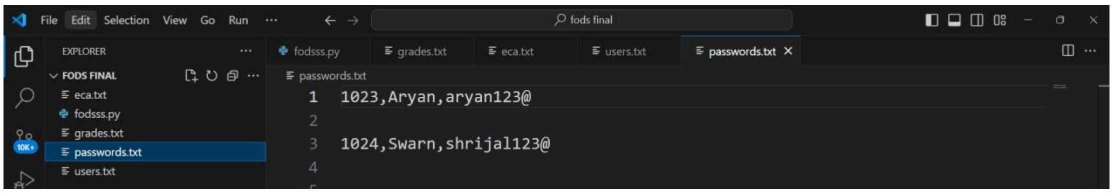
grades.txt

```
1023,Aryan,89,76,69,96,79

1024,Swarn,89,76,57,88,90
```



eca.txt

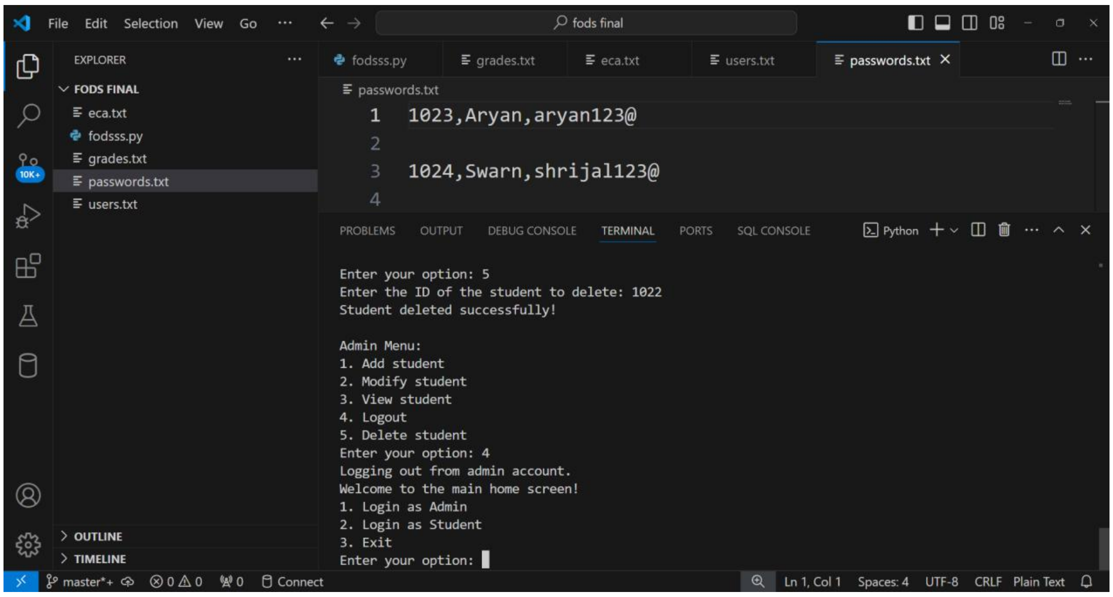
```
1023,Aryan,Basketball

1024,Swarn,lawn tennis
```



passwords.txt

```
1023,Aryan,aryan123@

1024,Swarn,shrijal123@
```

When we log out, it send us back to the home screen:


File Edit Selection View Go
fods final
EXPLORER
FODS FINAL
eca.txt
fodsss.py
grades.txt
passwords.txt
users.txt
OUTLINE
TIMELINE
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS SQL CONSOLE
Python
master*+ 0 0 0 Connect
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Plain Text

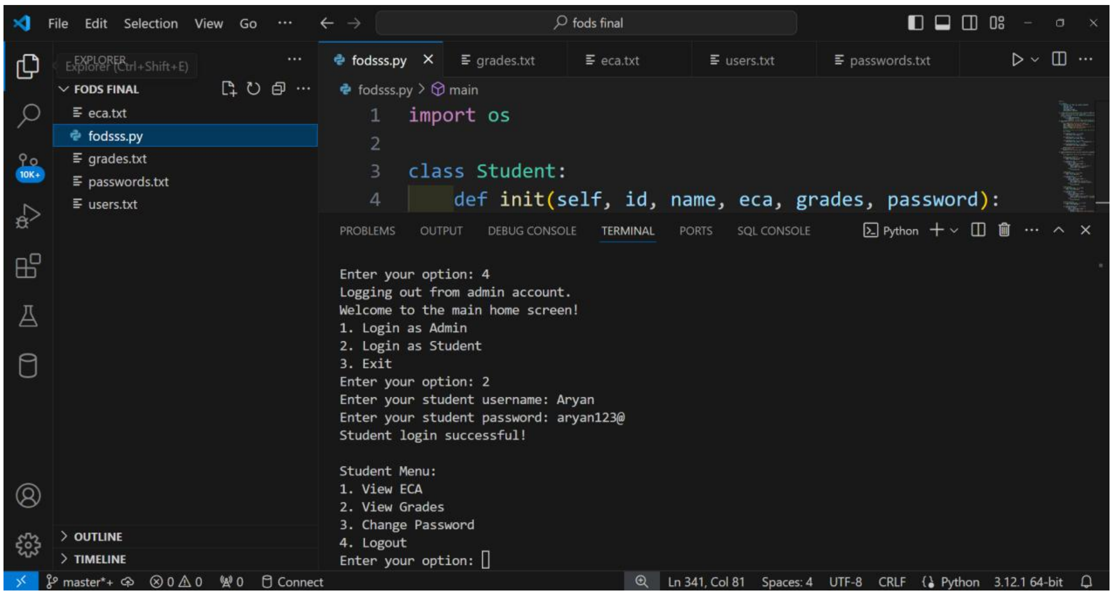
passwords.txt

```
1023,Aryan,aryan123@

1024,Swarn,shrijal123@
```

```
Enter your option: 5
Enter the ID of the student to delete: 1022
Student deleted successfully!

Admin Menu:
1. Add student
2. Modify student
3. View student
4. Logout
5. Delete student
Enter your option: 4
Logging out from admin account.
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option: 
```

FOR STUDENT LOGIN:

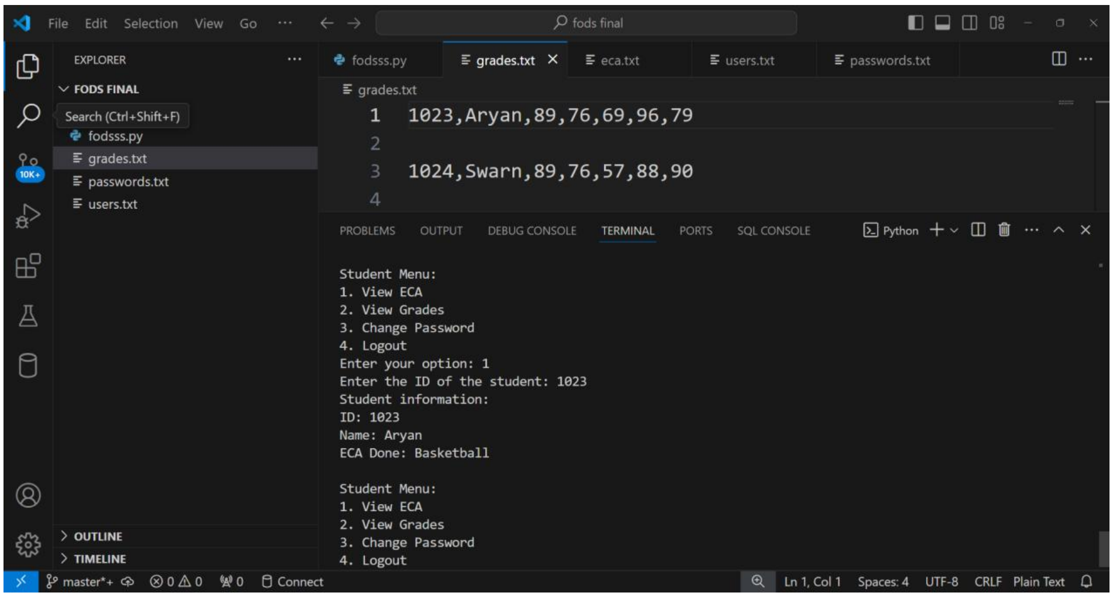
When we enter 2 to login as student, it asks for username and password and finally student menu appears:



```python
import os

class Student:
    def init(self, id, name, eca, grades, password):
```

```
Enter your option: 4
Logging out from admin account.
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option: 2
Enter your student username: Aryan
Enter your student password: aryan123@
Student login successful!

Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
Enter your option:
```

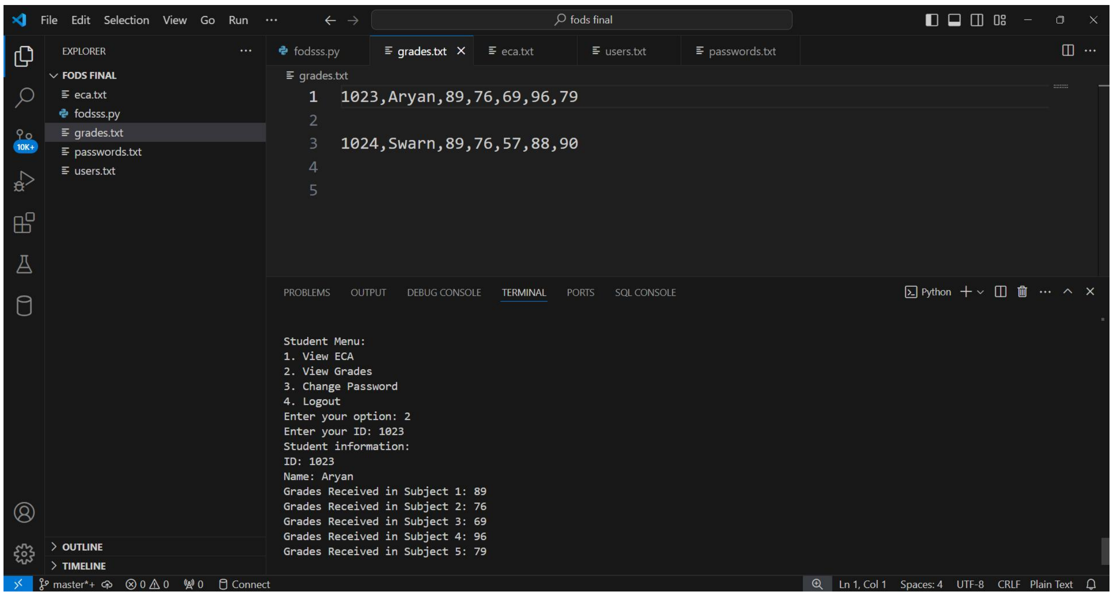
When we click option 1; view ECA and enter our details, it shows our ECA:



```
1023,Aryan,89,76,69,96,79

1024,Swarn,89,76,57,88,90

```

```
Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
Enter your option: 1
Enter the ID of the student: 1023
Student information:
ID: 1023
Name: Aryan
ECA Done: Basketball

Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
```

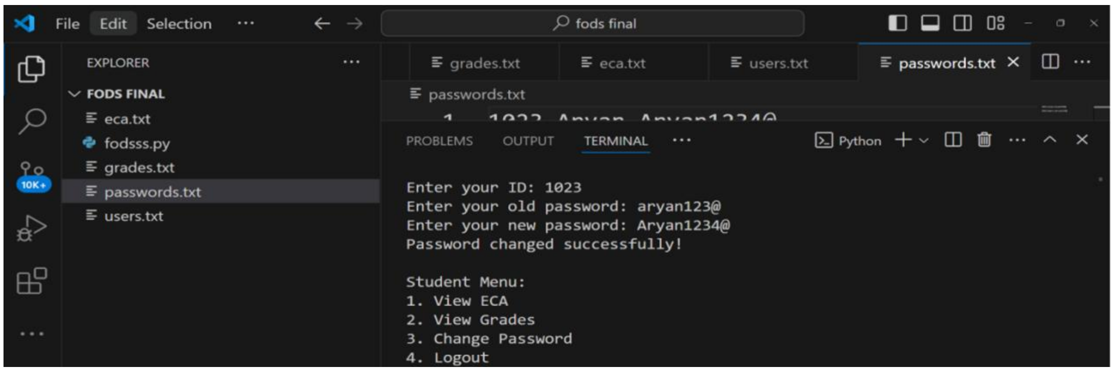
When we click option 2; view grades and enter our details, it shows our grades:



```
1023,Aryan,89,76,69,96,79

1024,Swarn,89,76,57,88,90
```

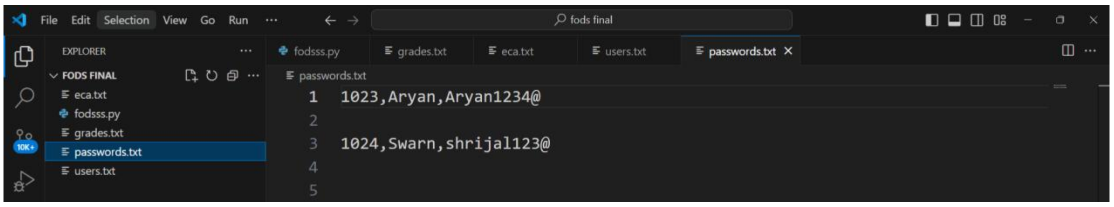
```
Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
Enter your option: 2
Enter your ID: 1023
Student information:
ID: 1023
Name: Aryan
Grades Received in Subject 1: 89
Grades Received in Subject 2: 76
Grades Received in Subject 3: 69
Grades Received in Subject 4: 96
Grades Received in Subject 5: 79
```

When we click option 3 to change password; it asks for previous password for verification:



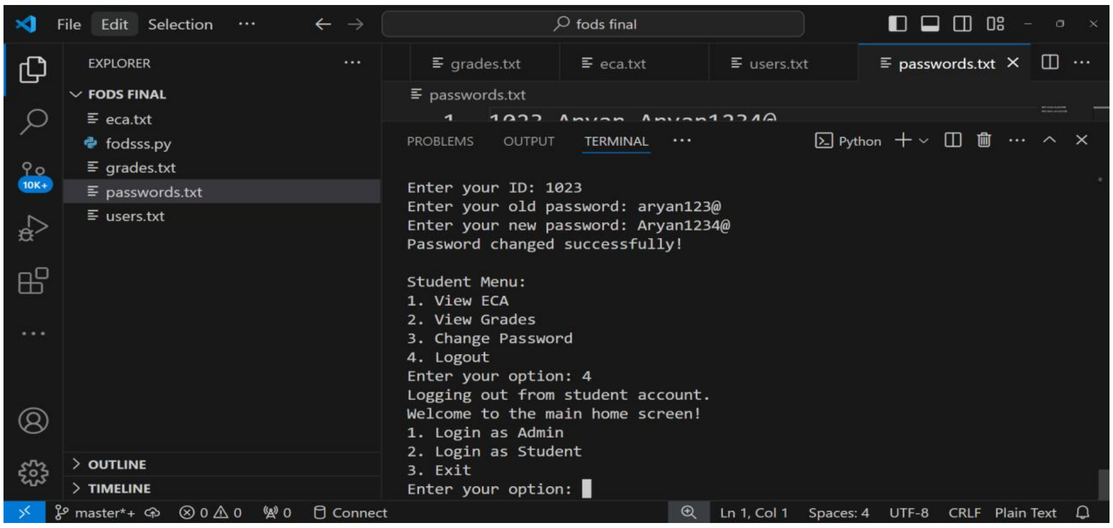
```
Enter your ID: 1023
Enter your old password: aryan123@
Enter your new password: Aryan1234@
Password changed successfully!

Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
```

We can see the changed password here in the txt:



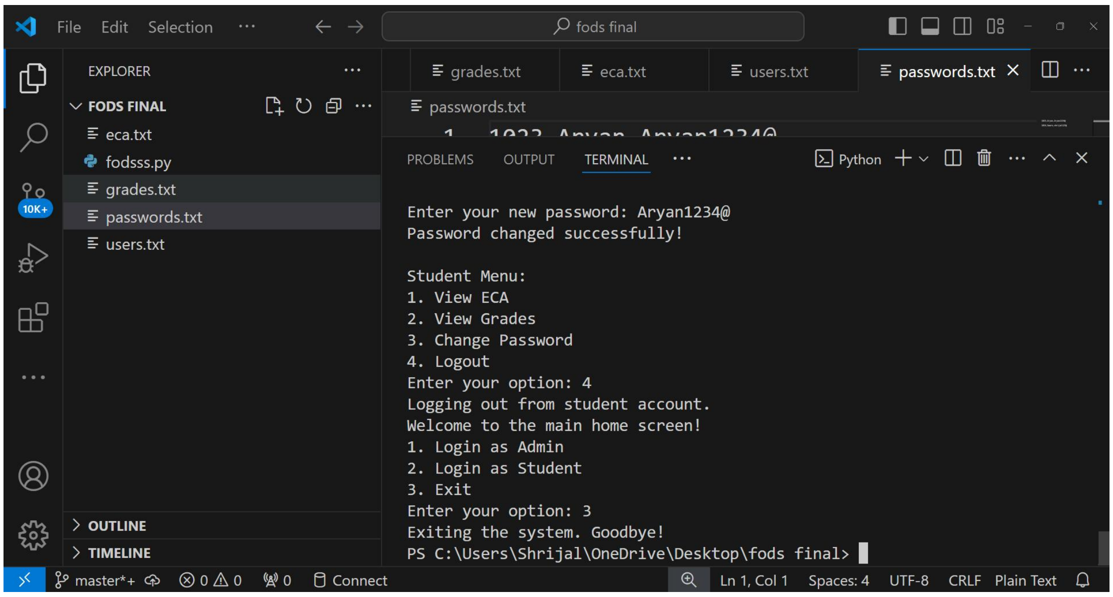
```
1023,Aryan,Aryan1234@

1024,Swarn,shrijal123@
```

When we click on option 4 for logout, it sends us back to the home screen:



```
Enter your ID: 1023
Enter your old password: aryan123@
Enter your new password: Aryan1234@
Password changed successfully!

Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
Enter your option: 4
Logging out from student account.
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option:
```

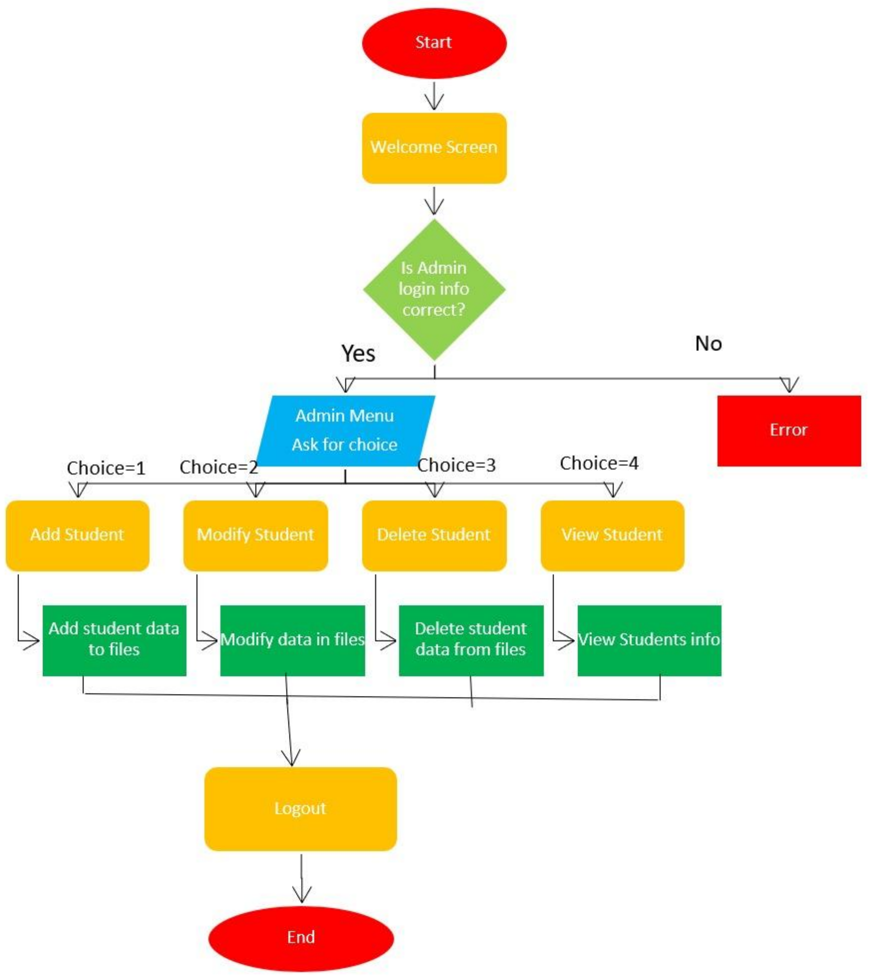
When we enter option 3 to exit, it says Exiting the system. Goodbye!



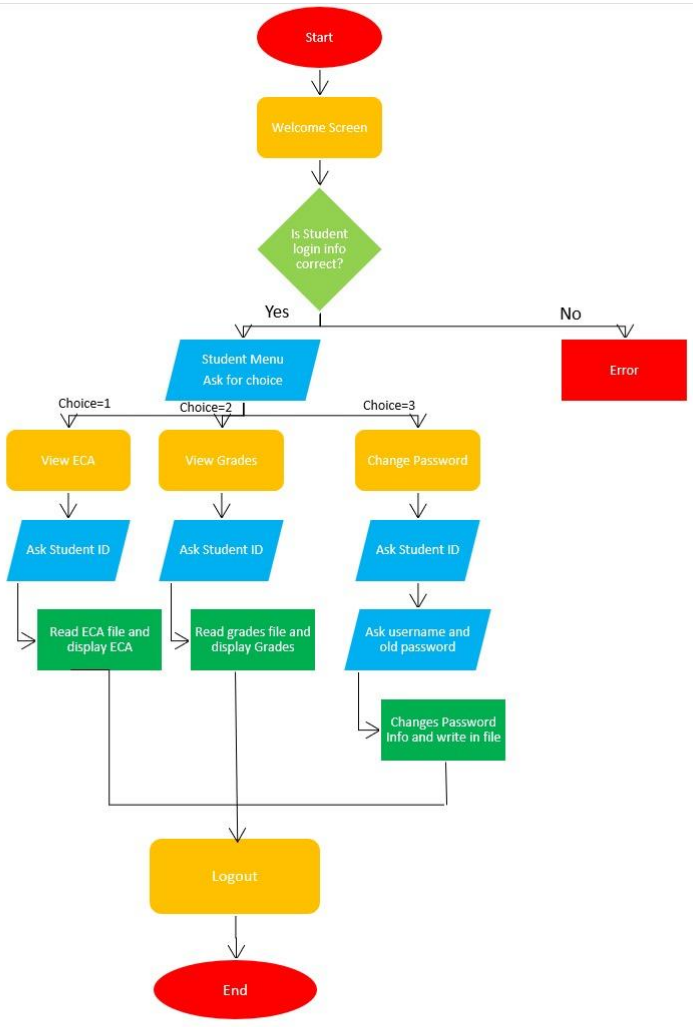
```
Enter your new password: Aryan1234@
Password changed successfully!

Student Menu:
1. View ECA
2. View Grades
3. Change Password
4. Logout
Enter your option: 4
Logging out from student account.
Welcome to the main home screen!
1. Login as Admin
2. Login as Student
3. Exit
Enter your option: 3
Exiting the system. Goodbye!
PS C:\Users\Shrijal\OneDrive\Desktop\fods final>
```

FLOWCHART:

For Admin login:



For Student login:


Start
Welcome Screen
Is Student login info correct?
Yes
No
Student Menu Ask for choice
Error
Choice=1
Choice=2
Choice=3
View ECA
View Grades
Change Password
Ask Student ID
Ask Student ID
Ask Student ID
Read ECA file and display ECA
Read grades file and display Grades
Ask username and old password
Changes Password Info and write in file
Logout
End

LIMITATIONS:

- **Security:**

Passwords are stored as plain text, which is unsafe. They could be hashed and salted. There's no proper authentication mechanism for admin login, making it vulnerable to unauthorized access.

- **Input Validation:**

User inputs aren't thoroughly checked, which can lead to problems. Converting user input to integers without proper error handling can also cause problems.

- **File Handling:**

File operations lack error handling, which can result in unexpected behavior.

- **Scalability**:

Managing data in files may become inefficient as the system grows. Using a database would be better for scalability and data integrity.

- **Error Reporting:**

Error messages don't provide enough information to users, making it hard to understand and fix issues.

- **User Experience:**

The command-line interface may not be user-friendly, especially for non-technical users. A more intuitive GUI based interface would improve usability.

- **Error Handling:**

Error handling is minimal and needs improvement to provide better feedback and handle unexpected situations properly.