

Virtual Classroom Manager Programming

Problem Statement

Imagine you are developing the backend for an EdTech platform that aims to host virtual classrooms. Your task is to create a terminal-based Virtual Classroom Manager that handles class scheduling, student attendance, and assignment submissions

Sample Input and Outputs

PROJECT INITIATION

```
Jul 28, 2024 4:17:03 PM Classroom.AddClassroom loadClassroomsFromFile
INFO: Classrooms loaded from file
Jul 28, 2024 4:17:03 PM Student.AddStudentData loadStudentDataFromFile
INFO: Student data loaded from file
WELCOME TO EI CLASSROOM MANAGEMENT SYSTEM!
-----
Main Menu:
-----
1. Add Classroom - add_classroom [classroom_name]
2. View Classrooms - view_classroom
3. View Recent Classrooms - view_recent
4. Remove Classroom - remove_classroom [classroom_name]
5. Add Student - add_student [student_id] [class1 class2 ...]
6. Display Students by Classroom - students_at [classroom_name]
7. Display All Classrooms - display_all_classrooms
8. Schedule Assignment - schedule_assignment [classroom_name]
9. Submit Assignment - submit_assignment [studentId] [classroom]
10. Display Assignment Details - assignment_det
11. Display Assignment Details by Classroom- status_view [classroom]
12. Display Assignment Menu - display_menu
13. Exit - exit
-----
```

CLASSROOM

Existing Classroom.txt file

```
Classroom > ≡ classrooms.txt > data
1 os,2024-07-24 22:23:55
2 dbms,2024-07-24 22:24:14
3 networks,2024-07-24 22:24:03
4 dsa,2024-07-24 22:17:29
5 oops,2024-07-24 22:17:50
```

Command 1 : add_classroom <Classroom_name> (To add Classroom)

```
Jul 26, 2024 7:45:04 PM Classroom.AddClassroom loadClassroomsFromFile
INFO: Classrooms loaded from file
Jul 26, 2024 7:45:04 PM Student.AddStudentData loadStudentDataFromFile
INFO: Student data loaded from file
Welcome to the Classroom Management System!

Enter command (type 'exit' to quit):
add_classroom logical_thinking
Jul 26, 2024 7:45:34 PM Classroom.AddClassroom saveClassroomToFile
INFO: Classroom saved to file: logical_thinking at 2024-07-26 19:45:34
Classroom added: logical_thinking
```

Updated Classroom

```
Classroom > ≡ classrooms.txt > data
1  os,2024-07-24 22:23:55
2  dbms,2024-07-24 22:24:14
3  networks,2024-07-24 22:24:03
4  dsa,2024-07-24 22:17:29
5  oops,2024-07-24 22:17:50
6  logical_thinking,2024-07-26 19:45:34
```

Command 1.1 - add_classroom <Classroom1 Classroom2 Classroomn> (To add Multiple Classrooms)

```
Enter command (type 'exit' to quit):
add_classroom logic1 logic2 logic3
Jul 26, 2024 8:04:31 PM Classroom.AddClassroom saveClassroomToFile
INFO: Classroom saved to file: logic1 logic2 logic3 at 2024-07-26 20:04:31
Classroom added: logic1 logic2 logic3
Jul 26, 2024 8:04:31 PM Classroom.AddClassroom addClassroom
INFO: Classroom added: logic1 logic2 logic3
```

Command 2 - view_classroom (To View Entire Classroom List)

```
Enter command (type 'exit' to quit):
view_classroom
Total number of classrooms: 5
Classrooms (sorted by creation date):
Classroom: dsa, Created at: 2024-07-24 22:17:29
Classroom: os, Created at: 2024-07-24 22:23:55
Classroom: networks, Created at: 2024-07-24 22:24:03
Classroom: dbms, Created at: 2024-07-24 22:24:14
Classroom: logical_thinking, Created at: 2024-07-26 19:45:34
Jul 26, 2024 8:03:05 PM Classroom.ViewClassroom displayClassrooms
INFO: Displayed all classrooms sorted by creation date
```

Command 3 – view_recent(To view Recently Added Classrooms)

```
Enter command (type 'exit' to quit):
view_recent
Recently added classrooms:
Classroom: networks, Created at: 2024-07-24 22:24:03
Classroom: dbms, Created at: 2024-07-24 22:24:14
Classroom: logical_thinking, Created at: 2024-07-26 19:45:34
Jul 26, 2024 7:57:18 PM Classroom.ViewClassroom displayRecentClassrooms
INFO: Displayed the most recently added classrooms (up to 3)
```

Command 4 - remove_classroom <classroom_name> (To Remove Classroom)

```
Enter command (type 'exit' to quit):
remove_classroom oops
Are you sure you want to remove the classroom: oops? (yes/no)
yes
Jul 26, 2024 7:59:18 PM Classroom.RemoveClassroom saveUpdatedClassroomsToFile
INFO: Updated classroom list saved to file
Classroom removed: oops
Jul 26, 2024 7:59:18 PM Classroom.RemoveClassroom removeClassroom
INFO: Classroom removed: oops
```

Error Handling

```
Enter command (type 'exit' to quit):
add classroom
Invalid command: add
```

```
Enter command (type 'exit' to quit):
view_classrooms
Invalid command: view_classrooms
```

```
Enter command (type 'exit' to quit):
add_classroom os
Warning: Classroom already exists: os
Jul 26, 2024 8:07:18 PM Classroom.AddClassroom addClassroom
WARNING: Attempt to add an existing classroom: os
```

```
Enter command (type 'exit' to quit):
remove_classroom nosql
Are you sure you want to remove the classroom: nosql? (yes/no)
yes
Error: Classroom does not exist: nosql
Jul 26, 2024 8:07:59 PM Classroom.RemoveClassroom removeClassroom
WARNING: Attempt to remove non-existing classroom: nosql
```

STUDENT

Existing File Available

```
Student > ≡ students.txt
1 01,rithish,rithishkanna@student.tce.edu,9876454321,dsa,os
2 02,ramesh,ramesh@gmail.com,9876543621,dsa
3 05,ravi,ravi123@gmail.com,8901234567,dsa
4 07,ram,ram@gmail.com,1234567890,dsa
5 08,rakesh,raki@gmail.com,5678901234,dsa,os,networks,dbms
```

Command 5 – add_student <Classroom_name> (To Add Student to one Classroom)

```
Enter command (type 'exit' to quit):
add_student 09 dsa
Enter Student Name: santhosh
Enter Student Email: santhosh@gmail.com
Enter Student Phone Number: 5678912340
Jul 26, 2024 8:11:50 PM Student.AddStudentData saveStudentToFile
INFO: Student saved to file: santhosh with ID 09
Student Addition: Student 09 has been enrolled in dsa.
Jul 26, 2024 8:11:51 PM Student.AddStudentData addStudent
INFO: Student added: santhosh with ID 09
```

Command 5.1 - add_student <Classroom_name1 Classroom_name2 Classroom_name_n >
(To Add Student to Multiple Classroom)

```
Enter command (type 'exit' to quit):
add_student 10 dsa os logical_thinking
Enter Student Name: ragul
Enter Student Email: ragul@gmail.com
Enter Student Phone Number: 4612358909
Jul 26, 2024 8:13:38 PM Student.AddStudentData saveStudentToFile
INFO: Student saved to file: ragul with ID 10
Student Addition: Student 10 has been enrolled in dsa, os, logical_thinking.
Jul 26, 2024 8:13:38 PM Student.AddStudentData addStudent
INFO: Student added: ragul with ID 10
```

Student.txt after Updation

```
Student > ≡ students.txt
1 01,rithish,rithishkanna@student.tce.edu,9876454321,dsa,os
2 02,ramesh,ramesh@gmail.com,9876543621,dsa
3 05,ravi,ravi123@gmail.com,8901234567,dsa
4 07,ram,ram@gmail.com,1234567890,dsa
5 08,rakesh,raki@gmail.com,5678901234,dsa,os,networks,dbms
6 09,santhosh,santhosh@gmil.com,5678912340,dsa
7 10,ragul,ragul@gmail.com,4612358909,dsa,os,logical_thinking
8
```

Command 6 - students_at <Classroom_name> (To display the Students at specific class)

```
Enter command (type 'exit' to quit):
students_at dsa
Students in classroom: dsa
```

S.No	ID	Name	Email	Phone Number
1	01	rithish	rithishkanna@student.tce.edu	0987654321
2	05	ravi	ravi123@gmail.com	8901234567
3	08	rakesh	raki@gmail.com	5678901234
4	07	ram	ram@gmail.com	1234567890
5	02	ramesh	ramesh@gmail.com	0987654321
6	09	santhosh	santhosh@gmil.com	5678912340
7	10	ragul	ragul@gmail.com	4612358909

```
Total Enrollments in dsa: 7
```

Command 7 - display_all_classrooms (To display All Classes with details of Student)

```
Enter command (type 'exit' to quit):
display_all_classrooms
Students in classroom: dsa
S.No  ID      Name      Email      Phone Number
1     01      rithish   rithishkanna@student.tce.edu  9876454321
2     02      ramesh   ramesh@gmail.com  9876543621
3     05      ravi     ravi123@gmail.com  8901234567
4     07      ram      ram@gmail.com  1234567890
5     08      rakesh   raki@gmail.com  5678901234
6     09      santhosh santhosh@gmail.com  5678912340
7     10      ragul    ragul@gmail.com  4612358909
Total students in dsa: 7
Students in classroom: os
S.No  ID      Name      Email      Phone Number
1     01      rithish   rithishkanna@student.tce.edu  9876454321
2     08      rakesh   raki@gmail.com  5678901234
3     10      ragul    ragul@gmail.com  4612358909
Total students in os: 3
Students in classroom: logical_thinking
S.No  ID      Name      Email      Phone Number
1     10      ragul    ragul@gmail.com  4612358909
Total students in logical_thinking: 1
Students in classroom: dbms
S.No  ID      Name      Email      Phone Number
1     08      rakesh   raki@gmail.com  5678901234
Total students in dbms: 1
Students in classroom: networks
S.No  ID      Name      Email      Phone Number
1     08      rakesh   raki@gmail.com  5678901234
Total students in networks: 1
Total classrooms: 5
Total Enrollment in subjects: 13
```

Handling errors

```
Enter command (type 'exit' to quit):
add_studentt
Invalid command: add_studentt
```

```
Enter command (type 'exit' to quit):
add_student 01 os
Error: Student ID already exists.
Jul 26, 2024 8:16:01 PM Student.AddStudentData addStudent
WARNING: Attempt to add existing student ID: 01
```

```
Enter command (type 'exit' to quit):
add_student 03 os cn microprocessor
Error: One or more class names are invalid.
Jul 26, 2024 8:16:57 PM Student.AddStudentData addStudent
WARNING: Invalid class names provided: os, cn, microprocessor
```

SCHEDULE ASSIGNMENTS

assignments.txt File available

```
Exercise2_Virtual_Classroom_Manager > Assignments > assignments.txt > data
1 dsa,The world of DSA,2024-07-28 24:00:00,40,01,rithish,completed,2024-07-28 12:46:53
2 dsa,The world of DSA,2024-07-28 24:00:00,40,02,ramesh,completed,2024-07-28 12:46:53
3 dsa,The world of DSA,2024-07-28 24:00:00,40,05,ravi,not completed,2024-07-28 12:46:53
4 dsa,The world of DSA,2024-07-28 24:00:00,40,07,ram,not completed,2024-07-28 12:46:53
5 dsa,The world of DSA,2024-07-28 24:00:00,40,08,rakesh,not completed,2024-07-28 12:46:53
6 dsa,The world of DSA,2024-07-28 24:00:00,40,09,santhosh,not completed,2024-07-28 12:46:53
7 dsa,The world of DSA,2024-07-28 24:00:00,40,10,ragul,not completed,2024-07-28 12:46:53
8 |
```

Command 8 - schedule_assignment [classroom_name] (To Schedule assignment)

```
Enter command (type 'exit' to quit):
schedule_assignment os
Enter the assignment name: The OS Basics
Enter the deadline (yyyy-MM-dd HH:mm:ss): 24-08-2024 18:00:00
Enter the rubrics marks: 100
Jul 28, 2024 4:22:36 PM Assignments.ScheduleAssignment scheduleAssignment
INFO: Scheduled assignment: The OS Basics for classroom: os
Assignment for os has been Scheduled.
```

assignments.txt after Updation

```
Exercise2_Virtual_Classroom_Manager > Assignments > assignments.txt > data
1 dsa,The world of DSA,2024-07-28 24:00:00,40,01,rithish,completed,2024-07-28 12:46:53
2 dsa,The world of DSA,2024-07-28 24:00:00,40,02,ramesh,completed,2024-07-28 12:46:53
3 dsa,The world of DSA,2024-07-28 24:00:00,40,05,ravi,not completed,2024-07-28 12:46:53
4 dsa,The world of DSA,2024-07-28 24:00:00,40,07,ram,not completed,2024-07-28 12:46:53
5 dsa,The world of DSA,2024-07-28 24:00:00,40,08,rakesh,not completed,2024-07-28 12:46:53
6 dsa,The world of DSA,2024-07-28 24:00:00,40,09,santhosh,not completed,2024-07-28 12:46:53
7 dsa,The world of DSA,2024-07-28 24:00:00,40,10,ragul,not completed,2024-07-28 12:46:53
8 os,The OS Basics,24-08-2024 18:00:00,100,01,rithish,not completed,2024-07-28 16:22:36
9 os,The OS Basics,24-08-2024 18:00:00,100,08,rakesh,not completed,2024-07-28 16:22:36
10 os,The OS Basics,24-08-2024 18:00:00,100,10,ragul,not completed,2024-07-28 16:22:36
11
```


Command 9 - submit_assignment [classroom] [studentId] (To submit the assignment using Classroom_name and ID)

```
Enter command (type 'exit' to quit):
submit_assignment os 08
Jul 28, 2024 4:24:47 PM Assignments.SubmitAssignment submitAssignment
INFO: Assignment marked as completed for student: 08 in classroom: os
Assignment submitted 08 in os Classroom.
```

The Highlighted Part indicates the assignment is Completed(The change of State from Not Completed to Completed is made.)

```
Exersise2_Virtual_Classroom_Manager > Assignments > assignments.txt > data
1 dsa,The world of DSA,2024-07-28 24:00:00,40,01,rithish,completed,2024-07-28 12:46:53
2 dsa,The world of DSA,2024-07-28 24:00:00,40,02,ramesh,completed,2024-07-28 12:46:53
3 dsa,The world of DSA,2024-07-28 24:00:00,40,05,ravi,not completed,2024-07-28 12:46:53
4 dsa,The world of DSA,2024-07-28 24:00:00,40,07,ram,not completed,2024-07-28 12:46:53
5 dsa,The world of DSA,2024-07-28 24:00:00,40,08,rakesh,not completed,2024-07-28 12:46:53
6 dsa,The world of DSA,2024-07-28 24:00:00,40,09,santhosh,not completed,2024-07-28 12:46:53
7 dsa,The world of DSA,2024-07-28 24:00:00,40,10,ragul,not completed,2024-07-28 12:46:53
8 os,The OS Basics,24-08-2024 18:00:00,100,01,rithish,not completed,2024-07-28 16:22:36
9 os,The OS Basics,24-08-2024 18:00:00,100,08,rakesh,completed,2024-07-28 16:22:36
10 os,The OS Basics,24-08-2024 18:00:00,100,10,ragul,not completed,2024-07-28 16:22:36
11
```

Command 10 - assignment_det (To Display Assignment Details)

```
Enter command (type 'exit' to quit):
assignment_det
```

Assignment Details:

Classroom: dsa
Assignment Name: The world of DSA
Deadline: 2024-07-28 24:00:00
Rubrics: 40

No.	ID	Name	Status
1	01	rithish	completed
2	02	ramesh	completed
3	05	ravi	not completed
4	07	ram	not completed
5	08	rakesh	not completed
6	09	santhosh	not completed
7	10	ragul	not completed

Classroom: os
Assignment Name: The OS Basics
Deadline: 24-08-2024 18:00:00
Rubrics: 100

No.	ID	Name	Status
1	01	rithish	not completed
2	08	rakesh	completed
3	10	ragul	not completed

Command 11 - status_view [classroom] (To Display Assignment Details by Classroom)

Assignment Details:

Classroom: dsa

Assignment Name: The world of DSA

Deadline: 2024-07-28 24:00:00

Rubrics: 40

No.	ID	Name	Status
1	01	rithish	completed
2	02	ramesh	completed
3	05	ravi	not completed
4	07	ram	not completed
5	08	rakesh	not completed
6	09	santhosh	not completed
7	10	ragul	not completed

Error Handling

```
Enter command (type 'exit' to quit):
scdule_assignment
Invalid command: scdule_assignment
```

```
Enter command (type 'exit' to quit):
schedule_assignment sample
Error: Classroom does not exist.
```

```
Enter command (type 'exit' to quit):
submit_assignment 09 os
Error: Assignment not found or already completed for student
```

```
Enter command (type 'exit' to quit):
submit_assignment os 111
Error: Assignment not found or already completed for student: 111 in classroom: os
```

MAIN MENU

Command 12 – display_menu (To Display Main Menu)

```
Enter command (type 'exit' to quit):
display_menu
-----
Main Menu:
-----
1. Add Classroom - add_classroom [classroom_name]
2. View Classrooms - view_classroom
3. View Recent Classrooms - view_recent
4. Remove Classroom - remove_classroom [classroom_name]
5. Add Student - add_student [student_id] [class1 class2 ...]
6. Display Students by Classroom - students_at [classroom_name]
7. Display All Classrooms - display_all_classrooms
8. Schedule Assignment - schedule_assignment [classroom_name]
9. Submit Assignment - submit_assignment [classroom] [studentId]
10. Display Assignment Details - assignment_det
11. Display Assignment Details by Classroom- status_view [classroom]
12. Display Assignment Menu - display_menu
13. Exit - exit
-----
```

EXIT

Command 13 -exit

```
Enter command (type 'exit' to quit):
exit
DEVELOPED BY RITHISH KANNA S
THANK YOU
```
