Group 9.12

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Project : Student Reward System

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Final Version
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Software Requirement Specification for Students reward system

Index:

1. Introduction:

What is the student reward system?

A Students reward system is a motivation tactic that organizations use to help their Students feel encouraged to complete high-quality learning in every domain.

1.1 Purpose

To recognize excellence in all areas of student life, including academics, the arts, sports, perseverance, planning, self-assurance, resilience, social skills, and compassion.

- Encourage students to concentrate on their studies
- To ensure effective engagement in extracurricular activities
- To maintain an organized record of every student's learning behavior
- to give teachers a simple interface for managing each student's profile.
- Organize rewards distribution effectively
- Encourage peer-to-peer recognition to increase students' collaborative learning

1.2. Intended Audience and Reading Suggestions

that the document is intended for, such as developers, project managers, mentors, marketing staff, users, testers, and documentation writers.

1.3 Product Scope

- This reward system is specifically designed for the use of mentors,teachers,competition organizers and students,and their parents.
- Reward system will be designed to maximize the user(teacher,mentor,competition organizer) productivity by providing tools to assist in maintaining the track of rewards of respective students and also in maintaining the progress of each student,which would otherwise have to be performed manually.
- Student reward system is basically updating the reward information of students into application so that students can know their rewards on the basis of daily/weekly quizzes ,question-answer during lecture,semester wise exam,non academic activities etc.

1.4 Description

What we provide:

The Student reward system will provide an interface for organizations to manage students' learning behavior through rewards and much more. It will keep track of students' learning behavior. Students and Teachers both will have dashboards at their ends Parents of each student will also have dashboards. Teachers will be able to decide the reward scheme and students can get access to it. The main aspect of the “Students Reward System” are as following:

- Students can Check their performance, test scores , and rewards history at their end.
- Parents are able to see progress &,Online Result of their child and attendance of the child.
- Teachers can add test scores , give rewards and view each student's progress.

The relations that we are planning to implement for this system:

Student:
- It contains student’s information such as name,ID,phone number,address.

Instructor:
- Relation represents instructor’s personal information such as instructor ID, course ID, phone number, address.

Course :
- It contains information about course name , instructor name , instructor ID, course ID.

Reward :
- It contains information about reward type, activity type,course ID,instructor ID.

Acadamic_Rewards:
- Data such as Student_ID, course_ID, Activity type, obtained marks, total marks, Reward points

Non-acadamic_Rewards:
- Data such as Student_ID, Activity type, Reward points

Scale of Academic Performance:
- It contains data of Instructor_ID , course_ID , activity type, scale.

Scale of Non- Academic Performance:

- It contains data of Instructor_ID , activity type, scale.

Scale of combined Performance:

- It contains data of Instructor_ID , academic scale,non- academic scale

Performance:

- It has attributes of student_ID, Instructor_ID , performance .

Parent :

- It contains information about parent name, parent email, student ID.

Alert :

- It has attributes such as student ID, alert type , alert message.

Admin :

- It has attributes such as admin name, admin id.

Functions that planning to implement:

Add student: adding new student and information of that student
Add course: adding up a new course
Add instructor : the function add the new instructor into the database
Update instructor: updating the information of instructor into the database
Remove old student : the function delete the information of old student into the database
Remove course : delete the course into the database. This function is used by the admin and instructor.
Remove instructor : remove the instructor details from the database.which use by admin only
Add reward : This function adds the reward information like reward type, activity type and which instructor gives this reward into the database.
Removes reward : remove the reward details given by the instructor from the database.
Give academic reward : add student id and reward information by instructor into the database
Update academic reward info : update the student reward information into the database
Remove academic reward : removes the student id and reward information from the database
Give non academic reward : add student id and reward information by instructor into the database

Update non academic reward info : update the student reward information into the database
Remove non academic reward : removes the student id and reward information from the database
Add scale to course : instructor uses this function to define his/her course structure for the semester how to divide percentages among the academic activities.
Update scale to course : instructor uses this function to update his/her course structure for the semester and how to divide percentages among the academic activities.
Remove course scale : to remove course scale when course is removed by instructor or instructor is removed.
Add scale for non academic activity : This function adds scale to non academic activities
Like coding,sports,music etc. into the database by instructor.
Update non academic activity : update the existing scale of non academic activity.
Removes non academic scale : This function deletes the scale of non academic activities.
Add overall performance scale : add the scale of academic and non academic for the semester by instructor to calculate the performance of the student.
Removes the performance scale : removes the instructor-added performance scale from the database.
Alert parent : when student's attendance goes below 75% this trigger function adds the alert message and alert type into the database.
Add alert : function adds the alert type, alert message and student ID by instructor into the database.

Workflow for Student reward system:

- An existing student, who is already in the system. There will be a separate view for students so that they can check out their basic information, academic information like marks of particular course ,performance of the particular course and overall performance or an alert by the instructor.
- If the instructor is new in the college/school , the admin will add the instructor and their course details into the database. If the instructor leaves the college/school, the admin will delete the instructor details and course details of that instructor.
- Instructor view has access to add the student to their course and update the student performance information.also instructor view has access to set the performance scale of that course.
- All the rewards that are given to students by the instructor can be viewed by student,parent and access or update by the instructor.
- Overall calculated performance for every student is added to the performance table and available to see for all students.
- If an instructor decides to inform a student about some academic or non academic activity to all students that information is added to alert.

2. Fact-Finding Phase

2.1 Background Reading :

1. **College management system from**
   link: College-ERP/DBMS report.pdf at master
   From this, we referred to what are the functions and roles that we need to maintain and the overall relationship between them. In short, we referred to the structure of the database.

   Requirements:
   - Each user shall be able to view information in the database based on their user class.
   -The administrator shall be able to view all the information in the database.
   -Teachers shall be able to view, update and edit the attendance and marks of the students, part of their class.
   -Students shall be able to communicate with their instructor by sending personal messages.

2.2 Interviews:

Interview Plan 1: (Instructor Interview(Roleplay))

Project Reference : SF/SJ/2022/09

Interviewee:	Jim Kurose (Roleplay)	**Designation:** Instructor at unacademy
Interviewer:	Aditya Jadeja	**Designation**: System Developer
	Het Patel	**Designation:** System Developer

Date: 27/9/2022 **Time :** 14:30

Duration : 30 minutes **Place:** Phone call

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students reward system for instructors point of view.

Agenda :
- Basic intro to our idea
- Discussion about how the system can help to motivate the students for learning

- What functions instructors will need at their dashboard.
- How to calculate overall performance of a student

Documents to be brought to the interview :

- Rough plan of building

Interview Summary 1:

Project Reference : SF/SJ/2022/09

Interviewee: Jim Kurose(Roleplay)		**Designation:**	Teacher at unacademy
Interviewer:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 27/9/2022 **Time :** 14:30

Duration : 30 minutes **Place:** Phone call

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students reward system for instructors point of view.

Results of interview:

- After the interview, we got to know the needs of an instructor from the system and basic idea of how to design the instructor-side dashboard.
- Using the pen-paper (register) or excel sheet leads to very tiring work for instructors for tracking the performance of each student.
- A well organized database and easy to use interface should solve the problem.
- Instructor agrees with the reward system idea to motivate students and believes that it will help both - students and teachers .
- Instructor needs a simple procedure for entries of attendance , marks and points of non-academic activities.
- different academic activities should have their corresponding weightage and same goes for non-academic activities for calculating combined performance of a student.
- Instructors should be able to choose the scales of each component for evaluating final performance.
- Students can be sorted according to their performance to give rewards to them.

Interview Plan 2: (Student Interview)

Project Reference : SF/SJ/2022/09

Interviewee:	Manan Dankhara	**Designation:**	Student at DA-IICT
Interviewer:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 27/9/2022 **Time :** 15:30

Duration : 30 minutes **Place:** Cafetaria

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students reward system for students point of view.

Agenda :
- Basic intro to our idea
- Discussion about how the system can help to motivate the students for learning
- What functions students will need at their dashboard.
- Which type of reward do they want?

Documents to be brought to the interview :
- Rough plan of building

Interview Summary - 2:

Project Reference : SF/SJ/2022/09

Interviewee:	Manan Dankhara	**Designation:**	Student at DA-IICT
Interviewer:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 27/9/2022 **Time :** 15:30

Duration : 30 minutes **Place:** Cafetaria

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students reward system for students point of view.

Results of interview:

- After the interview, we got to know the needs of a student from the system and basic idea of how to design the student-side dashboard.
- Students want to have a system in which they are able to get information about their attendance, performance of each activity (academic and non-academic).
- This system will also ensure transparency in grading and students will be able to know how much and in which direction they need to improve their performance.
- Each student should have their personal view of their performance records.
- The leaderboards should be visible to all students so that they can compare their performance and which will lead to health competition among students.

Interview Plan 3: (Parent Interview)

Project Reference : SF/SJ/2022/09

Interviewee:	Darshit Bhakhar	**Designation:**	Parent
Interviewer:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 27/9/2022 **Time :** 16:30

Duration : 30 minutes **Place:** Phone call

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students' reward system from parents point of view.

Agenda :

- Basic intro to our idea
- Discussion about how the system can help to motivate the students for learning
- What functions parents will need at their dashboard.
- How to communicate with parents about the performance of their child.
- Concerns about attendance

Documents to be brought to the interview :

- Rough plan of building

Interview Summary-3:

Project Reference : SF/SJ/2022/09

Interviewee:	Darshit Bhakhar	**Designation:**	Parent
Interviewer:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 27/9/2022 **Time :** 16: 30

Duration : 30 minutes **Place:** Phone call

Purpose of Interview :

- Preliminary meeting to identify problems and requirements regarding students reward system for instructors point of view.

Results of interview:

- After the interview, we got to know the needs of a parent from the system and basic idea of how to design the instructor-side dashboard.
- Usually parents are unaware of the performance of their child because students don't discuss everything with parents.
- The system has a student's view where every detail of academic,non-academic performance and attendance are displayed . This same view can be used for parents but for parents it is not optimal to check each activity and its performance with their busy schedule.
- To solve this problem we can implement an alert system which will notify the parents/ keep a log of all activity of students with activity type tags, which will ensure ease for parents to stay updated with minimal efforts.
- The parents are also concerned about attendance of their children. So we will also implement an alert for the same which will notify the parents if attendance goes down below 75 percent (which will be implemented by triggers).

List the combined Requirements

- Instructor needs a simple procedure for entries of attendance , marks and points of non-academic activities.
- different academic activities should have their corresponding weightage and same goes for non-academic activities for calculating combined performance of a student.
- Instructors should be able to choose the scales of each component for evaluating final performance.
- Students can be sorted according to their performance to give rewards to them.

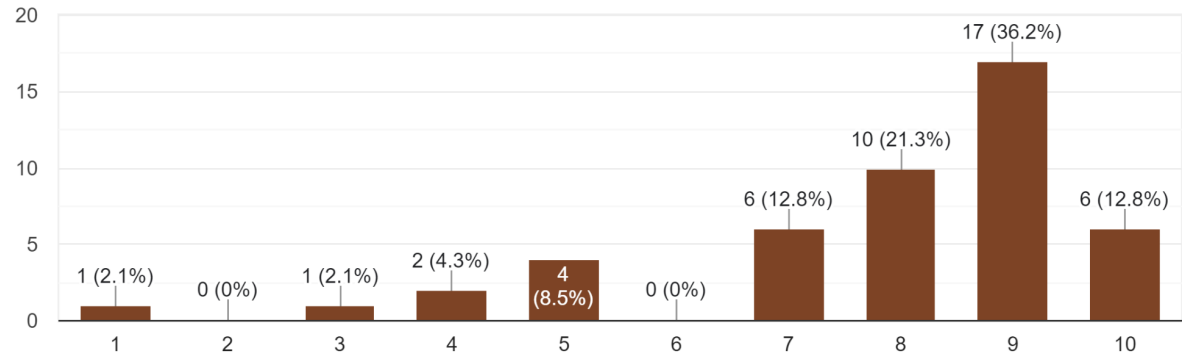
- Students want to have a system in which they are able to get information about their attendance, performance of each activity (academic and non-academic).
- This system will also ensure transparency in grading and students will be able to know how much and in which direction they need to improve their performance.
- Each student should have their personal view of their performance records.
- The leaderboards should be visible to all students so that they can compare their performance.
- an alert system which will notify the parents/ keep a log of all activity of students with activity type tags,
- an alert which will notify the parents if attendance goes down below 75 percent

2.3 Questionnaire/s

Question-1:

How much the Student Reward System will impact on learning behavior of students on the scale of 10?

47 responses



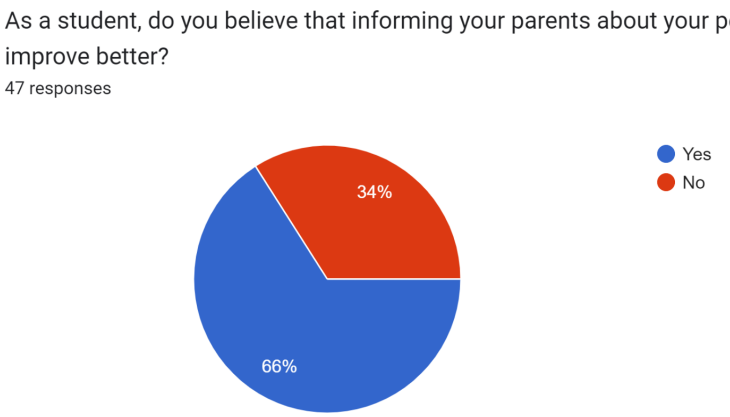
Intent of this question:

- To get to know how effective this system will be .

Observation from the response:

- The majority of the responders believe that this system will be useful and will create a positive impact

Question-2:



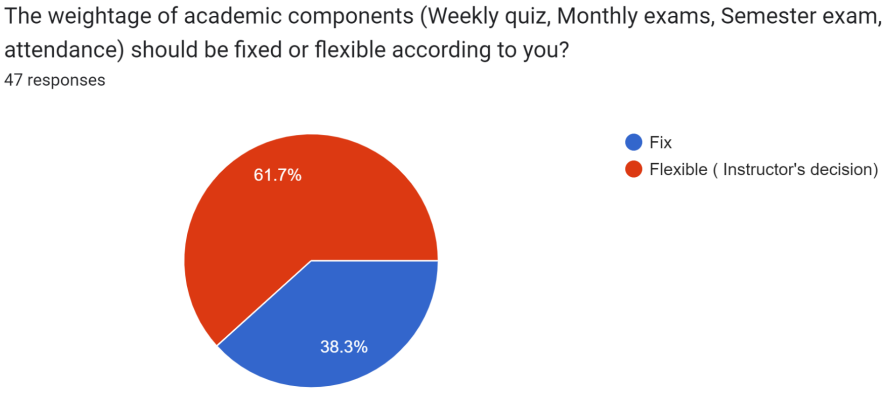
Intent of this question:

- To get to know if we should notify parents about students' performance or not.

Observation from the response:

- The majority of the responders say that notifying parents will help to improve performance of students, so will implement the parent alert functionality.

Question-3:



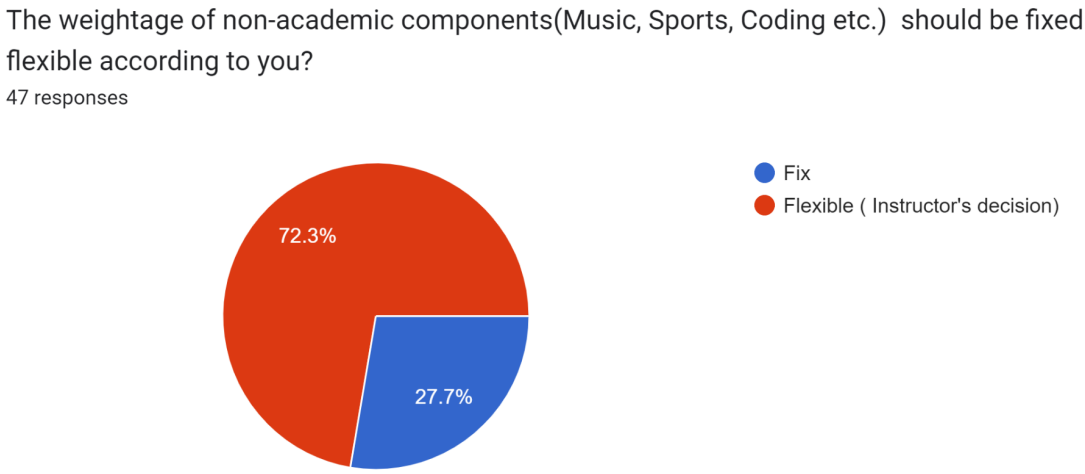
Intent of this question:

- To get to know if the weightage scale of academic activities should be fixed or flexible.

Observation from the response:

- The majority of the responders suggest that scale should be flexible so we will provide the feature of entering the scale of academic activities.

Question-4:



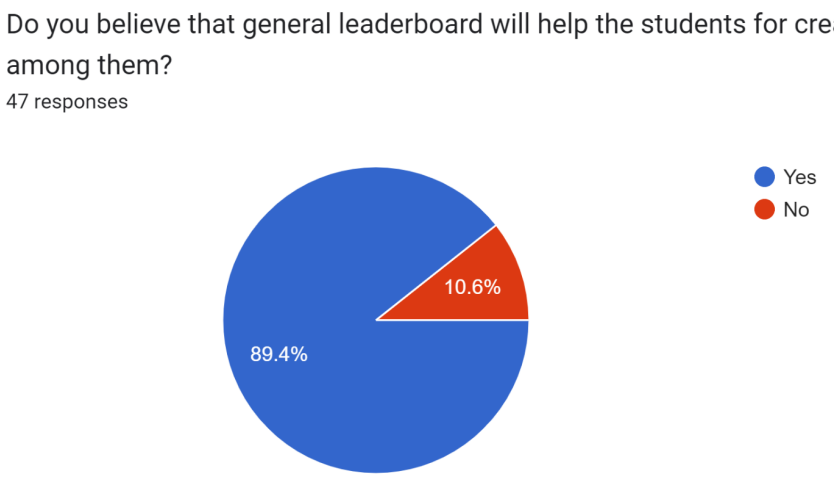
Intent of this question:

- To get to know if the weightage scale of non-academic activities should be fixed or flexible.

Observation from the response:

- The majority of the responders suggest that scale should be flexible so we will provide the feature of entering the scale of non-academic activities.

Question-5:



Intent of this question:

- To get to know if the general leaderboard would be useful or not.

Observation from the response:

- The majority of the responders suggest that scale would be useful and it will create a positive impact so we will make a general leaderboard for all the students.

List the combined Requirements from Questionaries:

- Instructor needs a simple procedure for entries of attendance , marks and points of non-academic activities.
- different academic activities should have their corresponding weightage and same goes for non-academic activities for calculating combined performance of a student.
- Instructors should be able to choose the scales of each component for evaluating final performance.
- Students can be sorted according to their performance to give rewards to them.
- Students want to have a system in which they are able to get information about their attendance, performance of each activity (academic and non-academic).
- This system will also ensure transparency in grading and students will be able to know how much and in which direction they need to improve their performance.
- Each student should have their personal view of their performance records.
- The leaderboards should be visible to all students so that they can compare their performance.
- an alert system which will notify the parents/ keep a log of all activity of students with activity type tags,

- an alert which will notify the parents if attendance goes down below 75 percent.

2.4 Observations

System : University database

Project Reference : SF/SJ/2003/12

Observations by:	Aditya Jadeja	**Designation**:	System Developer
	Het Patel	**Designation:**	System Developer

Date: 04/10/2022 **Time:** 11:00

Duration: 45 minutes **Place:** Faculty office

Observations:

- Real-time updating of all student's attendance in every course lecture session.
- Not all data was accessible to everyone, privacy and security of the data were given priority.
- Instructor can see only the details of those students, who have registered for that particular instructor's course.
- Instructors and students are able to see their profile anywhere on site.
- Instructors are able to update final grades for the course only.So All instructor's are maintaining separate marks spreadsheets for lab exam,viva,mid semester exam,Final semester exam and quiz etc.
- Having a proper internet connection is very important.

Combined requirements from Observations:

- The database is updated in real-time.
- The instructor will be able to view their respective students and update their attendance and marks using an effortless interface.
- Different user classes should be given different authorization to access or update the system.
- All the users can connect to the database server from anywhere and have access to their information.
- The database contains sensitive information of all the students and staff. Therefore, optimal security measures must be taken to ensure data is safe from unauthorized users.

3. Fact Finding Chart

Objective	Technique	Subject	Time Commitment
To get background knowledge on the Student Reward System	Background readings	Similar projects on internet, websites	1 day
To know what functions instructors will need at their dashboard.	Interview	Instructor(Roleplay)	1 hour
To know how to calculate overall performance of a student	Interview, Qutionary	Instructor(Roleplay) ,Students	1 day
To know what functions students will need at their dashboard.	Interview	Any student	1 hour
To know how to communicate with parents about the performance of their child.	Interview, Qutionary	Any parent, students	1 day
To get to know if the weightage scale of academic activities or non-academic should be fixed or flexible.	Qutionary	Students	1 day

4. List Requirements

- Instructors should be able to choose the scales of each component for evaluating final performance.(Interview, Questionnaire)
- The leaderboards should be visible to all students so that they can compare their performance and which will lead to health competition among students.Each student will be able to see each component or course performance leaderboard as well.(Interview, Questionnaire)
- An alert system which will notify the parents/ keep a log of all activity of students with activity type tags and attendance log also, which will ensure ease for parents to stay updated with minimal efforts.(Interview, Questionnaire)
- Students shall be able to communicate with their instructor by sending personal messages.(Background reading)
- Students want to have a system in which they are able to get information about their attendance, performance of each activity (academic and non-academic). (Interview)
- This system will also ensure transparency in grading and students will be able to know how much and in which direction they need to improve their performance.(Interview)
- Different user classes should be given different authorization to access or update the system.(Observation)
- All the users can connect to the database server from anywhere and have access to their information.(Observation)
- The database contains sensitive information of all the students and staff. Therefore, optimal security measures must be taken to ensure data is safe from unauthorized users.(Observation)

5. User Classes and Characteristics

List of the user-class:

- **Admin:** Admin will have access to the entire database and will be in charge of managing it.
- **Students:** Students can access the database to view their personal data, performance, and rewards.
- **Teachers:** Teachers will be able to view and update each student's details, as well as add attendance, choose performance scale, and assign rewards.
- **Parents:** parents will receive notifications on every activity of their child and monitor progress.

List of the functions which can be used by different user classes:

1. **Admin:**

- Add course
- Add instructor
- Update instructor
- Remove course
- Remove instructor
- All the functions which can be accessed by students,instructors,and parents.

2. **Instructor:**

- Add student
- Add student info
- Update student info
- Remove old student
- Remove old student info
- Add reward
- Removes reward
- Give academic reward
- Update academic reward info
- Remove academic reward
- Give non academic reward
- Update non academic reward info
- Remove non academic reward
- Add scale to course
- Update scale to course
- Remove course scale
- Add scale for non academic activity
- Update non academic activity
- Removes non academic scale
- Add overall performance scale.
- Removes the performance scale
- Alert parent

- Add alert

3. **Student:**
- View student profile
- Check attendance
- Check Rewards
- View Leaderboard

4. **Parents:**
- Check alerts log
- All the functions which can be accessed by students

6. Assumption

- The hardware and software required to execute this application are considered to be available to users.
- It is also believed that the database's data is constantly updated with the right information.
- The users will have access to alternate resources in the event of any unpreventable circumstance.
- Users must be able to use a computer and have a basic understanding of how the system works.

7. Business Constraints

- If the user pool is quite huge, the aforementioned database's scalability may become a problem. For it, distributed database systems are required.
- The information must be kept on a server. It could be costly to store big volumes of data on cloud servers.
- Highly scaled systems require specialized employees to handle and maintain the entire system.

Noun & Verb Analysis

Sr. No.	Noun	Verbs
1	Reward	motivate
2	Student	focus
3	semester	study
4	academic	think
5	non-academic	given
6	points	contain
7	activity	include
8	questions	Gets
9	answers	can
10	lecture	Has
11	quiz	likewise
12	exam	see
13	teachers	will
14	progress	to
15	dashboard	manage
16	class	learning
17	prize	Notify
18	information	decide
19	database	takes

20	system	access
21	way	Decides
22	details	add
23	interface	alert
24	organization	update
25	behavior	Has
26	parents	be
27	scheme	Observes
28	Login id	exist
29	Password	Check
30	performance	Remove
31	test score	maintains
32	Reward history	Provide
33	result	receives
34	attendance	notify
35	child	Able
36	student_info	
37	instructor	
38	course	
39	Student name	
40	Student id	
41	Phone no	
42	address	

43	marks	
44	Course id	
45	Instructor id	
46	Course name	
47	Instructor name	
48	Reward type	
49	Activity type	
50	Academic reward	
51	Non-academic reward	
52	Obtained marks	
53	Total marks	
54	Reward points	
55	Scale of academic performance	
56	Scale of non-academic performance	
57	scale	
58	Scale of combined performance	
59	Parent name	
60	Parent email	
61	Academic scale	
62	Non-academic scale	
63	alert	

64	Alert type	
65	Alert message	
66	admin	
67	Admin name	
68	Admin id	

2. Entity - Attribute:

Candidate entity set	Candidate attribute set	Candidate relationship set
Student	Student ID, student name, phone no, address	Teaches,Has_parent, Receives,Gets, Student_Course,Observes
Instructor	Instructor ID, instructor name, course ID, phone no, address	Teaches, Assigns ,Maintains , Decides,Takes
Course	Instructor name, course id, course name, instructor id	Takes , Notify , Contains,Student_Course, Course rewards
Reward	reward name, course id, instructor id,Reward type	Contains
Academic Rewards	Student_ID, course_ID, Activity type, obtained marks, total marks, Reward points	Assigns , Academic performance ,Course rewards
Non-acadamic_Rewards:	Student_ID, Activity type, ,Instructor IDReward points	Assigns, Non-academic rewards
Scale of Academic Performance	instructor_ID , course_ID , activity type, scale.	Course scale,decides
Scale of Non- Academic Performance	instructor_ID , activity type, scale.	Decides
Scale of combined Performance	Instructor_ID , academic scale,non- academic scale	Decides
Performance	student_ID ,overall score	Academic performance, non-academic performance
Parent	student ID , parent name, parent email,	Has_parent

Alert	Alert no. (student ID, course id,date), alert type , alert message,	Notify, receives
Admin	admin id ,admin name	Maintains

3. Rejected Nouns and Verbs :

Noun	**Reason**
semester	Attribute
Reward points	Attribute
activity	Duplicate
questions	irrelevant
answers	irrelevant
lecture	irrelevant
quiz	Duplicate
exam	Duplicate
teachers	Duplicate
progress	duplicate
dashboard	irrelevant
class	duplicate
prize	duplicate
information	general
database	general
system	general

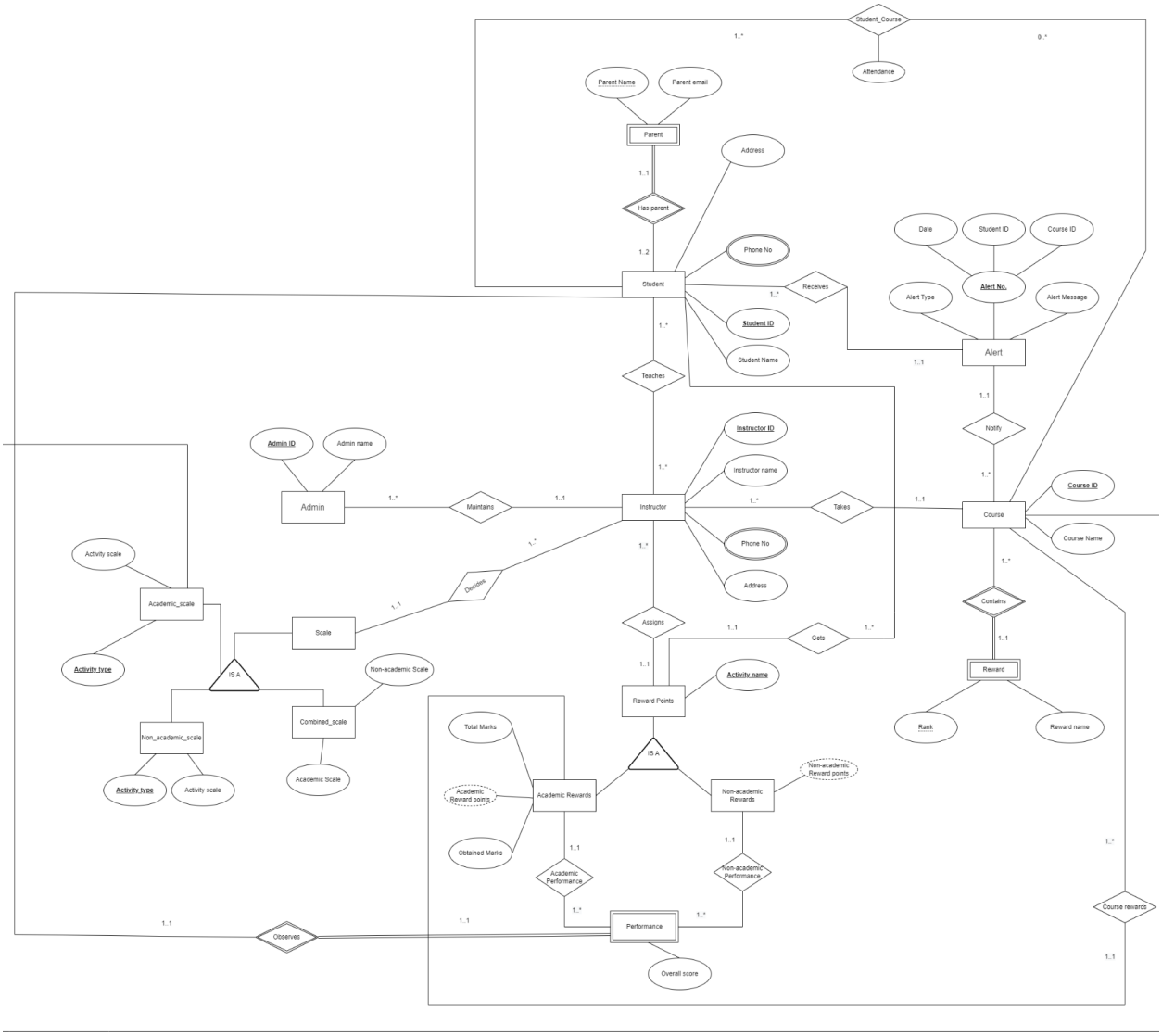
way	vague
details	general
interface	general
organization	irrelevant
behavior	irrelevant
scheme	vague
Login id	attribute
Password	attribute
test score	Duplicate
Reward history	Irrelevant
result	general
attendance	attribute
child	irrelevant
Student name	attribute
Student id	attribute
Phone no	attribute
address	attribute
marks	attribute
Course id	attribute
Instructor id	attribute
Course name	attribute
Instructor name	attribute
Reward type	attribute

Activity type	attribute
Obtained marks	attribute
Total marks	attribute
Reward points	attribute
scale	attribute
Parent name	attribute
Parent email	attribute
Academic scale	attribute
Non-academic scale	attribute
Alert type	attribute
Alert message	attribute
Admin name	attribute
Admin id	attribute

Verbs	**Reason**
motivate	Irrelevant
focus	Irrelevant
study	General
think	Irrelevant
given	General
contain	vague
include	duplicate
get	general

can	vague
be	vague
likewise	vague
see	general
will	vague
provide	general
manage	general
learning	general
track	irrelevant
decide	irrelevant
able	vague
access	general
check	general
add	association
alert	general
update	association
remove	association
exist	vague

❖ ER Diagram (Final Version):



❖ Mapping ER model to Relational model:

1. **Student**(**Student_ID**, student name, address)
   Primary Key: Student_ID

2. **Student_phone**(**Student_ID, Phone no**)
   Primary Key: (composite): Student ID, phone no
   Foreign key: Student_ID references **Student**

3. **Instructor**(**Instructor_ID**, instructor name, address,Admin_ID)
   Primary Key: Instructor_ID
   Foreign Key: Admin_ID references **Admin**

4. **Instructor_phone**(**Instructor_ID, Phone no**)
   Primary Key: (composite): Instructor ID, phone no
   Foreign key: Instructor_ID references **Instructor**

5. **Teches(Instructor_ID, Student_ID**)
   Primary Key: (composite) : Instructor ID, Student ID
   Foreign Key: Instructor ID references **Instructor**
   Foreign Key: Student ID references **Student**

6. **Course**(**Course_ID**, course name, Instructor_ID)
   Primary Key: Course_ID
   Foreign Key: Instructor_ID references **Instructor**

7. **Sudent_course**(**student_ID**, **Course_ID**, Attendance)
   Primary Key: (composite) : Student_ID, Course_ID.
   Foreign Key: Student ID references **Student**
   Foreign Key: Course ID references **Course**

8. **Reward**(**Rank,Reward_name**)
   Primary Key: : Rank

9. **Academic_rewards**(**Student_ID**, **Course_ID**, **Activity_name**, obtained_marks, Total_marks, Reward_points, Instructor ID)
   Primary Key: (composite) : Student_ID, Course_ID, activity_name
   Foreign Key: Student_ID references **Student**
   Foreign Key: Course_ID references **Course**
   Foreign Key: Instructor_ID references **Instructor**

10. **Non_acadamic_rewards**(**Student_ID**, **Activity_name**, ,Instructor ID,Reward points)
    Primary Key: (composite) : Student_ID,Activity_name
    Foreign Key: Student_ID references **Student**
    Foreign Key: Instructor_ID references **Instructor**

11. **Academic_scale**(**Instructor_ID** , **Course_ID** , **Activity_type**, scale)
    Primary Key: (composite) : Instructor_ID, Course_ID, activity_type
    Foreign Key: Instuctor_ID references **Instructor**
    Foreign Key: Course_ID references **Course**

12. **Non_academic_scale**(**Instructor_ID** , **Activity_type**, scale)
    Primary Key: (composite) : Instructor_ID, activity_type
    Foreign Key: Instuctor_ID references **Instructor**

13. **Combined_scale**(**Instructor_ID** , academic scale,non- academic scale)
    Primary Key : Instructor_ID
    Foreign Key: Instuctor_ID references **Instructor**

14. **Performance**(**Student_ID** ,overall score)
    Primary Key : Student_ID
    Foreign Key: Student_ID references **Student**

15. **Parent**(**Student_ID , parent_name**, parent email)
    Primary Key: (composite) Student_ID, parent name
    Foeign key: Student_ID references **Student**

16. **Alert**(**Student_ID**, **Course_ID**,**date**, alert type , alert message)
    Primary Key: student ID, Course_ID,date
    Foeign key: Student_ID references **Student**
    Foeign key: Course_ID references **Course**

17. **Admin**(**Admin_ID** ,admin name)
    Primary Key: Admin_ID

❖ Functional Dependencies:

1. **Student**(Student_ID → student name,
   Student_ID → address)

2. **Student_phone** : No Dependencies

3. **Instructor**(Instructor_ID → instructor name,
   Instructor_ID→address,
   Instructor_ID →Admin_ID)

4. **Instructor_phone**: No Dependencies

5. **Teches :** No Dependencies

6. **Course**(Course_ID→course name,
   Course_ID→ Instructor_ID)

7. **Sudent_course**(Student_ID, Course_ID → Attendance)

8. **Reward**:No Dependencies

9. **Academic_rewards**(
   Student_ID, Course_ID, Activity_name→ obtained_marks,
   Course_ID, Activity_name→ Total_marks,
   Student_ID, Course_ID, Activity_name→ Reward_points)

10. **Non_acadamic_rewards**(
    Student_ID, Activity_name →Instructor ID,
    Student_ID, Activity_name →Reward points)

11. **Academic_scale**(Course_ID , Activity_type → scale)

12. **Non_academic_scale**(Instructor_ID , Activity_type →scale)

13. **Combined_scale**(Instructor_ID → academic scale,
    Instructor_ID →non- academic scale)

14. **Performance**(Student_ID →overall score)

15. **Parent**(Student_ID , parent_name → parent email)

16. **Alert**(Student_ID, Course_ID,date → alert type ,
    Student_ID, Course_ID,date → alert message)

17. **Admin**(Admin_ID → admin name)

❖ Redundancies and anomalies:

1. **Student**(**Student_ID**, student_name, address)
- **Redundancy:** it is possible to have the same student_name multiple times with different Student_IDs.
- There are no anomalies in this relation.

2. **Student_phone**(**Student_ID, Phone no**)
- Foreign key: Student_ID references **Student**
- **Redundancy:** It is possible to have the same student_ID multiple times with different Phone_no.
- There are no anomalies in this relation.

3. **Instructor**(**Instructor_ID**, instructor name, address,Admin_ID)
- Foreign Key: Admin_ID references **Admin**
- **Redundancy:** It is possible to have the same Instructor_name multiple times with different Student_IDs.
- There are no anomalies in this relation.

4. **Instructor_phone**(**Instructor_ID, Phone no**)
- Foreign key: Instructor_ID references **Instructor**
- **Redundancy:** It is possible to have the same Instructor_ID multiple times with different Phone_no.
- There are no anomalies in this relation.

5. **Teches(Instructor_ID, Student_ID**)
- Foreign Key: Instructor ID references **Instructor**
- Foreign Key: Student ID references **Student**
- There are no anomalies in this relation.
- **Redundancy:** It is possible to have the same Instructor_ID multiple times with different Student_ID and same Student_ID multiple times with different Instructor_ID.

6. **Course**(**Course_ID**, course name, Instructor_ID)
- Foreign Key: Instructor_ID references **Instructor**
- **Redundancy:** It is possible to have the same Instructor_ID multiple times with different Course_ID.
- There are no anomalies in this relation.

7. **Sudent_course**(**student_ID**, **Course_ID**, Attendance)
- Foreign Key: Student ID references **Student**
- Foreign Key: Course ID references **Course**
- There are no anomalies in this relation.

8. **Reward**(**Reward_name**, **Course_ID**,Reward type)
- Foreign Key: Course_ID references **Course**
- There are no anomalies in this relation.

9. **Academic_rewards**(**Student_ID**, **Course_ID**, **Activity_name**, obtained_marks, Total_marks, Reward_points)

- Foreign Key: Student_ID references **Student**
- Foreign Key: Course_ID references **Course**
- **FD = (**Course_ID, Activity_name→ Total_marks)
- This is NOT in 2NF as it has a partial dependency.
- **Anomalies:**
    - **Insertion:**We cannot add Total_marks until it is associated with any Student_ID.
    - **Deletion:**If you delete the only Student_ID , you lose data about the Total marks about particular activity of course.
    - **Update:** Total_marks is repeated for every activity_name for a particular course.

10. **Non_acadamic_rewards**(**Student_ID**, **Activity_name**, ,Instructor ID,Reward points)

- Foreign Key: Student_ID references **Student**
- Foreign Key: Instructor_ID references **Instructor**
- There are no anomalies in this relation.

11. **Academic_scale**(**Course_ID** , **Activity_type**, scale)

- Foreign Key: Course_ID references **Course**
- There are no anomalies in this relation.
- **Redundancy:** It is possible to have the same scale multiple times with different activities in the same Course_ID.

12. **Non_academic_scale**(**Instructor_ID** , **Activity_type**, scale)

- Foreign Key: Instuctor_ID references **Instructor**
- **Redundancy:** It is possible to have the same scale multiple times with different activities of the same Instructor_ID.
- There are no anomalies in this relation.

13. **Combined_scale**(**Instructor_ID** , academic scale,non- academic scale)

- Foreign Key: Instuctor_ID references **Instructor**
- There are no anomalies in this relation.

14. **Performance**(**Student_ID** ,overall score)

- Foreign Key: Student_ID references **Student**
- There are no anomalies in this relation.
- **Redundancy:** It is possible to have the same overall_score multiple times with different Student_ID

15. **Parent**(**Student_ID , parent_name**, parent email)

- Foeign key: Student_ID references **Student**
- There are no anomalies in this relation.

16. **Alert**(**Student_ID**, **Course_ID**,**date**, alert type , alert message)

- Foeign key: Student_ID references **Student**
- Foeign key: Course_ID references **Course**
- There are no anomalies in this relation.

17. **Admin**(**Admin_ID** ,admin name)

- **Redundancy:** It is possible to have the same admin_name multiple times with different Admin_ID.
- There are no anomalies in this relation.

❖ Normalization of Schema up to 3NF/BCNF:

1. **Student**(**Student_ID**, student_name, address)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

2. **Student_phone**(**Student_ID, Phone no**)
- Since this is all key relation, all dependencies are trivial dependencies.
- So this relation is already in BCNF, This implies that it is in 3NF.

3. **Instructor**(**Instructor_ID**, instructor name, address,Admin_ID)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

4. **Instructor_phone**(**Instructor_ID, Phone no**)
- Since this is all key relation, all dependencies are trivial dependencies.
- So this relation is already in BCNF, This implies that it is in 3NF.

5. **Teches(Instructor_ID, Student_ID**)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

6. **Course**(**Course_ID**, course name, Instructor_ID)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

7. **Sudent_course**(**student_ID**, **Course_ID**, Attendance)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

8. **Reward**(**Rank,**Reward_name)
- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

9. **Academic_rewards**(**Student_ID**, **Course_ID**, **Activity_name**, obtained_marks, Total_marks, Reward_points)
- Since every attribute value is atomic the relation is in 1NF.
- There is one partial dependency so we will decompose the table as follows to get it into 2NF.
    - **Academic_rewards**(**Student_ID**, **Course_ID**, **Activity_name**, obtained_marks, Reward_points)
    - **Total_marks**(**Course_ID, Activity_name**, Total_marks)
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

10. **Non_acadamic_rewards**(**Student_ID**, **Activity_name**, ,Instructor ID,Reward points)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

11. **Academic_scale**(**Course_ID** , **Activity_type**, scale)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

12. **Non_academic_scale**(**Instructor_ID** , **Activity_type**, scale)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

13. **Combined_scale**(**Instructor_ID** , academic scale,non- academic scale)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

14. **Performance**(**Student_ID** ,overall score)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

15. **Parent**(**Student_ID , parent_name**, parent email)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

16. **Alert**(**Student_ID, Course_ID,date**, alert type , alert message)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF

17. **Admin**(**Admin_ID** ,admin name)

- Since every attribute value is atomic the relation is in 1NF.
- Since there is only one value in PK and also there is only one candidate key the relation is in 2NF.
- Every candidate key is on LHS of the functional dependencies, so the relation is in BCNF. This implies that the relation is also in 3NF.

❖ List of Final relations with schema:

1. **Student**(**Student_ID**, student_name, address)
2. **Student_phone**(**Student_ID, Phone no**)
3. **Instructor**(**Instructor_ID**, instructor name, address,Admin_ID)
4. **Instructor_phone**(**Instructor_ID, Phone no**)
5. **Teches(Instructor_ID, Student_ID**)
6. **Course**(**Course_ID**, course name, Instructor_ID)
7. **Student_course**(**student_ID**, **Course_ID**, Attendance)
8. **Reward**(**Rank**,Reward_name)
9. **Academic_rewards**(**Student_ID**, **Course_ID**, **Activity_name**, obtained_marks, Reward_points)
10. **Non_acadamic_rewards**(**Student_ID**, **Activity_name**, ,Instructor ID,Reward points)
11. **Academic_scale**(**Course_ID** , **Activity_type**, scale)
12. **Non_academic_scale**(**Instructor_ID** , **Activity_type**, scale)
13. **Combined_scale**(**Instructor_ID** , academic scale,non- academic scale)
14. **Performance**(**Student_ID** ,overall score)
15. **Parent**(**Student_ID , parent_name**, parent email)
16. **Alert**(**Student_ID**, **Course_ID**,**date**, alert type , alert message)
17. **Admin**(**Admin_ID** ,admin name)
18. **Total_marks**(**Course_ID, Activity_name**, Total_marks)

❖ DDL Scripts and Data entries of each table :

1.Student

```
CREATE TABLE IF NOT EXISTS srs."Student"
(
    "Student_ID" bigint NOT NULL,
    "Student_name" character varying COLLATE pg_catalog."default",
    "Address" character varying COLLATE pg_catalog."default",
    CONSTRAINT "Student_pkey" PRIMARY KEY ("Student_ID")
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Student"
    OWNER to postgres;
```

- **Student(<u>Student_ID</u>**, student_name, address)

Query | Query History

```
1  SELECT * FROM srs."Student"
2  ORDER BY "Student_ID" ASC
```

Data output | Messages | Notifications

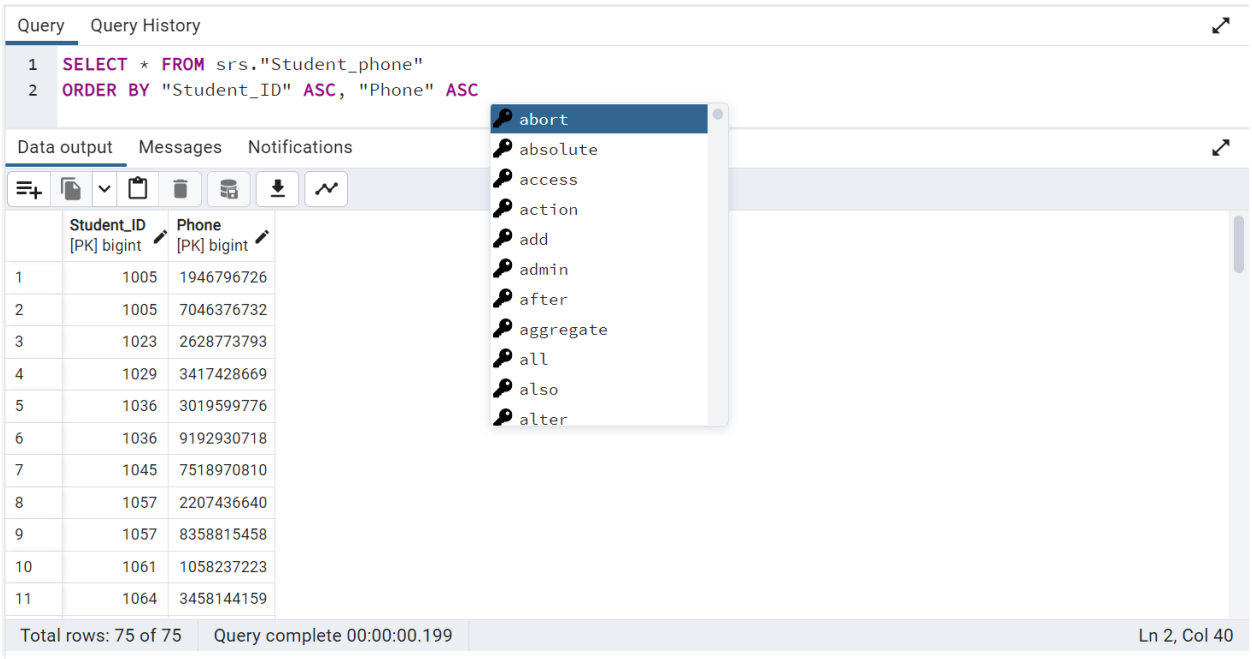
	Student_ID [PK] bigint	Student_name character varying	Address character varying
1	1005	Philippe Raftery	33 Ramsey Terra...
2	1023	Bertina Camacho	324 Schurz Park...
3	1029	Petr Kulis	56 Forster Trail
4	1036	Dick Timbridge	16 Hansons Way
5	1045	Zane Pellamonut...	324 Troy Place
6	1057	Jereme Willbraha...	4242 Farmco Cir...
7	1061	Dinny Penberthy	159 Green Ridge ...
8	1064	Nev Mogie	92 Thierer Street
9	1075	Nata Axelby	3487 Ilene Terrace
10	1086	Chaunce McCarn...	12148 Northport ...
11	1092	Engracia Sweten...	071 Jenifer Terra...

Total rows: 51 of 51 | Query complete 00:00:00.274 | Ln 1, Col 1

2.Student_phone :

```
CREATE TABLE IF NOT EXISTS srs."Student_phone"
(
    "Student_ID" bigint NOT NULL,
    "Phone" bigint NOT NULL,
    CONSTRAINT "Student_phone_pkey" PRIMARY KEY ("Phone",
"Student_ID"),
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Student_phone"
    OWNER to postgres;
```

- **Student_phone(<u>Student_ID, Phone no</u>)**



3.Instructor :

```
CREATE TABLE IF NOT EXISTS srs."Instructor"
(
    "Instructor_ID" bigint NOT NULL,
    "Instructor_name" character varying COLLATE pg_catalog."default"
NOT NULL,
    "Address" character varying COLLATE pg_catalog."default",
    "Admin_ID" bigint,
    CONSTRAINT "Instructor_pkey" PRIMARY KEY ("Instructor_ID"),
    CONSTRAINT "Admin_ID" FOREIGN KEY ("Admin_ID")
        REFERENCES srs."Admin" ("Admin_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Instructor"
    OWNER to postgres;
```

- **Instructor**(**Instructor_ID**, instructor name, address,Admin_ID)

Query | Query History

```
1  SELECT * FROM srs."Instructor"
2  ORDER BY "Instructor_ID" ASC
```

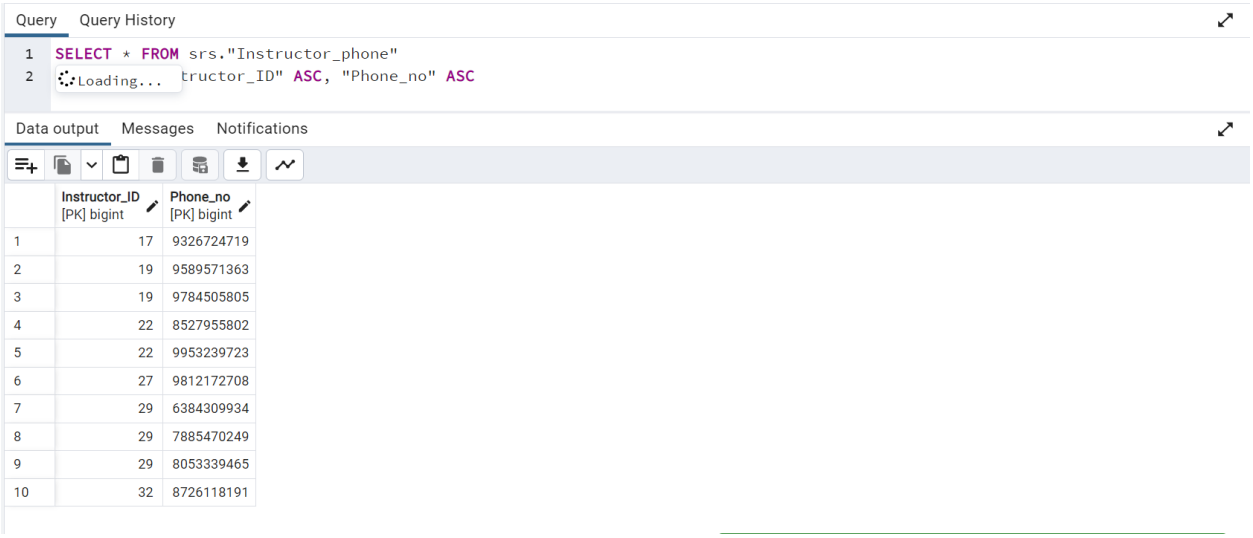
Data output | Messages | Notifications

	Instructor_ID [PK] bigint	Instructor_name character varying	Address character varying	Admin_ID bigint
1	17	Chevalier Minma...	0274 Lakewood ...	6
2	19	Arny Mustard	445 Surrey Trail	67
3	22	Ned Moyer	451 Maple Wood ...	78
4	27	Rufus Probbing	28 Canary Juncti...	38
5	29	Sarina Sherlock	7770 Forest Run ...	6
6	32	Obediah Coneron	3652 Iowa Street	6

4.Instructor_phone :

```
CREATE TABLE IF NOT EXISTS srs."Instructor_phone"
(
    "Instructor_ID" bigint NOT NULL,
    "Phone_no" bigint NOT NULL,
    CONSTRAINT "Instructor_phone_pkey" PRIMARY KEY
("Instructor_ID", "Phone_no"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Instructor_phone"
    OWNER to postgres;
```

- **Instructor_phone(Instructor_ID, Phone no)**



5.Teaches :

```
CREATE TABLE IF NOT EXISTS srs."Teaches"
(
    "Instructor_ID" bigint NOT NULL,
    "Student_ID" bigint NOT NULL,
    CONSTRAINT "Teaches_pkey" PRIMARY KEY ("Instructor_ID",
"Student_ID"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Teaches"
    OWNER to postgres;
```

- **Teches(Instructor_ID, Student_ID)**

Query | Query History

```
1  SELECT * FROM srs."Teaches"
2  ORDER BY "Instructor_ID" ASC, "Student_ID" ASC
```

Loading...

Data output | Messages | Notifications

	Instructor_ID [PK] bigint	Student_ID [PK] bigint
1	17	1005
2	17	1023
3	17	1029
4	17	1036
5	17	1045
6	17	1057
7	17	1061
8	17	1064
9	17	1075
10	17	1086
11	17	1092

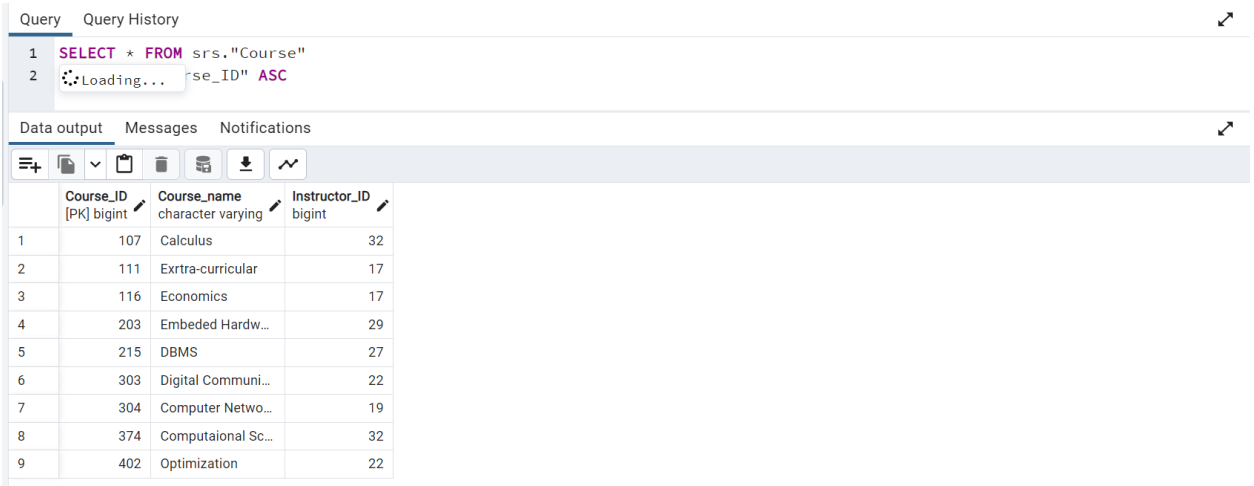
Total rows: 300 of 300 | Query complete 00:00:00.252

Successfully run. Total query runtime: 252 msec. 300 rows affected.

6. Course :

```
CREATE TABLE IF NOT EXISTS srs."Course"
(
    "Course_ID" bigint NOT NULL,
    "Course_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Instructor_ID" bigint,
    CONSTRAINT "Course_pkey" PRIMARY KEY ("Course_ID"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Course"
    OWNER to postgres;
```

- **Course(<u>Course_ID</u>**, course name, Instructor_ID)

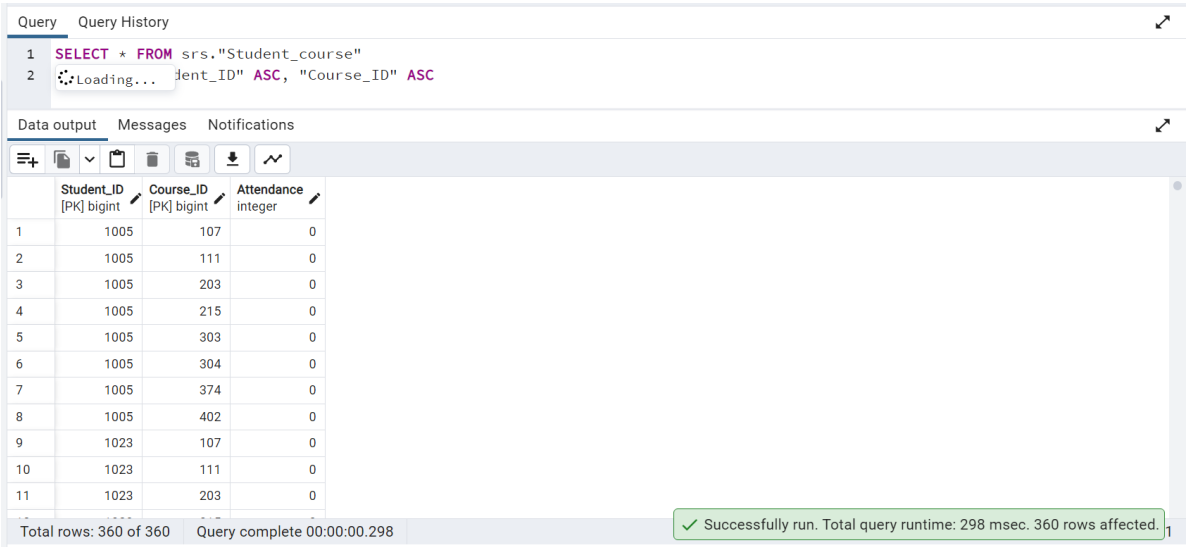


	Course_ID [PK] bigint	Course_name character varying	Instructor_ID bigint
1	107	Calculus	32
2	111	Exrtra-curricular	17
3	116	Economics	17
4	203	Embeded Hardw...	29
5	215	DBMS	27
6	303	Digital Communi...	22
7	304	Computer Netwo...	19
8	374	Computaional Sc...	32
9	402	Optimization	22

7.Student_course :

```
CREATE TABLE IF NOT EXISTS srs."Student_course"
(
    "Student_ID" bigint NOT NULL,
    "Course_ID" bigint NOT NULL,
    "Attendance" integer,
    CONSTRAINT "Student_course_pkey" PRIMARY KEY ("Student_ID",
"Course_ID"),
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Student_course"
    OWNER to postgres;
```

- **Student_course(<u>student_ID, Course_ID</u>**, Attendance)



8.Reward :

```
CREATE TABLE IF NOT EXISTS srs."Reward"
(
    "Reward_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Course_ID" bigint NOT NULL,
    "Reward_type" character varying COLLATE pg_catalog."default",
    CONSTRAINT "Reward_pkey" PRIMARY KEY ("Reward_name",
"Course_ID"),
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Reward"
    OWNER to postgres;
```

- **Reward**(**Reward_name**, **Course_ID**,Reward type)

Query | Query History

```
1  SELECT * FROM srs."Reward"
2  ORDER BY "Reward_name" ASC, "Course_ID" ASC
```

Loading...

Data output | Messages | Notifications

	Reward_name [PK] character varying	Course_ID [PK] bigint	Reward_type character varying
1	Amazon voucher	303	Academic
2	Arduino	304	Academic
3	Cash	203	Academic
4	Ear phone	116	Academic
5	La' pinoz Coupon	215	Academic
6	Netflix subscription	107	Academic
7	Resort Passes	402	Academic
8	sports kit or music in...	111	Non-Academic
9	Storage device	374	Academic

9.Academic_reward :

```
CREATE TABLE IF NOT EXISTS srs."Academic_reward"
(
    "Student_ID" bigint NOT NULL,
    "Course_ID" bigint NOT NULL,
    "Activity_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Obtained_marks" double precision,
    "Reward_points"double precision,
    CONSTRAINT "Academic_reward_pkey" PRIMARY KEY
("Student_ID", "Course_ID", "Activity_name"),
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Academic_reward"
    OWNER to postgres;
```

- **Academic_rewards(<u>Student_ID, Course_ID, Activity_name</u>,** obtained_marks, Reward_points)

Query Query History

```
SELECT * FROM srs."Academic_reward"
ORDER BY "Student_ID" ASC, "Course_ID" ASC, "Activity_name" ASC
```

Data output Messages Notifications

	Student_ID [PK] bigint	Course_ID [PK] bigint	Activity_name [PK] character varying	Obtained_marks double precision	Reward_points double precision
1	1005	107	Endsem	41	0
2	1005	107	Lab	26	17.3333333333333
3	1005	107	Midsem	0	0
4	1005	107	Quiz	11	11.0000000000000
5	1005	107	Viva	7	10.5
6	1005	203	Endsem	58	0
7	1005	203	Lab	18	12
8	1005	203	Midsem	29	14.5
9	1005	203	Quiz	10	10
10	1005	203	Viva	3	4.5
11	1005	215	Endsem	49	0

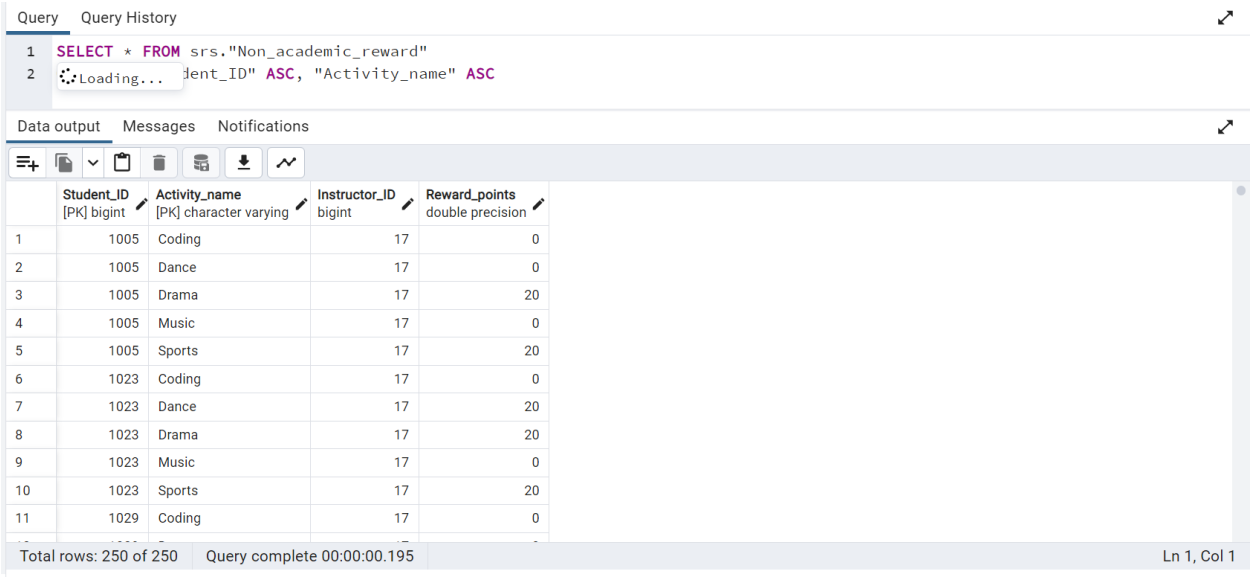
Total rows: 1000 of 1550 Query complete 00:00:00.179 Ln 1, Col 1

10.Non_academic_reward :

```
CREATE TABLE IF NOT EXISTS srs."Non_academic_reward"
(
    "Student_ID" bigint NOT NULL,
    "Activity_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Instructor_ID" bigint,
    "Reward_points" double precision,
    CONSTRAINT "Non_academic_reward_pkey" PRIMARY KEY
("Student_ID", "Activity_name"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)
```

```
TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Non_academic_reward"
    OWNER to postgres;
```

- **Non_acadamic_rewards**(**Student_ID**, **Activity_name**, ,Instructor ID,Reward points)



Query | Query History

```
SELECT * FROM srs."Non_academic_reward"
dent_ID" ASC, "Activity_name" ASC
```

Loading...

Data output | Messages | Notifications

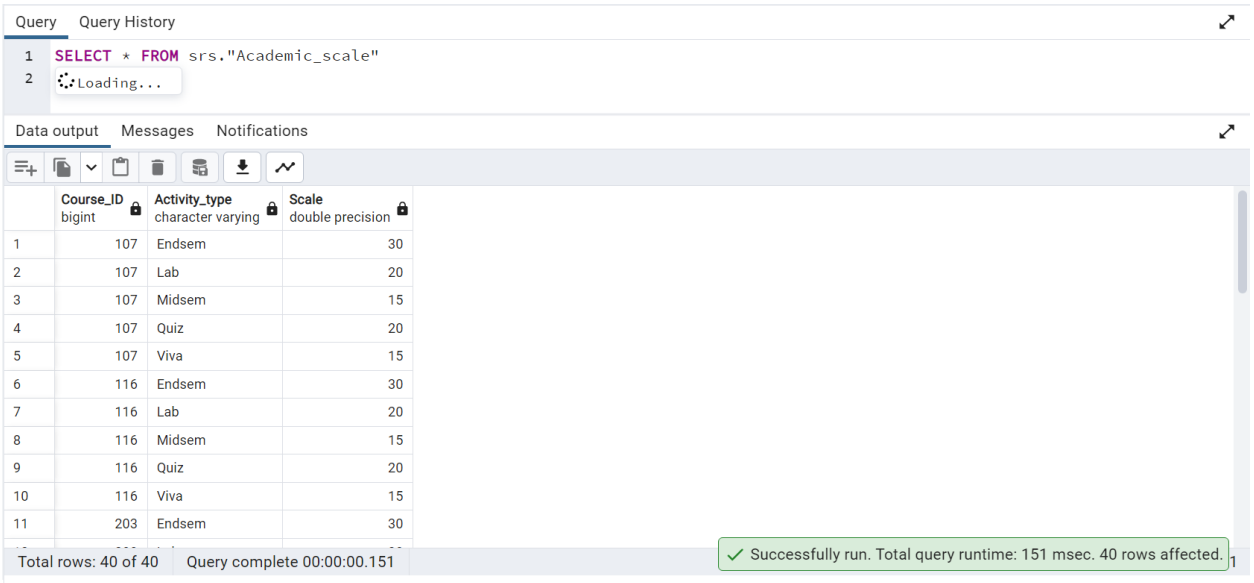
	Student_ID [PK] bigint	Activity_name [PK] character varying	Instructor_ID bigint	Reward_points double precision
1	1005	Coding	17	0
2	1005	Dance	17	0
3	1005	Drama	17	20
4	1005	Music	17	0
5	1005	Sports	17	20
6	1023	Coding	17	0
7	1023	Dance	17	20
8	1023	Drama	17	20
9	1023	Music	17	0
10	1023	Sports	17	20
11	1029	Coding	17	0

Total rows: 250 of 250 | Query complete 00:00:00.195 | Ln 1, Col 1

11.Academic_scale :

```
CREATE TABLE IF NOT EXISTS srs."Academic_scale"
(
    "Course_ID" bigint NOT NULL,
    "Activity_type" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Scale" double precision,
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Academic_scale"
    OWNER to postgres;
```

- **Academic_scale**(**Course_ID** , **Activity_type**, scale)



12.Non_academic_scale :

```
CREATE TABLE IF NOT EXISTS srs."Non_academic_scale"
(
    "Instructor_ID" bigint NOT NULL,
    "Activity_type" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Scale" double precision,
    CONSTRAINT "Non_academic_scale_pkey" PRIMARY KEY
("Instructor_ID", "Activity_type"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Non_academic_scale"
    OWNER to postgres;
```

- **Non_academic_scale(<u>Instructor_ID</u> , <u>Activity_type</u>, scale)**

Query Query History

```
1  SELECT * FROM srs."Non_academic_scale"
2  Loading...  tructor_ID" ASC, "Activity_type" ASC
```

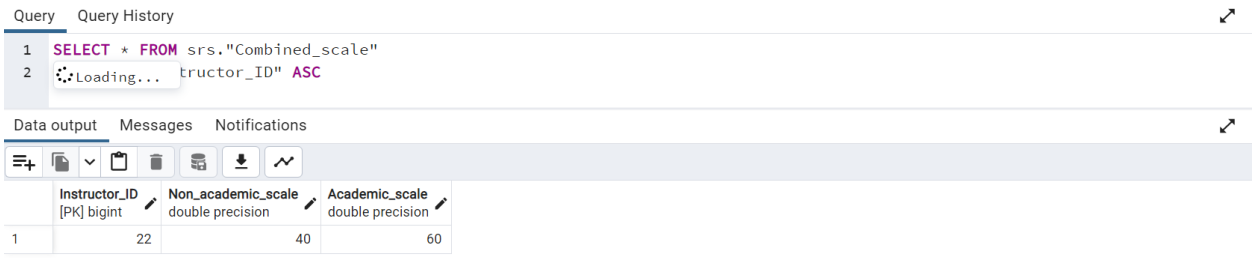
Data output Messages Notifications

	Instructor_ID [PK] bigint	Activity_type [PK] character varying	Scale double precision
1	17	Coding	20
2	17	Dance	20
3	17	Drama	20
4	17	Music	20
5	17	Sports	20

13.Combined_scale :

```
CREATE TABLE IF NOT EXISTS srs."Combined_scale"
(
    "Instructor_ID" bigint NOT NULL,
    "Non_academic_scale" double precision,
    "Academic_scale" double precision,
    CONSTRAINT "Combined_scale_pkey" PRIMARY KEY
("Instructor_ID"),
    CONSTRAINT "Instructor_ID" FOREIGN KEY ("Instructor_ID")
        REFERENCES srs."Instructor" ("Instructor_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Combined_scale"
    OWNER to postgres;
```

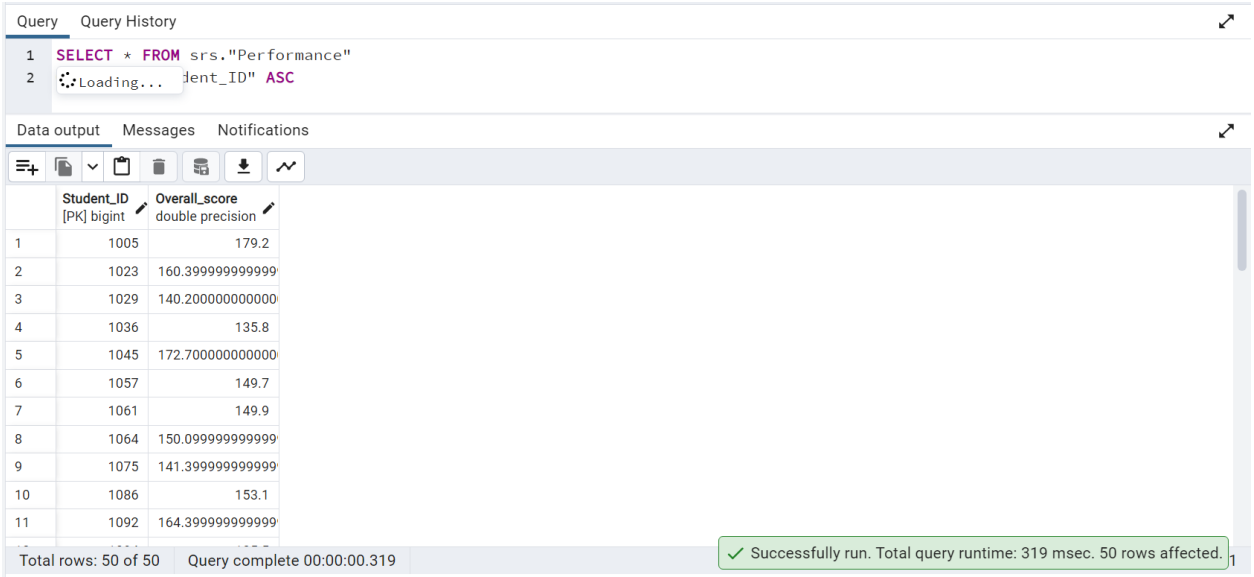
- **Combined_scale**(**Instructor_ID** , academic scale,non- academic scale)



14.Performance :

```
CREATE TABLE IF NOT EXISTS srs."Performance"
(
    "Student_ID" bigint NOT NULL,
    "Overall_score" double precision,
    CONSTRAINT "Performance_pkey" PRIMARY KEY ("Student_ID"),
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Performance"
    OWNER to postgres;
```

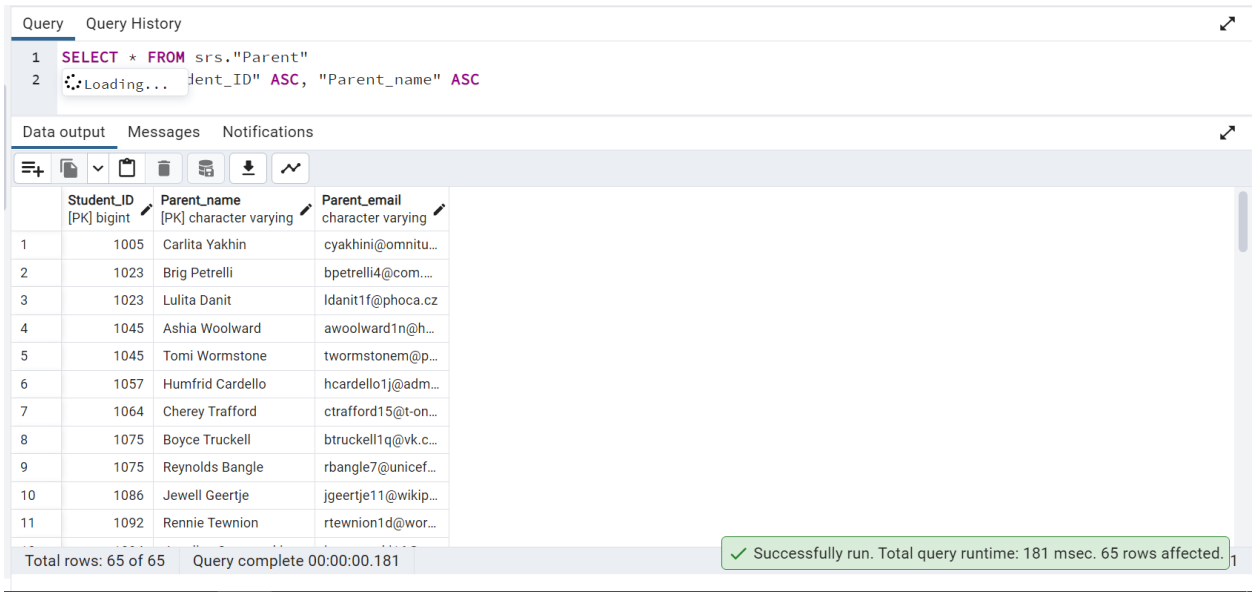
- **Performance(<u>Student_ID</u>** ,overall score)



15.Parent :

```
CREATE TABLE IF NOT EXISTS srs."Parent"
(
    "Student_ID" bigint NOT NULL,
    "Parent_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Parent_email" character varying COLLATE pg_catalog."default",
    CONSTRAINT "Parent_pkey" PRIMARY KEY ("Student_ID",
"Parent_name"),
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Parent"
    OWNER to postgres;
```

- **Parent(<u>Student_ID</u> , <u>parent_name</u>**, parent email)



16.Alert :

```
CREATE TABLE IF NOT EXISTS srs."Alert"
(
    "Student_ID" bigint NOT NULL,
    "Course_ID" bigint NOT NULL,
    "Date" date NOT NULL,
    "Alert_type" character varying COLLATE pg_catalog."default",
    "Alert_message" character varying COLLATE pg_catalog."default",
    CONSTRAINT "Alert_pkey" PRIMARY KEY ("Student_ID",
"Course_ID", "Date"),
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID,
    CONSTRAINT "Student_ID" FOREIGN KEY ("Student_ID")
        REFERENCES srs."Student" ("Student_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
        NOT VALID
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Alert"
    OWNER to postgres;
```

- **Alert(<u>Student_ID, Course_ID,date</u>**, alert type , alert message)

Query Query History

```
1  SELECT * FROM srs."Alert"
2  Loading...  dent_ID" ASC, "Course_ID" ASC, "Date" ASC
```

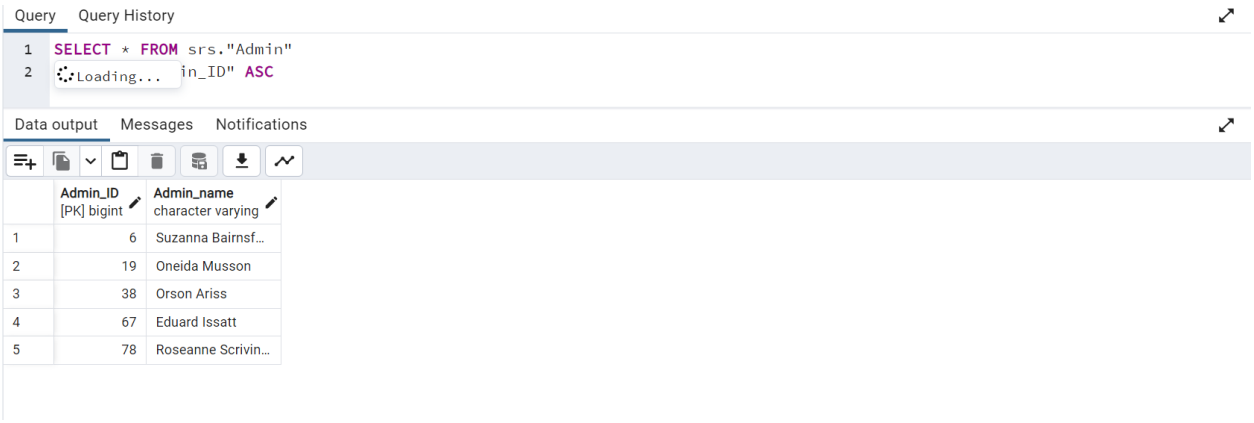
Data output Messages Notifications

	Student_ID [PK] bigint	Course_ID [PK] bigint	Date [PK] date	Alert_type character varying	Alert_message character varying
1	1005	303	2022-11-15	Attendance related	Your attendance i...
2	1036	374	2022-11-20	lab related	Please submit yo...
3	1057	215	2022-10-10	quiz related	You missed your ...
4	1119	402	2022-11-16	meeting with par...	meeting start at ...
5	1150	203	2022-10-11	course related	focus on studies ...

17. Admin :

```
CREATE TABLE IF NOT EXISTS srs."Admin"
(
    "Admin_ID" bigint NOT NULL,
    "Admin_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    CONSTRAINT "Admin_pkey" PRIMARY KEY ("Admin_ID")
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Admin"
    OWNER to postgres;
```

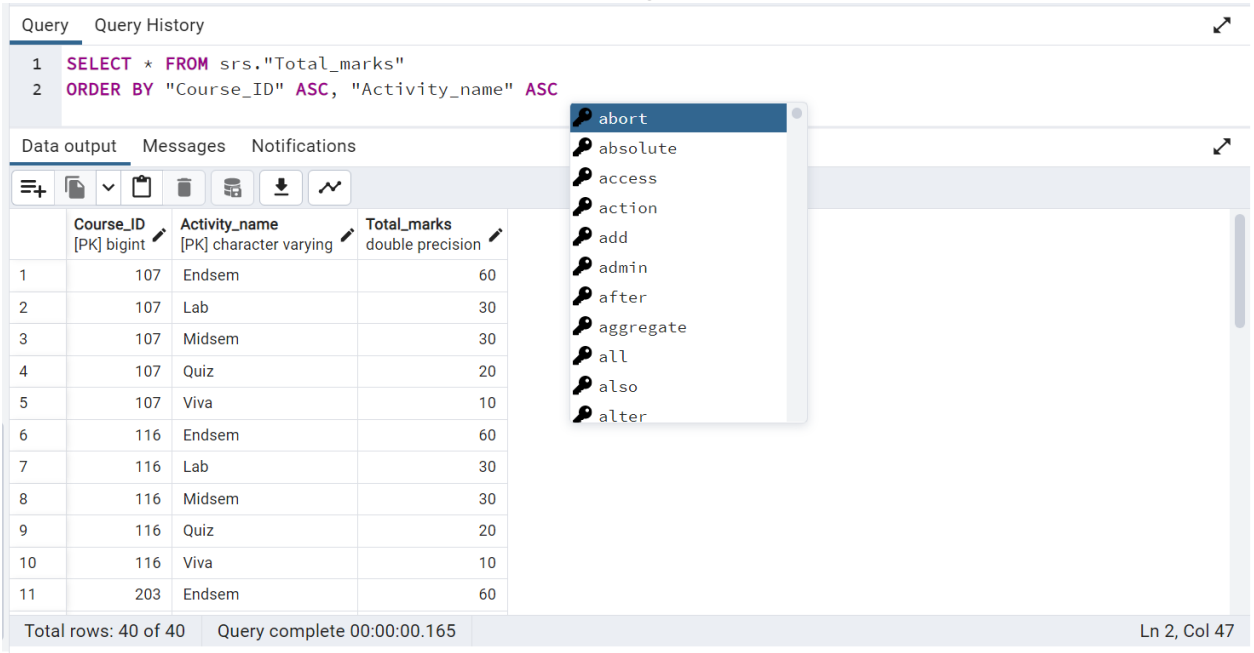
- **Admin(<u>Admin_ID</u>** ,admin name)



18.Total_marks :

```
CREATE TABLE IF NOT EXISTS srs."Total_marks"
(
    "Course_ID" bigint NOT NULL,
    "Activity_name" character varying COLLATE pg_catalog."default" NOT
NULL,
    "Total_marks" integer,
    CONSTRAINT "Total_marks_pkey" PRIMARY KEY ("Course_ID",
"Activity_name"),
    CONSTRAINT "Course_ID" FOREIGN KEY ("Course_ID")
        REFERENCES srs."Course" ("Course_ID") MATCH SIMPLE
        ON UPDATE CASCADE
        ON DELETE CASCADE
)

TABLESPACE pg_default;

ALTER TABLE IF EXISTS srs."Total_marks"
    OWNER to postgres;
```

- **Total_marks(<u>Course_ID</u>, <u>Activity_name</u>**, Total_marks)



Queries:

1. Show the number of students studying under each Instructor.

```
SELECT "Instructor_ID",COUNT(*)
FROM srs."Teaches"
GROUP BY "Instructor_ID"
```

Query | Query History

```
1  select "Instructor_ID" , count(*)
2  from srs."Teaches"
3  group by "Instructor_ID"
```

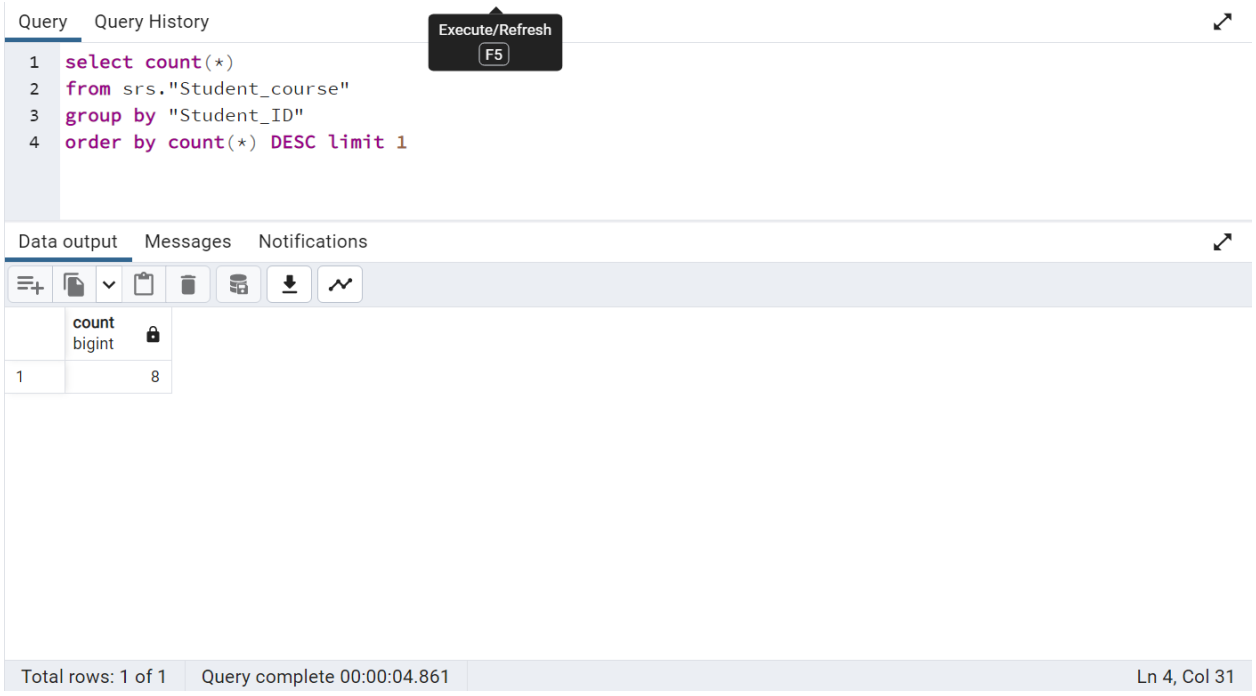
Data output | Messages | Notifications

	Instructor_ID bigint	count bigint
1	19	50
2	27	50
3	17	50
4	29	50
5	22	50
6	32	50

Total rows: 6 of 6 | Query complete 00:00:11.515 | Ln 3, Col 25

2. Show the highest number of courses taken by 1 student in the semester.

```
SELECT COUNT(*) FROM srs."Student_course"
GROUP BY "Student_ID"
ORDER BY COUNT(*) DESC LIMIT 1
```



3. Show all details of academic activities of Student whose Student_Id = 1075.

```
SELECT *
FROM srs."Academic_reward"
WHERE "Student_ID" = 1075
```

```
select *
from srs."Academic_reward"
where "Student_ID" = 1075
```

	Student_ID bigint	Course_ID bigint	Activity_name character varying	Obtained_marks double precision	Reward_points double precision
1	1075	203	Lab	24	80
2	1075	203	Midsem	23	76.6666666666667
3	1075	203	Endsem	19	31.6666666666667
4	1075	203	Quiz	5	25
5	1075	203	Viva	2	20
6	1075	215	Endsem	43	71.6666666666667
7	1075	215	Lab	4	13.3333333333333
8	1075	215	Midsem	19	63.3333333333333
9	1075	215	Quiz	2	10

Total rows: 30 of 30 | Query complete 00:00:52.440 | Ln 3, Col 26

4. Show details of student with non-academic activities whose name starts with ‘N’

```
SELECT *
FROM srs."Student" NATURAL JOIN srs."Non_academic_reward"
WHERE "Student"."Student_name" lIKE 'N%'
```

```
select *
from  srs."Student" natural join srs."Non_academic_reward"
where "Student"."Student_name" like 'N%'
```

	Student_ID bigint	Student_name character varying	Address character varying	Activity_name character varying	Instructor_ID bigint	Reward_points integer
1	1064	Nev Mogie	92 Thierer Street	Drama	17	20
2	1064	Nev Mogie	92 Thierer Street	Coding	17	0
3	1064	Nev Mogie	92 Thierer Street	Dance	17	20
4	1064	Nev Mogie	92 Thierer Street	Sports	17	0
5	1064	Nev Mogie	92 Thierer Street	Music	17	20
6	1235	Nikita Sacker	2881 Shasta Cen…	Drama	17	0
7	1235	Nikita Sacker	2881 Shasta Cen…	Coding	17	20
8	1235	Nikita Sacker	2881 Shasta Cen…	Dance	17	0
9	1235	Nikita Sacker	2881 Shasta Cen…	Sports	17	20

Total rows: 15 of 15 | Query complete 00:00:12.652 | Ln 4, Col 1

5. Show all courses' course_id and course_name taken by the student whose Student_ID is 1075.

```
SELECT "Course_ID","Course_name"
FROM srs."Student_course" NATURAL JOIN srs."Course"
WHERE "Student_ID" = 1075
```

6.Print Student_id and Student_name whose overall_score is greater than avg overall_score.

```
SELECT "Student"."Student_ID","Student"."Student_name"
FROM srs."Performance" NATURAL JOIN srs."Student"
WHERE "Performance","Overall_score">(SELECT
AVG("Performance"."Overall_score") FROM srs."Performance")
```

```
select "Student"."Student_ID","Student"."Student_name"
from srs."Performance" natural join srs."Student"
where "Performance"."Overall_score">(select avg("Performance"."Overall_score" )from srs."Performance")
```

	Student_ID [PK] bigint	Student_name character varying
1	1150	Giselle Tarry
2	1345	Shelley Osgorby
3	1045	Zane Pellamonuten
4	1218	Dorian Craxford
5	1086	Chaunce McCarney
6	1061	Dinny Penberthy
7	1131	Seline Jeeves
8	1147	Pammie O'Lochan
9	1286	Klement Teggart

Total rows: 27 of 27 | Query complete 00:00:00.073 | Ln 1, Col 55

7. Display names of Students in upper case.

```
SELECT UPPER("Student"."Student_name")
FROM srs."Student"
```

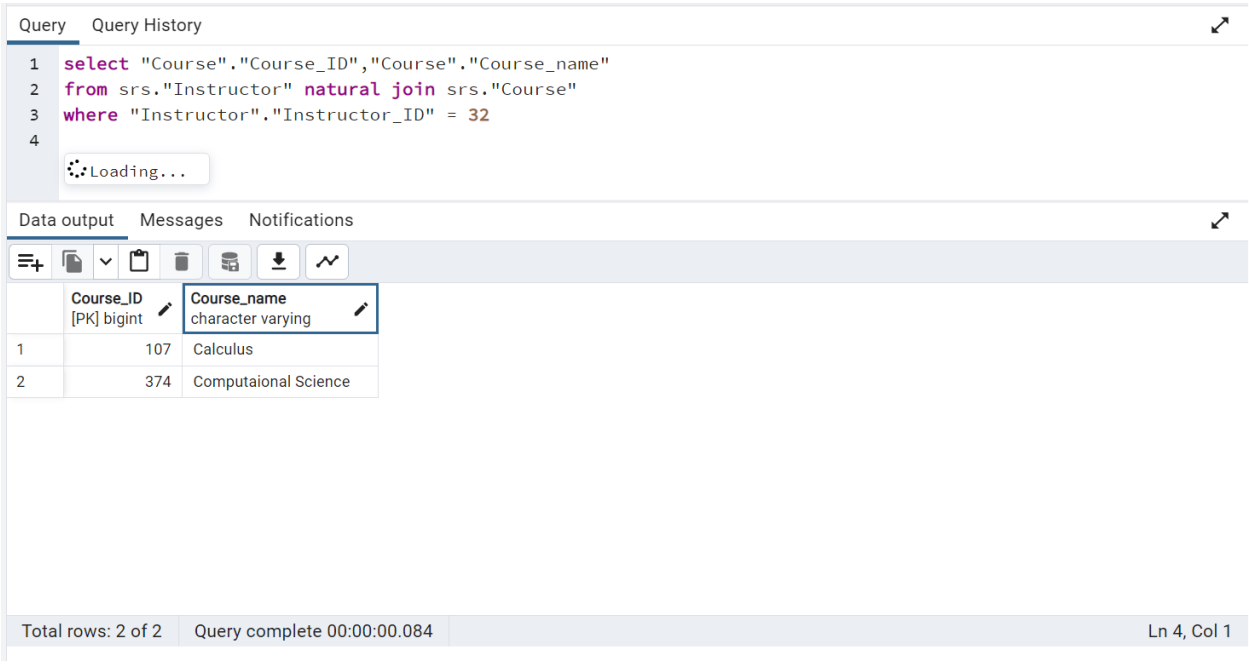
```
select upper("Student"."Student_name")
from srs."Student"
```

	upper text
1	JACK
2	ZANE PELLAMONUTEN
3	GISELLE TARRY
4	BROOKE DYNE
5	TYMOTHY DUBOIS
6	DINNY PENBERTHY
7	PETR KULIS
8	PHILIPPE RAFTERY
9	JOYE VILA

Total rows: 51 of 51 | Query complete 00:00:00.106 | Ln 1, Col 15

8.Display the Course_ID and Course_name which are taken by instructor whose Instructor_ID is 32.

```
SELECT "Course"."Course_ID","Course"."Course_name"
FROM srs."Instructor" NATURAL JOIN srs."Course"
WHERE "Instructor"."Instructor_ID" = 32
```



9. Show final academic score for every student with use of view.

```
CREATE OR REPLACE VIEW academic_score_final AS
SELECT "Student_ID", SUM("Reward_points") AS
"final_acadmic_score"
FROM srs."Academic_reward"
GROUP BY "Student_ID"

SELECT * FROM academic_score_final
```

```
create or replace view academic_score_final AS
select "Student_ID" , sum("Reward_points") as "final_acadmic_score"
from srs."Academic_reward"
group by "Student_ID"

select * from academic_score_final
```

Loading...

Data output | Messages | Notifications

	Student_ID bigint	final_acadmic_score double precision
1	1150	379.666666666667
2	1045	366.5
3	1345	342.5
4	1257	254.5
5	1119	263.666666666667
6	1218	300
7	1397	288
8	1288	278

Total rows: 50 of 50 | Query complete 00:00:00.070 | Ln 6, Col 35

10. Display Total numbers of Students.

```
SELECT COUNT(*) FROM srs."Student"
```

```
select count(*)
from srs."Student"
```

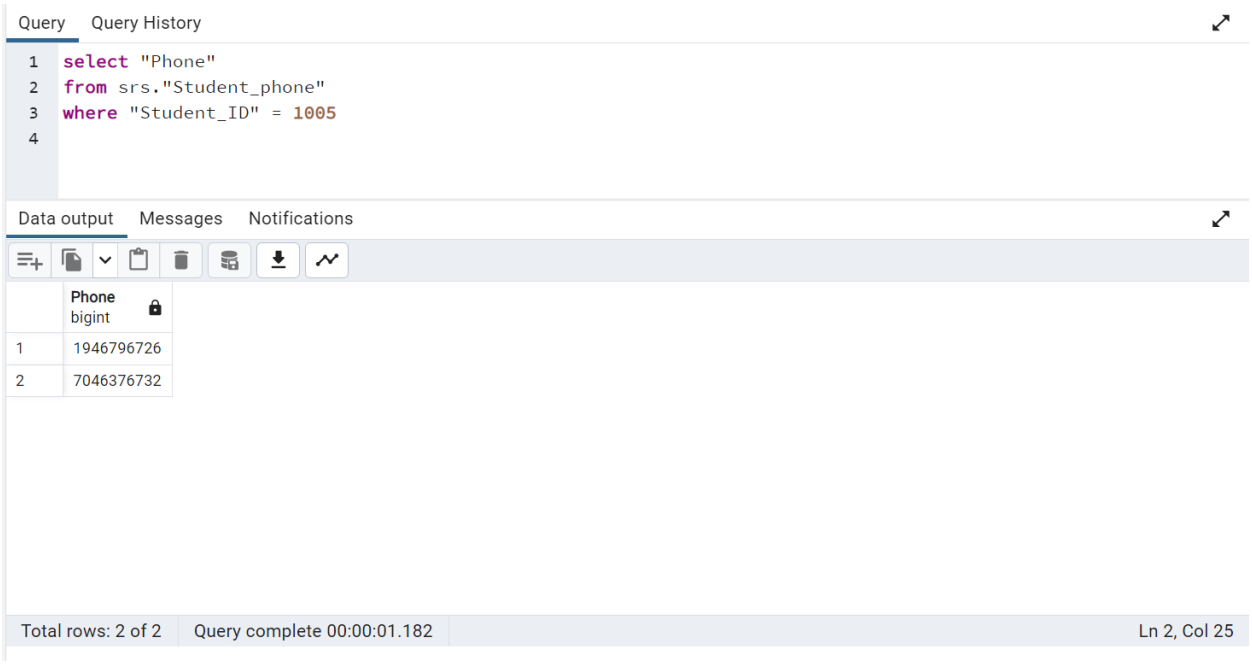
Data output | Messages | Notifications

	count bigint
1	51

Total rows: 1 of 1 | Query complete 00:00:00.119 | Ln 2, Col 19

11. Display all the phone numbers of student id 1005.

```
SELECT "Phone" FROM srs."Student_phone"
WHERE "Student_ID" = 1005
```



12. Show total non academic reward points earned by every student using view.

```
CREATE OR REPLACE VIEW non_academic_score_final AS
SELECT "Student_ID" , SUM("Reward_points") AS
"final_non_acadmic_score"
FROM srs."Non_academic_reward"
GROUP BY "Student_ID"

SELECT * FROM non_academic_score_final
```

```
create or replace view non_academic_score_final AS
select "Student_ID" , sum("Reward_points") as "final_non_acadmic_score"
from srs."Non_academic_reward"
group by "Student_ID"

select * from non_academic_score_final
```

Data output | Messages | Notifications

	Student_ID bigint	final_non_acadmic_score double precision
1	1150	40
2	1345	80
3	1257	80
4	1045	60
5	1119	80
6	1397	20
7	1218	80
8	1288	40

Total rows: 50 of 50 | Query complete 00:00:00.086 | Ln 6, Col 39

13.Run the query that updates or calculates the overall performance table with use of all academic and non academic data of each student.

```
UPDATE srs."Performance"
set "Overall_score"=final_score.os
from (select fp."Student_ID",(((fp."arp" * fp."Academic_scale")
/ 100) + ((fp."Non_academic_scale" * fp."nrp") / 100))
as os
from (((select "Student_ID",sum("Reward_points") as ARP from
(Select
ar."Student_ID",ar."Course_ID",ar."Activity_name",ar."Obtained_m
arks",ar."Reward_points",ars."Scale",tm."Total_marks"
From srs."Academic_reward" as ar,srs."Academic_scale" as
ars,srs."Total_marks" as tm
Where ar."Course_ID"=ars."Course_ID" and
ar."Activity_name"=ars."Activity_type"
```

```
and tm."Course_ID"=ar."Course_ID" and
tm."Activity_name"=ar."Activity_name") as academic_reward group
by "Student_ID")
as afs
natural join
(select n."Student_ID",sum(n."Reward_points") as NRP from
(select
nar."Student_ID",nar."Activity_name",nar."Reward_points"
from srs."Non_academic_reward" as nar join
srs."Non_academic_scale" as nas
on nar."Instructor_ID"=nas."Instructor_ID" and
nar."Activity_name"=nas."Activity_type") as n group by
n."Student_ID") as
nfs)
cross join srs."Combined_scale" as cs) as fp) as final_score;

select * from srs."Performance"
```

```
1  UPDATE srs."Performance"
2  set "Overall_score"=final_score.os
3  from (select fp."Student_ID",(((fp."arp" * fp."Academic_scale") / 100) + ((fp."Non_academic_scale" * fp."nrp") / 100)) as os
4  from (((select "Student_ID",sum("Reward_points") as ARP from (Select ar."Student_ID",ar."Course_ID",ar."Activity_name",ar."Ob
5  From srs."Academic_reward" as ar,srs."Academic_scale" as ars,srs."Total_marks" as tm
6  Where ar."Course_ID"=ars."Course_ID" and ar."Activity_name"=ars."Activity_type"
7  and tm."Course_ID"=ar."Course_ID" and tm."Activity_name"=ar."Activity_name") as academic_reward group by "Student_ID") as afs
8  natural join
9  (select n."S  Loading...  n(n."Reward_points") as NRP from (select nar."Student_ID",nar."Activity_name",nar."Reward_points"
10 from srs."Non_academic_reward" as nar join srs."Non_academic_scale" as nas
11 on nar."Instructor_ID"=nas."Instructor_ID" and nar."Activity_name"=nas."Activity_type") as n group by n."Student_ID") as nfs)
12 cross join srs."Combined_scale" as cs) as fp) as final_score;
13
14 select * from srs."Performance"
```

Data output | Messages | Notifications

	Student_ID bigint	overall_score double precision
1	1150	155.5
2	1345	182
3	1257	133.099999999999
4	1045	172.700000000000
5	1119	146.400000000000
6	1397	134.3
7	1218	163.4
8	1288	147.3
9	1376	134
10	1341	130.700000000000
11	1086	153.1
12	1061	149.9
13	1131	164.3
14	1160	95.5000000000000
15	1147	149.600000000000

Total rows: 50 of 50 | Query complete 00:00:00.097 | Ln 10, Col 46

14. Display Top 5 student of this semester who score high in overall semester.

```
SELECT "Student_ID","Overall_score"
FROM srs."Performance" ORDER BY "Overall_score" DESC LIMIT 5
```

```
1  select "Student_ID","Overall_score"
2  From srs."Performance" ORDER BY "Overall_score" DESC LIMIT 5
```

Data output | Messages | Notifications

	Student_ID [PK] bigint	Overall_score double precision
1	1345	182
2	1005	179.2
3	1222	179.000000000000
4	1045	172.700000000000
5	1229	170.700000000000

15. List 10 brilliant student who score higher under Instructor ID=’22’.

```
SELECT
"Academic_reward"."Reward_points","Academic_reward"."Course_ID",
"Academic_reward"."Student_ID"
FROM (srs."Academic_reward" NATURAL JOIN (srs."Teaches" NATURAL
JOIN srs."Course"))
WHERE "Teaches"."Instructor_ID"=22
ORDER BY "Academic_reward"."Reward_points" DESC LIMIT 10
```

```
1  select "Academic_reward"."Reward_points","Academic_reward"."Course_ID","Academic_reward"."Student_ID"
2  from (srs."Academic_reward" natural join (srs."Teaches" natural join srs."Course"))
3  where "Teaches"."Instructor_ID"=22
4  order by "Academic_reward"."Reward_points" DESC limit 10
```

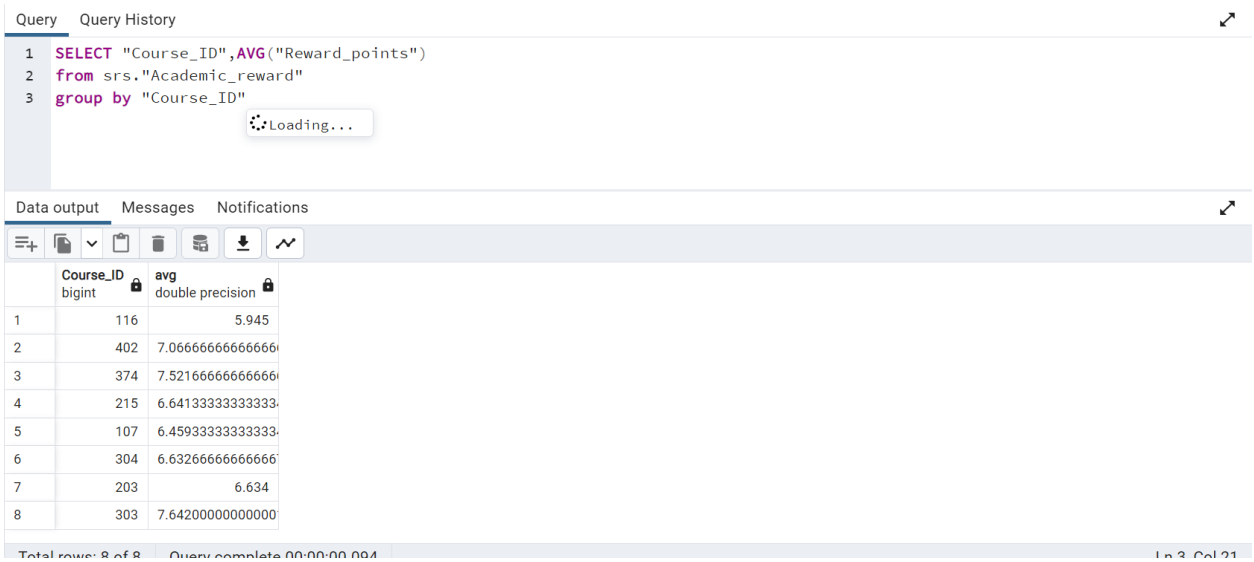
Data output | Messages | Notifications

	Reward_points double precision	Course_ID bigint	Student_ID bigint
1	20	402	1131
2	20	402	1169
3	20	402	1180
4	20	303	1229
5	20	402	1256
6	19.3333333333333	303	1075
7	19.3333333333333	303	1086
8	19	303	1141
9	19	402	1023
10	19	402	1119

Total rows: 10 of 10 | Query complete 00:00:00.925 | Ln 3, Col 35

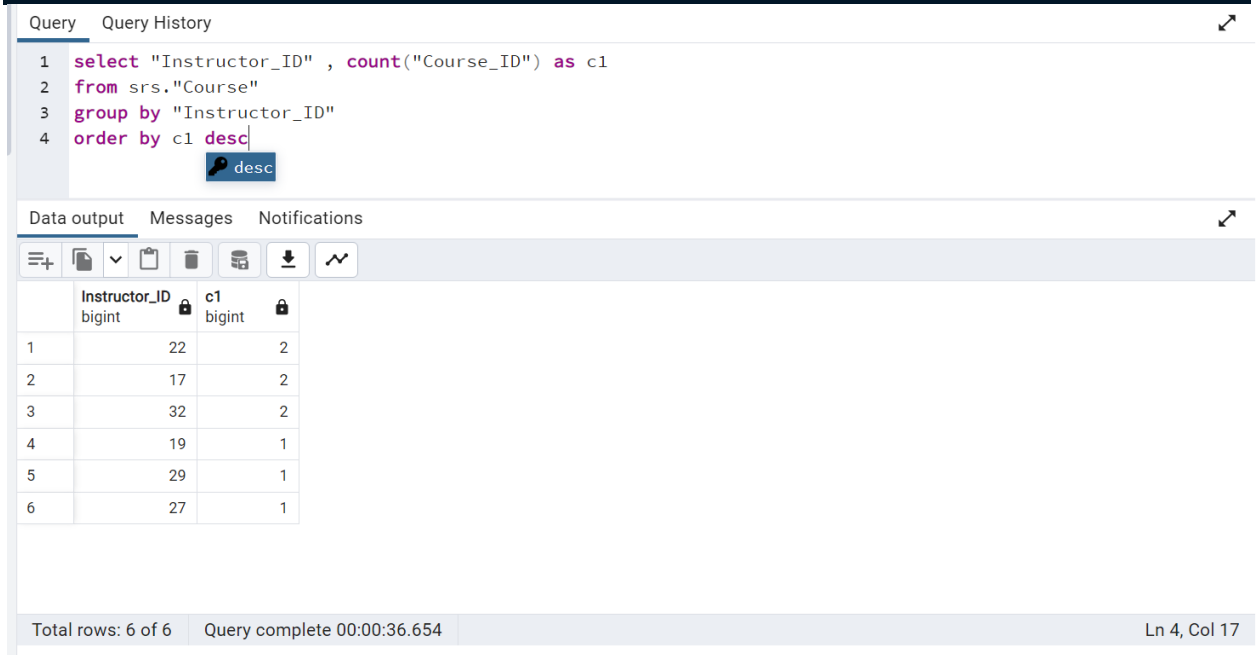
16.Display all courses average scores in semester.

```
SELECT "Course_ID",AVG("Reward_points")
FROM srs."Academic_reward"
GROUP BY "Course_ID"
```



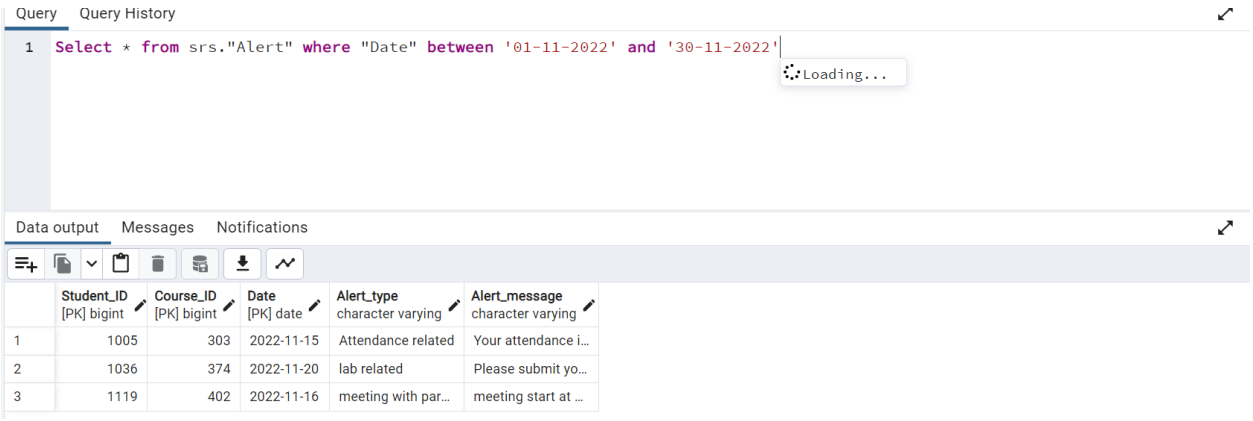
17. Display number of courses taken by every instructor.

```
SELECT "Instructor_ID" , COUNT("Course_ID") AS c1
FROM srs."Course"
GROUP BY "Instructor_ID"
ORDER BY c1 DESC
```



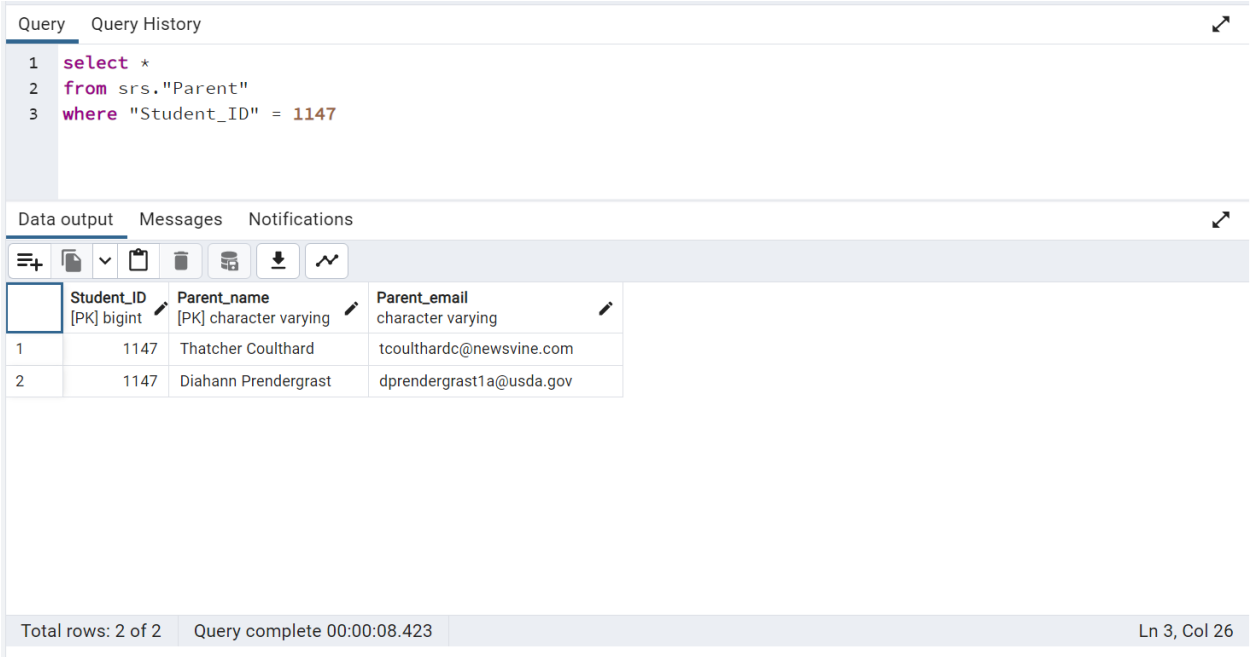
18. Display all alerts received in the month of November-2022.

```
SELECT * FROM srs."Alert"
WHERE "Date" BETWEEN '01-11-2022' AND '30-11-2022'
```



19. Display details of parents whose Student_id is 1147.

```
SELECT * FROM srs."Parent"
WHERE "Student_ID" = 1147
```

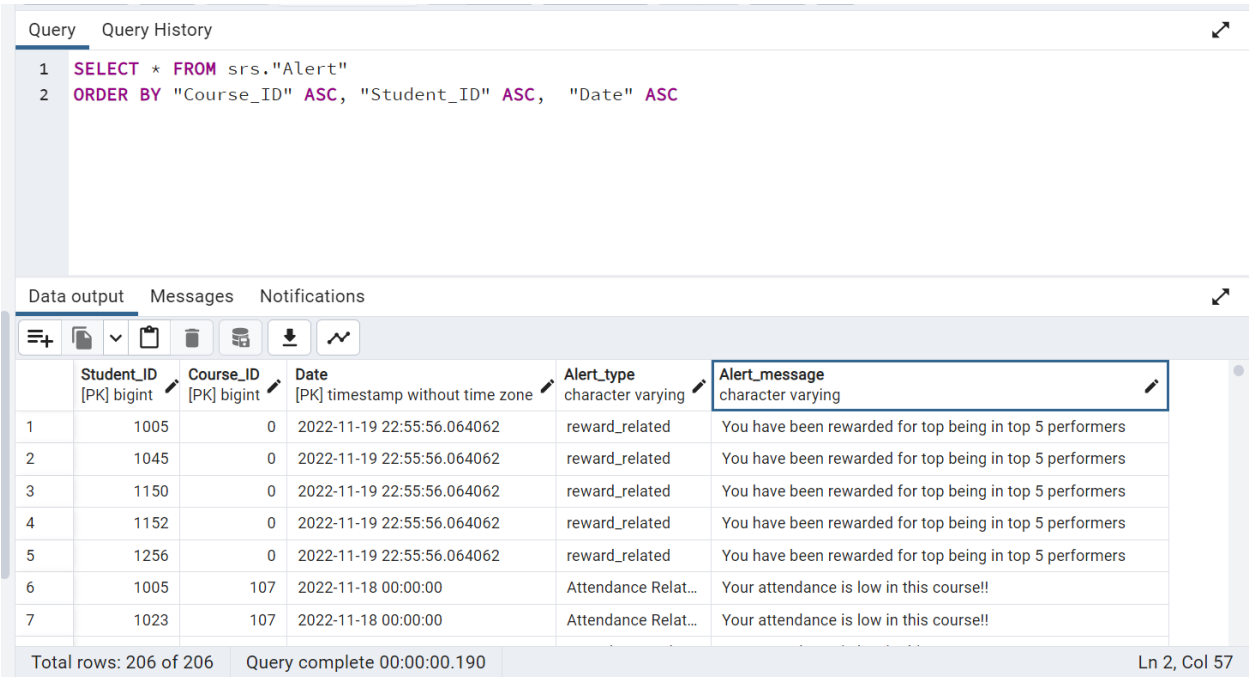


20. Create a function for sending alert to top 5 students for getting reward.

```
create or replace function give_reward_notification()
returns void
as
$$
declare

BEGIN
insert into srs."Alert"
("Student_ID","Course_ID","Date","Alert_type","Alert_message")
(select "Student_ID",111,current_timestamp,'reward_related','You
have been rewarded for top being in top 5 performers'
from srs."Reward" as r cross join (select "Student_ID",rank()
over (order by "Overall_score" desc) from
srs."Performance" order by "Overall_score" desc limit 5) as sid
where r."Rank" = sid.rank);

end;
$$
language 'plpgsql'

select give_reward_notification()
```

Query | Query History

```
1  create or replace function give_reward_notification()
2  returns void
3  as
4  $$
5  declare
6
7  BEGIN
8      insert into srs."Alert" ("Student_ID","Course_ID","Date","Alert_type","Alert_message")
9      (select "Student_ID",0,current_timestamp,'reward_related','You have been rewarded for top being in top
10     from srs."Reward" as r cross join (select "Student_ID",rank()  over (order by "Overall_score" desc) fro
11     where r."Rank" = sid.rank);
12
13 end;
14 $$
15 language 'plpgsql'
16
17
```



Query | Query History

```
1  SELECT * FROM srs."Alert"
2  ORDER BY "Course_ID" ASC, "Student_ID" ASC,  "Date" ASC
```

Data output | Messages | Notifications

	Student_ID [PK] bigint	Course_ID [PK] bigint	Date [PK] timestamp without time zone	Alert_type character varying	Alert_message character varying
1	1005	0	2022-11-19 22:55:56.064062	reward_related	You have been rewarded for top being in top 5 performers
2	1045	0	2022-11-19 22:55:56.064062	reward_related	You have been rewarded for top being in top 5 performers
3	1150	0	2022-11-19 22:55:56.064062	reward_related	You have been rewarded for top being in top 5 performers
4	1152	0	2022-11-19 22:55:56.064062	reward_related	You have been rewarded for top being in top 5 performers
5	1256	0	2022-11-19 22:55:56.064062	reward_related	You have been rewarded for top being in top 5 performers
6	1005	107	2022-11-18 00:00:00	Attendance Relat...	Your attendance is low in this course!!
7	1023	107	2022-11-18 00:00:00	Attendance Relat...	Your attendance is low in this course!!

Total rows: 206 of 206 | Query complete 00:00:00.190 | Ln 2, Col 57

21. Create a trigger-function for calculating the Reward_points on inserting or updating tuples in the table Academic_rewards.

```
create or replace function
update_before_Academic_Reward_Points()
returns trigger
as
$$
declare
total double precision;
scale_temp double precision;
BEGIN
select "Total_marks" into total
from srs."Total_marks"
where "Activity_name"=new."Activity_name" and "Course_ID" =
new."Course_ID" ;
select "Scale" into scale_temp
from srs."Academic_scale"
where "Activity_type"=new."Activity_name" and "Course_ID" =
new."Course_ID" ;
new."Reward_points" = new."Obtained_marks"*scale_temp/total;
```

```
return new;
end;
$$
language 'plpgsql'


create trigger trigger_update_before_academic_reward_points
before update or insert on srs."Academic_reward"
for each row
execute procedure update_before_Academic_Reward_Points();
```

Query | Query History

```
1  create or replace function update_before_Academic_Reward_Points()
2  returns trigger
3  as
4  $$
5  declare
6  total double precision;
7  scale_temp double precision;
8  BEGIN
9     select "Total_marks" into total
10    from srs."Total_marks"
11    where "Activity_name"=new."Activity_name" and "Course_ID" = new."Course_ID" ;
12    select "Scale" into scale_temp
13    from srs."Academic_scale"
14    where "Activity_type"=new."Activity_name" and "Course_ID" = new."Course_ID" ;
15    new."Reward_points" = new."Obtained_marks"*scale_temp/total;
16    return new;
17 end;
18 $$
19 language 'plpgsql'
20 create trigger trigger_update_before_academic_reward_points
21 before update or insert on srs."Academic_reward"
22 for each row
23 execute procedure update_before_Academic_Reward_Points();
```

Query | Query History

```
1  UPDATE srs."Academic_reward"
2      SET "Obtained_marks"=50
3      WHERE "Student_ID"=1005 and "Course_ID"=107 and "Activity_name"='Endsem'
4
5  select * from srs."Academic_reward" WHERE "Student_ID"=1005 and "Course_ID"=107 and "Activity_name"='Endsem
6
7  Loading...
```

Data output | Messages | Notifications

	Student_ID [PK] bigint	Course_ID [PK] bigint	Activity_name [PK] character varying	Obtained_marks double precision	Reward_points double precision
1	1005	107	Endsem	50	25

22. Create a trigger-function for calculating the Reward_points on inserting or updating tuples in the table Non_academic_rewards.

```
create or replace function
update_before_Non_academic_Reward_Points()
returns trigger
as
$$
declare
scale_temp double precision;
BEGIN
select "Scale" into scale_temp
from srs."Non_academic_scale"
where "Activity_type"=new."Activity_name" ;
new."Reward_points" = new."Reward_points"*scale_temp/100;
return new;
end;
$$
language 'plpgsql'


create trigger trigger_update_before_non_academic_reward_points
before update or insert on srs."Non_academic_reward"
for each row
execute procedure update_before_Non_academic_Reward_Points();
```

Query | Query History

```
create or replace function update_before_Non_academic_Reward_Points()
returns trigger
as
$$
declare
scale_temp double precision;
BEGIN
   select "Scale" into scale_temp
   from srs."Non_academic_scale"
   where "Activity_type"=new."Activity_name"  ;
   new."Reward_points" = new."Reward_points"*scale_temp/100;
   return new;
end;
$$
language 'plpgsql'


create trigger trigger_update_before_non_academic_reward_points
before update or insert on srs."Non_academic_reward"
for each row
execute procedure update_before_Non_academic_Reward_Points();

```

Query | Query History

```
UPDATE srs."Non_academic_reward"
    SET "Reward_points"=100
    WHERE "Student_ID"=1005 and "Activity_name"='Coding'

select * from srs."Non_academic_reward" WHERE "Student_ID"=1005 and "Activity_name"='Coding'

```

Loading...

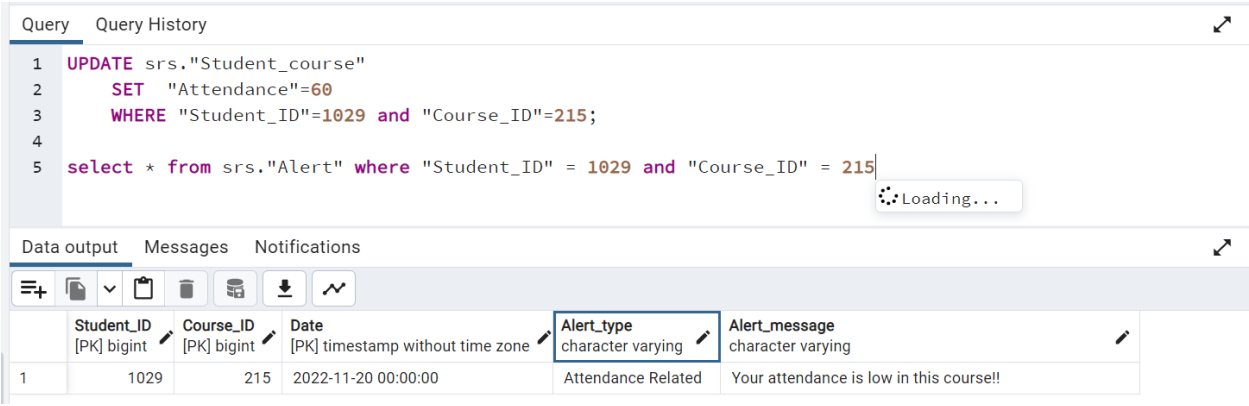
Data output | Messages | Notifications

	Student_ID [PK] bigint	Activity_name [PK] character varying	Instructor_ID bigint	Reward_points double precision
1	1005	Coding	17	20

23.Create a trigger-function for sending alerts to the students who have attendance less than 80 percent in a particular course on updating the value of attendance.

```
create or replace function update_after_alert_Attendance()
returns trigger
as
$$
declare

BEGIN
    if new."Attendance" < 80 then
  INSERT INTO srs."Alert"(
```

```
  "Student_ID", "Course_ID", "Date", "Alert_type",
"Alert_message")
    VALUES (new."Student_ID", new."Course_ID", current_date,
'Attendance Related', 'Your attendance is low in this
course!!');
   return new;
   end if;
   return new;
end;
$$
language 'plpgsql'

create trigger trigger_update_after_alert_attendance
after update or insert on srs."Student_course"
for each row
execute procedure update_after_alert_Attendance();
```



24. Create a function for calculating the final performance of all the students.

```
create or replace function calculate_final_performance()
returns trigger
as
$$
declare
aascore double precision;
nascore double precision;
aascale double precision;
nascale double precision;
BEGIN
select academic_score_final.final_acadmic_score into aascore
from academic_score_final
where "Student_ID" = new."Student_ID";
select non_academic_score_final.final_non_acadmic_score into
nascore
from non_academic_score_final
where "Student_ID" = new."Student_ID";
select "Academic_scale" into aascale
from srs."Combined_scale"
where "Instructor_ID" = 22;
select "Non_academic_scale" into nascale
from srs."Combined_scale"
where "Instructor_ID" = 22;
```

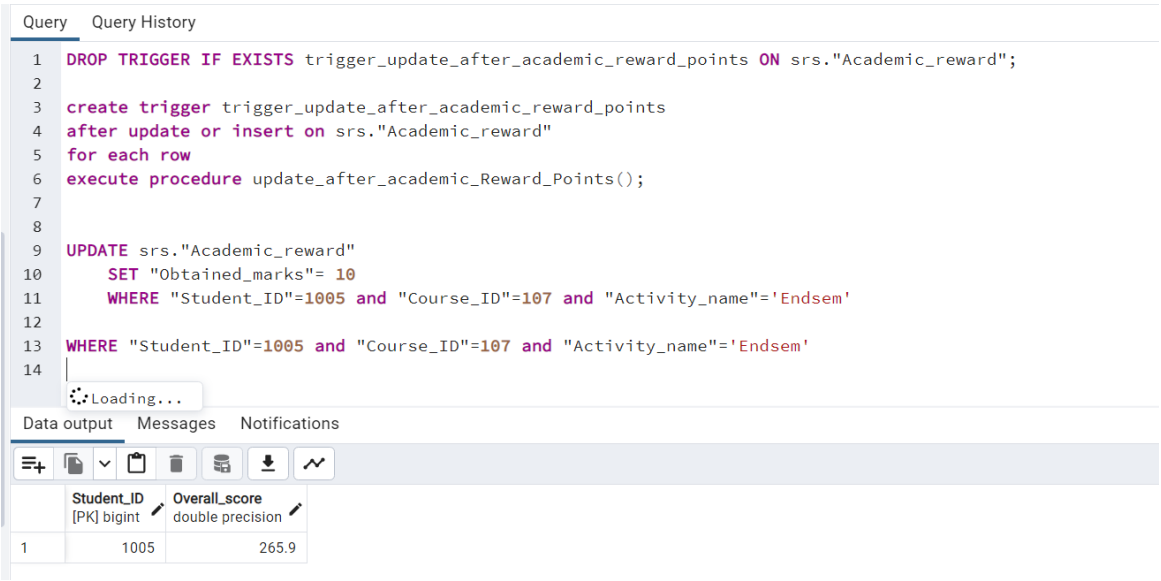
```
update srs."Performance" set "Overall_score"=((aascore*aascale)
+ (nascore*nascale))/100
where "Student_ID" = new."Student_ID";
return new;
end;
$$
language 'plpgsql'
```

Query | Query History

```
create or replace function calculate_final_performance()
returns trigger
as
$$
declare
aascore double precision;
nascore double precision;
aascale double precision;
nascale double precision;
BEGIN
    select academic_score_final.final_acadmic_score into aascore
    from academic_score_final
    where "Student_ID" = new."Student_ID";
    select non_academic_score_final.final_non_acadmic_score into nascore
    from non_academic_score_final
    where "Student_ID" = new."Student_ID";
    select "Academic_scale" into aascale
    from srs."Combined_scale"
    where "Instructor_ID" = 22;
    select "Non_academic_scale" into nascale
    from srs."Combined_scale"
    where "Instructor_ID" = 22;
   update srs."Performance" set "Overall_score"=((aascore*aascale) + (nascore*nascale))/100
   where "Student_ID" = new."Student_ID";
   return new;
end;
$$
language 'plpgsql'
```

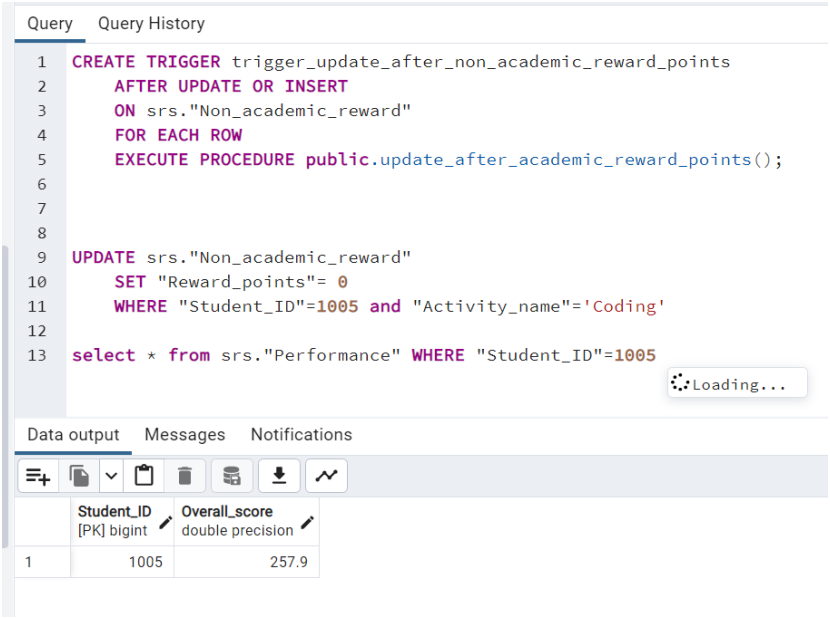
25. Create a trigger for updating the final performance of a particular student on updating or inserting data in the academic reward table.(which uses the function ‘calculate_final_performance()’

```
create trigger trigger_update_after_academic_reward_points
after update on srs."Academic_reward"
for each row
execute procedure update_after_academic_Reward_Points();
```



26. Create a trigger for updating the final performance of a particular student on updating or inserting data in the non_academic reward table.(which uses the function ‘calculate_final_performance()’

```
create trigger trigger_update_after_non_academic_reward_points
after update on srs."Non_academic_reward"
for each row
execute procedure update_after_academic_Reward_Points();
```



Project Code with output screenshots

❖ Backend Code:

Connects frontend with backend (Using Django):

```
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql',
        'NAME': 'srs_app_DB',
        'USER': 'postgres',
        'PASSWORD': 'admin',
        'HOST': 'localhost',
        'PORT': '5432'
    }
}
```

Code for setting up the URL:

```
urlpatterns = [
    path('',views.showhomepage,name='homepage'),

path('performance/',views.performanceall,name='performance_all')
,

path('performance/<str:var>/',views.performance_sort,name='perfo
rmance_sort'),
    path('adminview/',views.showadmin,name='admin_view'),

path('adminview/instructor/',views.instructor_form,name='instruc
tor_insert'),
```

```
path('adminview/instructor/<int:id>/',views.instructor_form,name
='instructor_update'),

path('adminview/instructor/delete/<int:id>',views.instructor_del
ete,name='instructor_delete'),

path('adminview/instructor/list/<str:var>/',views.instructor_sor
t,name='instructor_sort'),

path('adminview/instructor/list/',views.instructor_list,name='in
structor_list'),

path('adminview/course/',views.course_form,name='course_insert')
,

path('adminview/course/<int:id>/',views.course_form,name='course
_update'),

path('adminview/course/delete/<int:id>',views.course_delete,name
='course_delete'),

path('adminview/course/list/<str:var>/',views.course_sort,name='
course_sort'),

path('adminview/course/list/',views.course_list,name='course_lis
t'),
    path('student/',views.student_form,name='student_insert'),

path('<int:student_ID>/',views.student_form,name='student_update
'),
    path('list/',views.student_list,name='student_list'),
```

```
path('delete/<int:id>',views.student_delete,name='student_delete
'),
    path('<str:var>/',views.student_sort,name='student_sort'),

path('q/studentview/',views.studentviewquery,name='show_studentv
iew'),

path('q/instructorview/alert',views.sendalert,name='send_alert')
,

path('q/instructorview/',views.instructorviewquery,name='show_in
structorview'),

path('q/instructorview/update',views.updatemarks,name='update_ma
rks'),

]
```

Code for setting up the modules used for frontend:

```
class student(models.Model):
    student_ID = models.IntegerField(primary_key=truediv)
    student_name = models.CharField(max_length=60)
    address = models.CharField(max_length=60)

    def __str__(self):
        return str(self.student_ID)


class admin(models.Model):
    admin_ID = models.IntegerField(primary_key=truediv)
    admin_name = models.CharField(max_length=60)
```

```
    def __str__(self):
        return str(self.admin_ID)

class instructor(models.Model):
    instructor_ID = models.IntegerField(primary_key=truediv)
    instructor_name = models.CharField(max_length=60)
    instructor_address = models.CharField(max_length=60)
    admin_ID = models.ForeignKey(admin,on_delete=models.CASCADE)

    def __str__(self):
        return str(self.instructor_ID)

class course(models.Model):
    course_ID = models.IntegerField(primary_key=truediv)
    course_name = models.CharField(max_length=60)
    instructor_ID =
models.ForeignKey(instructor,on_delete=models.CASCADE)


class reward(models.Model):
    rank = models.IntegerField(primary_key=truediv)
    reward_name = models.CharField(max_length=60)


class combined_scale(models.Model):
    instructor_ID =
models.ForeignKey(instructor,on_delete=models.CASCADE,primary_ke
y=truediv)
    academic_scale = models.FloatField()
    non_academic_scale = models.FloatField()


class performance(models.Model):
```

```
    student_ID =
models.ForeignKey(student,on_delete=models.CASCADE,primary_key=t
ruediv)
    performance = models.FloatField()
```

Code for fetching, editing, deleting,sorting and running queries in the database:

```
def showhomepage(request):
    return render(request,"srsapp/homepage.html")

def showadmin(request):
    return render(request,"srsapp/admin.html")

def student_list(request):
    context = {'student_list':student.objects.all()}
    return render(request,"srsapp/student_list.html",context)

def instructor_list(request):
    context = {'instructor_list':instructor.objects.all()}
    return render(request,"srsapp/instructor_list.html",context)

def student_form(request,student_ID=0):
    if request.method == "GET":
        if student_ID==0:
            form = studentForm()
        else:
            students=student.objects.get(pk=student_ID)
            form = studentForm(instance=students)
        return
render(request,"srsapp/student_form.html",{'form':form})
    else:
        if student_ID==0:
            form = studentForm(request.POST)
        else:
```

```
            students=student.objects.get(pk=student_ID)
            form = studentForm(request.POST,instance=students)
        if form.is_valid():
            form.save()
        return redirect('/student/list')

def instructor_form(request,id=0):
    if request.method == "GET":
        if id==0:
            form = instructorForm()
        else:
            instructors=instructor.objects.get(pk=id)
            form = instructorForm(instance=instructors)
        return
render(request,"srsapp/instructor_form.html",{'form':form})
    else:
        if id==0:
            form = instructorForm(request.POST)
        else:
            instructors=instructor.objects.get(pk=id)
            form =
instructorForm(request.POST,instance=instructors)
        if form.is_valid():
            form.save()
        return redirect('/adminview/instructor/list')

def student_delete(request,id):
    students=student.objects.get(pk=id)
    students.delete()
    return redirect('/student/list')

def student_sort(request,var):
    students=student.objects.order_by(var)
    context={ 'student_list' : students}
```

```
    return render(request,"srsapp/student_list.html",context)

def instructor_delete(request,id):
    instructors=instructor.objects.get(pk=id)
    instructors.delete()
    return redirect('/adminview/instructor/list')

def instructor_sort(request,var):
    instructors=instructor.objects.order_by(var)
    context={ 'instructor_list' : instructors}
    return render(request,"srsapp/instructor_list.html",context)

def course_list(request):
    context = {'course_list':course.objects.all()}
    return render(request,"srsapp/course_list.html",context)

def course_delete(request,id):
    courses=course.objects.get(pk=id)
    courses.delete()
    return redirect('/adminview/course/list')

def course_sort(request,var):
    courses=course.objects.order_by(var)
    context={ 'course_list' : courses}
    return render(request,"srsapp/course_list.html",context)

def course_form(request,id=0):
    if request.method == "GET":
        if id==0:
            form = courseForm()
        else:
            courses=course.objects.get(pk=id)
            form = courseForm(instance=courses)
```

```
        return
render(request,"srsapp/course_form.html",{'form':form})
    else:
        if id==0:
            form = courseForm(request.POST)
        else:
            courses=course.objects.get(pk=id)
            form = courseForm(request.POST,instance=courses)
        if form.is_valid():
            form.save()
        return redirect('/adminview/course/list')

def performanceall(request):
    context = {'performance_all':performance.objects.all()}
    return render(request,"srsapp/performanceall.html",context)

def performance_sort(request,var):
    performances=performance.objects.order_by(var)
    context={ 'performance_all' : performances}
    return render(request,"srsapp/performanceall.html",context)

def studentviewquery(request):
    if request.method == 'POST':
        search_id = request.POST.get('textfield', None)
        raw_query1 = "select * from srsapp_student where
\"student_ID\" = %s ;"
        cursor = connection.cursor()
        cursor.execute(raw_query1,(search_id,))
        alldata1=cursor.fetchall()

        raw_query2 = "select * from srsapp_performance where
\"student_ID_id\"=%s ;"
        cursor = connection.cursor()
        cursor.execute(raw_query2,(search_id,))
```

```
        alldata2=cursor.fetchall()

        raw_query3 = "select * from academic_score_final natural
join non_academic_score_final where
academic_score_final.\"student_ID\" = %s;"
        cursor = connection.cursor()
        cursor.execute(raw_query3,(search_id,))
        alldata3=cursor.fetchall()

        raw_query4 = "select * from srsapp_alert where
\"student_ID\" = %s;"
        cursor = connection.cursor()
        cursor.execute(raw_query4,(search_id,))
        alldata4=cursor.fetchall()

        raw_query5 = "SELECT \"course_ID\",
sum(reward_points)from srsapp_academic_reward   where
\"student_ID\"=%s group by \"course_ID\";"
        cursor = connection.cursor()
        cursor.execute(raw_query5,(search_id,))
        alldata5=cursor.fetchall()

        raw_query6 = "select * from srsapp_non_academic_reward
where \"student_ID\"=%s"
        cursor = connection.cursor()
        cursor.execute(raw_query6,(search_id,))
        alldata6=cursor.fetchall()

        return
render(request,'srsapp/student_view.html',{'data':alldata1,'data
2':alldata2,'data3':alldata3,'data4':alldata4,'data5':alldata5,'
data6':alldata6})

    else:
```

```
        return render(request, 'srsapp/studentviewip.html')

def sendalert(request):
    if request.method == 'POST':
        s_id = request.POST.get('id', None)
        c_id= request.POST.get('c_id', None)
        type_1 = request.POST.get('type', None)
        msg = request.POST.get('msg', None)

        raw_query1 = "INSERT INTO
public.srsapp_alert(\"student_ID\", \"course_ID\", date,
alert_type, alert_message) VALUES (%s, %s,CURRENT_TIMESTAMP,
%s,%s);"
        cursor = connection.cursor()
        cursor.execute(raw_query1,(s_id,c_id,type_1,msg))

        return redirect('show_instructorview')

    else:
        return render(request, 'srsapp/alert_input.html')

def instructorviewquery(request):
    if request.method == 'POST':
        search_id = request.POST.get('textfield', None)
        raw_query1 = "select * from srsapp_course natural join
srsapp_academic_reward where srsapp_course.\"instructor_ID_id\"
= %s ;"
        cursor = connection.cursor()
        cursor.execute(raw_query1,(search_id,))
        alldata1=cursor.fetchall()

        raw_query2 = "select *from public.srsapp_instructor
where \"instructor_ID\" = %s ;"
        cursor = connection.cursor()
```

```
        cursor.execute(raw_query2,(search_id,))
        alldata2=cursor.fetchall()



        return
render(request,'srsapp/instructorview.html',{'data':alldata1,'da
ta2':alldata2})

    else:
        return render(request, 'srsapp/instructor_ip.html')


def updatemarks(request):
    if request.method == 'POST':
        s_id = request.POST.get('id', None)
        c_id= request.POST.get('c_id', None)
        type_1 = request.POST.get('type', None)
        mark = request.POST.get('marks', None)

        raw_query1 = "UPDATE public.srsapp_academic_reward SET
obtained_marks= %s WHERE \"student_ID\"=%s and \"course_ID\"=%s
and activity_name=%s;"
        cursor = connection.cursor()
        cursor.execute(raw_query1,(mark,s_id,c_id,type_1))
        return redirect('show_instructorview')

    else:
        return render(request, 'srsapp/acad_input.html')
```

Code for setting up model-forms:

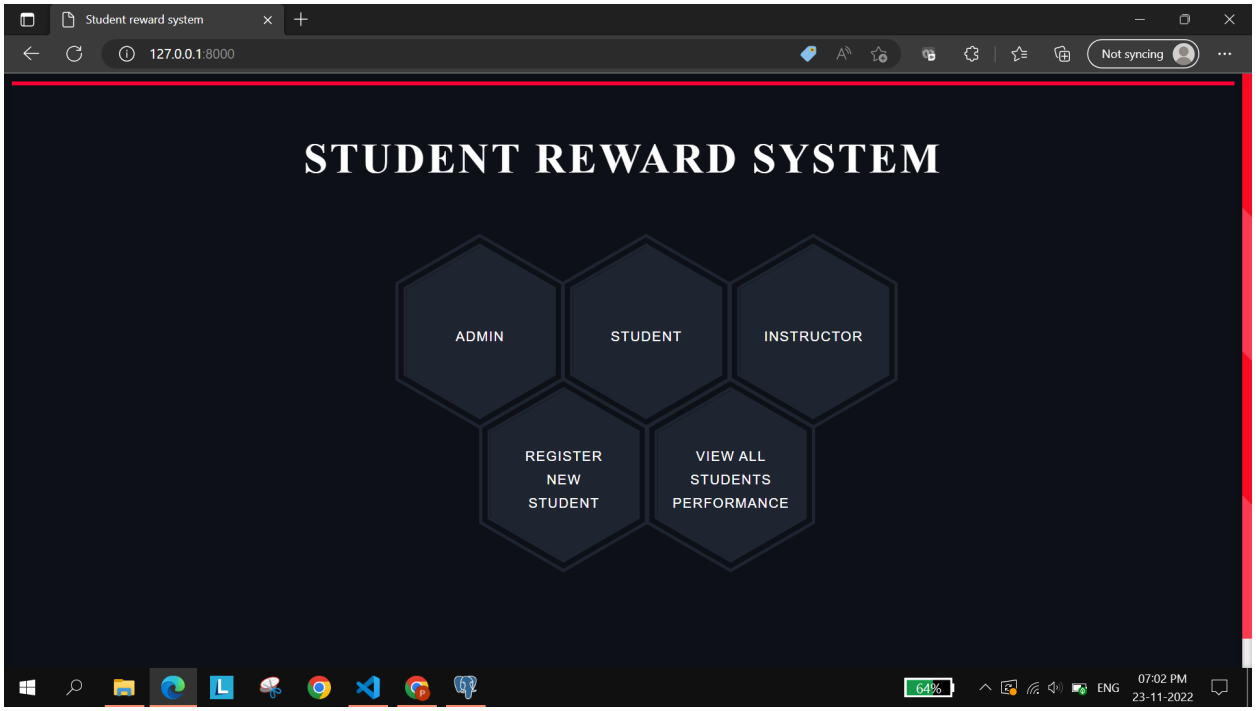
```
class studentForm(forms.ModelForm):
```

```
    class Meta:
        model = student
        fields = ('student_ID','student_name','address')
        labels = {
            'student_ID':'Student ID',
            'student_name':'Student Name',
            'address': 'Address'
        }

    def __init__(self, *args, **kwargs):
        super(studentForm,self).__init__( *args, **kwargs)
        self.fields['address'].required = False

class instructorForm(forms.ModelForm):

    class Meta:
        model = instructor
        fields = [
'instructor_ID','instructor_name','instructor_address','admin_ID
' ]
        labels = {
            'instructor_ID':'Instructor ID',
            'instructor_name':'Instructor Name',
            'instructor_address':'Address',
            'admin_ID':'Admin_ID'
        }

    def __init__(self, *args, **kwargs):
        super(instructorForm,self).__init__(*args, **kwargs)
        self.fields['admin_ID'].empty_label = "select"

class courseForm(forms.ModelForm):

    class Meta:
```

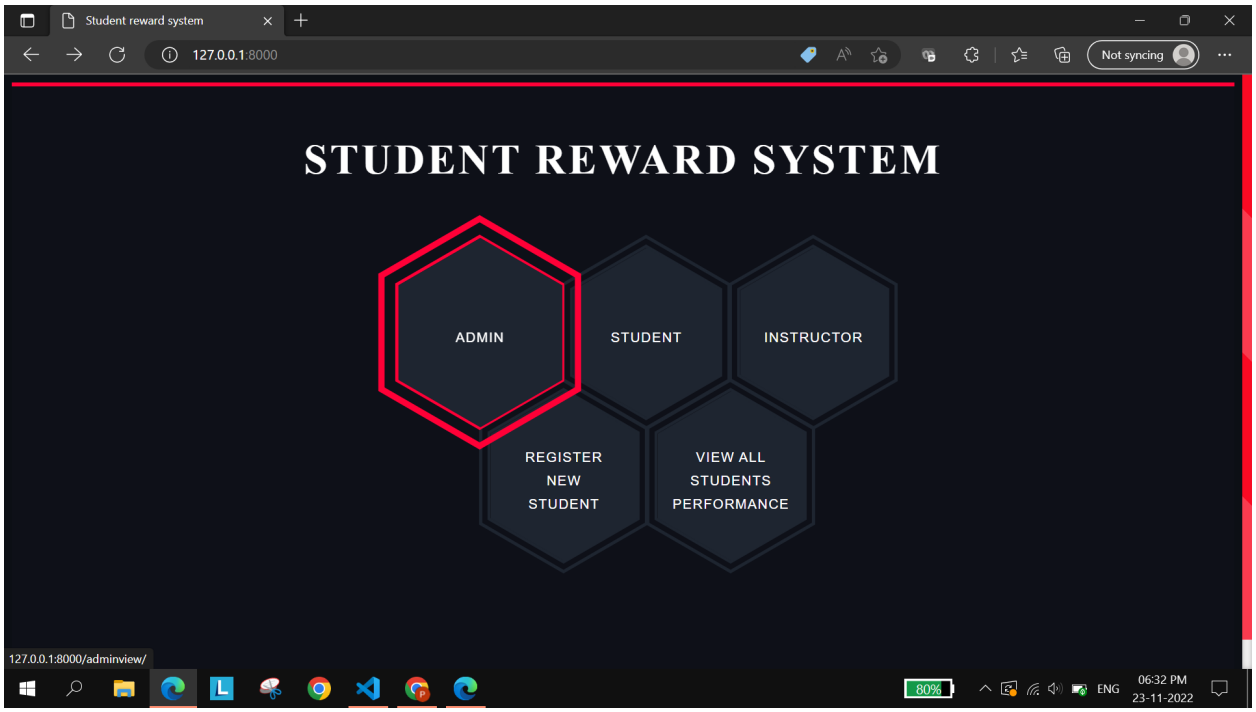
```
        model = course
        fields = [ 'course_ID','course_name','instructor_ID' ]
        labels = {
            'course_ID':'Course ID',
            'course_name':'Course Name',
            'instructor_ID':'Instructor ID'
        }

    def __init__(self, *args, **kwargs):
        super(courseForm,self).__init__(*args, **kwargs)
        self.fields['instructor_ID'].empty_label = "select"
```

❖ Screenshots of the Website that connects the Database:

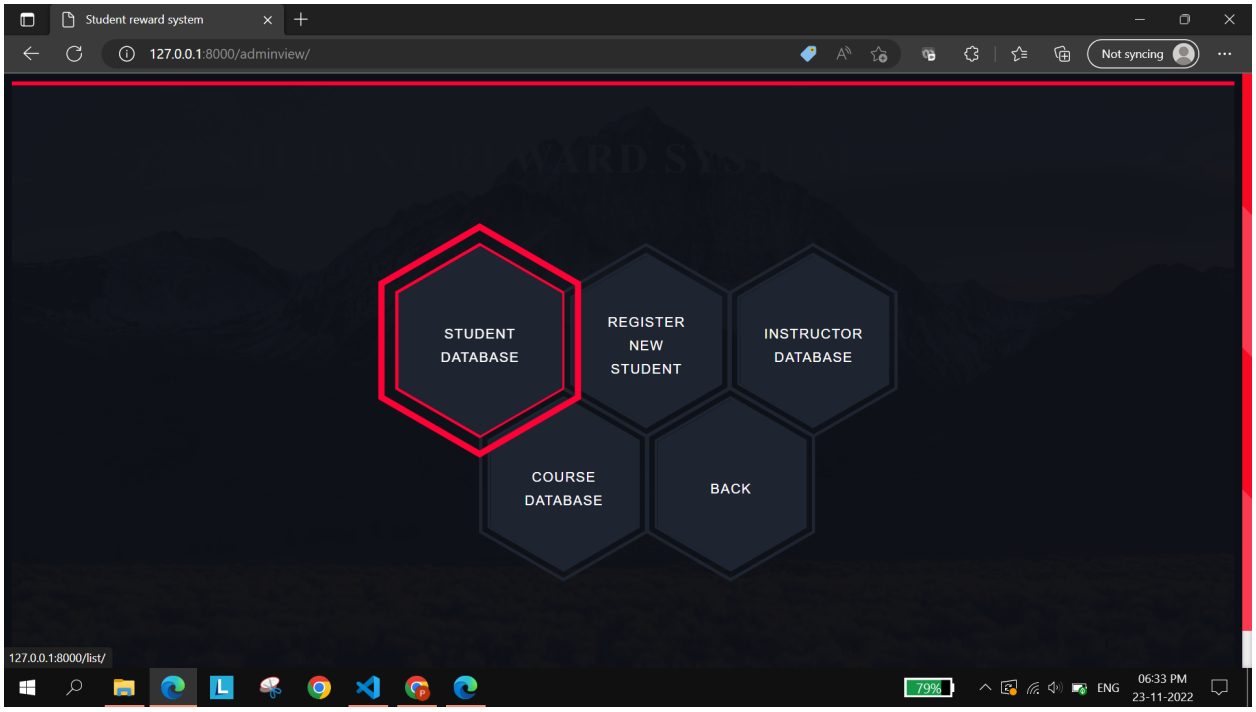
1) Homepage:



2) Admin-view:



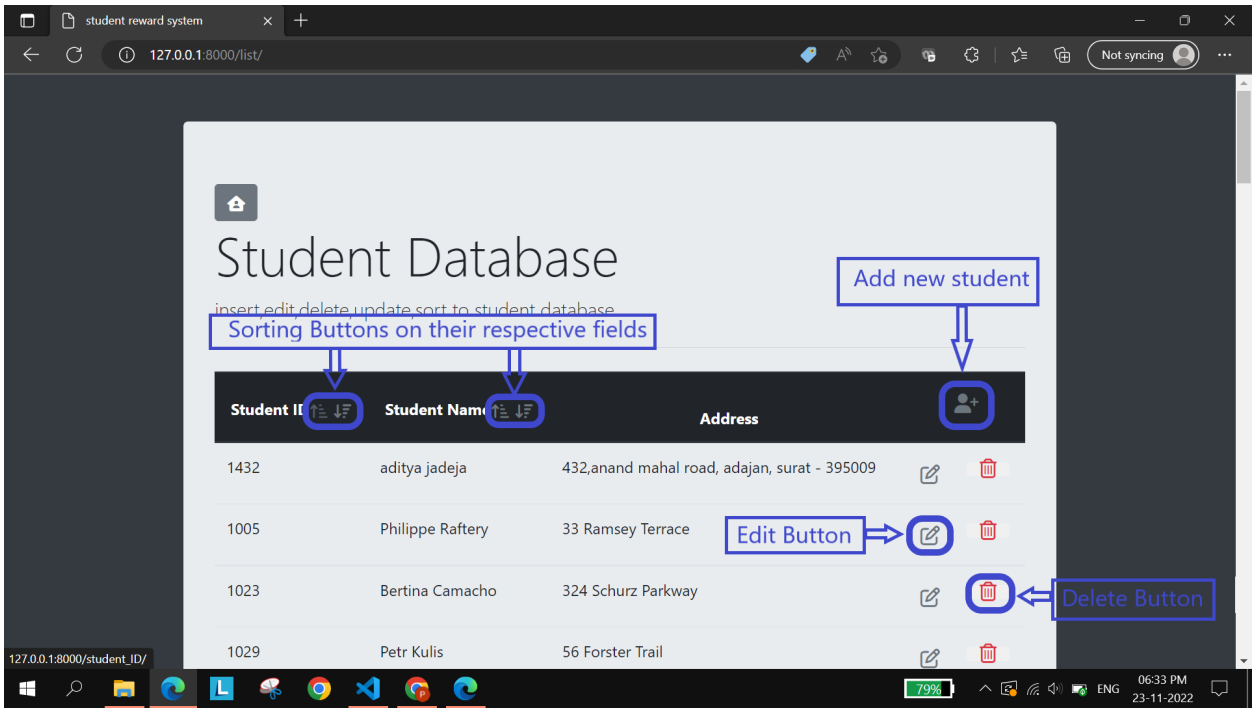
→ Inside Admin view :



→ We will have the following functionalities:
i) Student Database
ii) Register New Student
iii) Instructor Database
iv) Course Database

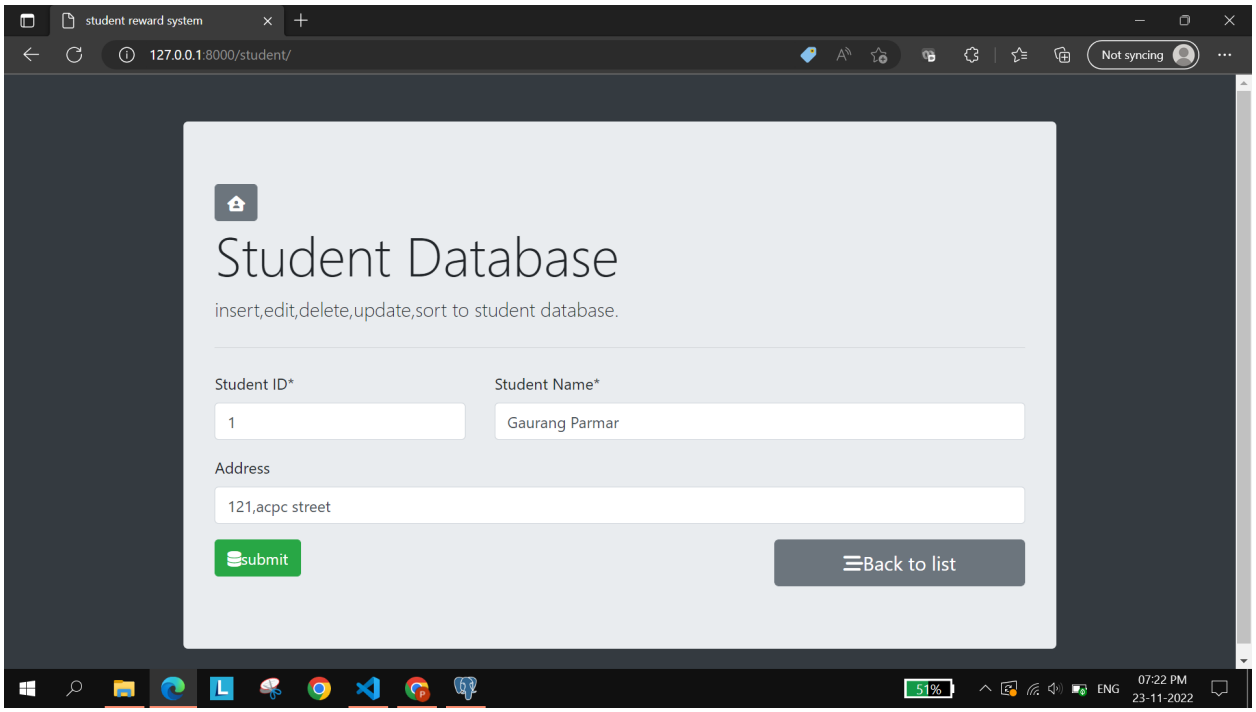
i) Student Database:

- Admin will be able to see the details of each student and can edit ,insert and delete the information of students.
- The sorting buttons will sort the table based on respective fields.

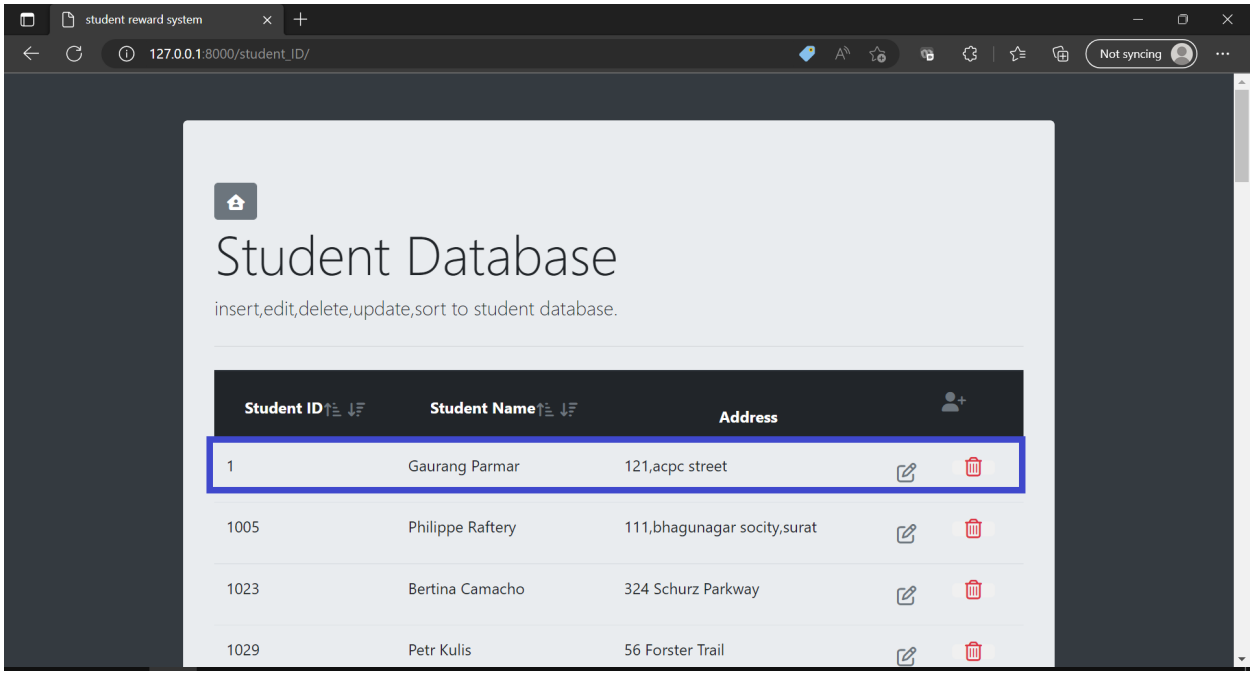


a) Insertion of student:

→ Entering details of new students:

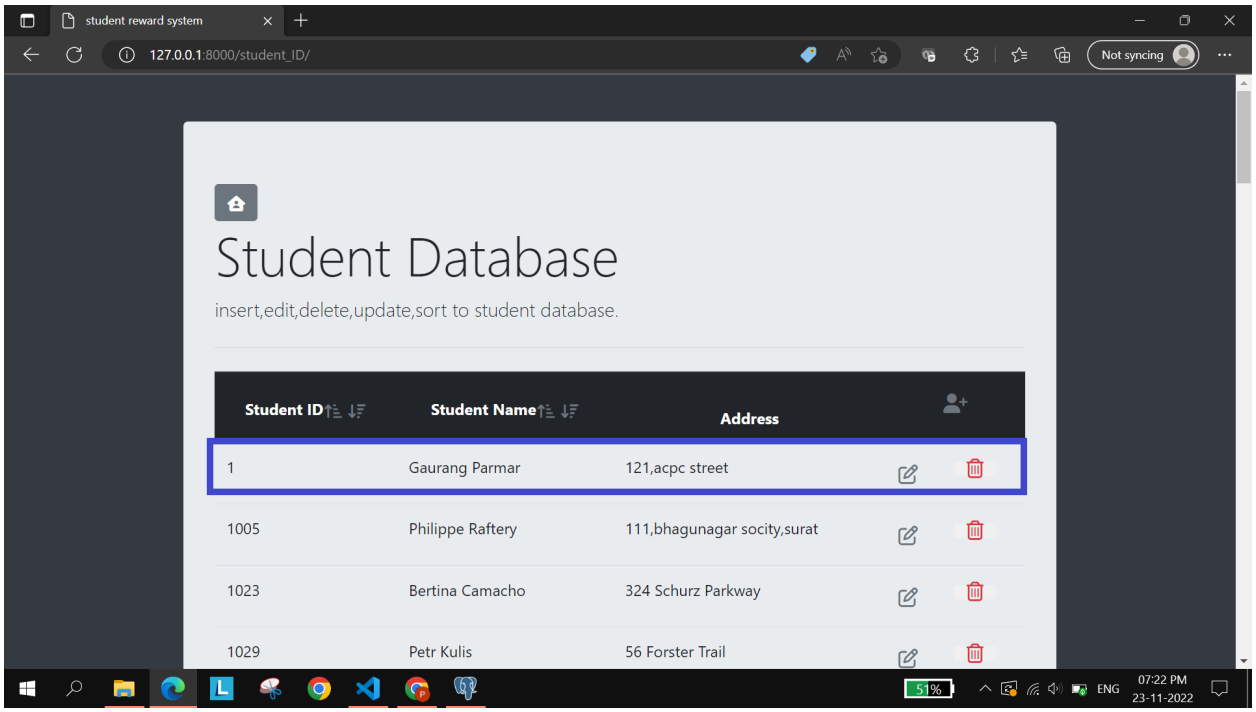


→ New student data is inserted into the table.

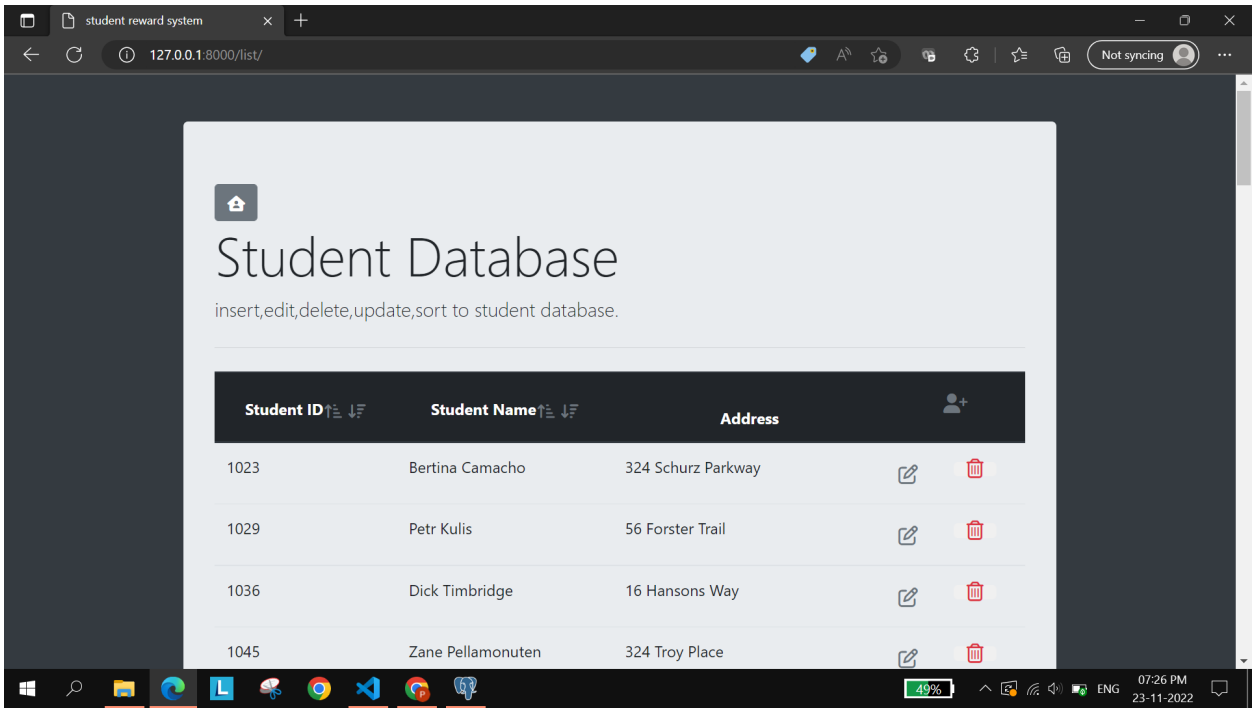


b) Deletion of student:

→ Deleting the following tuple:

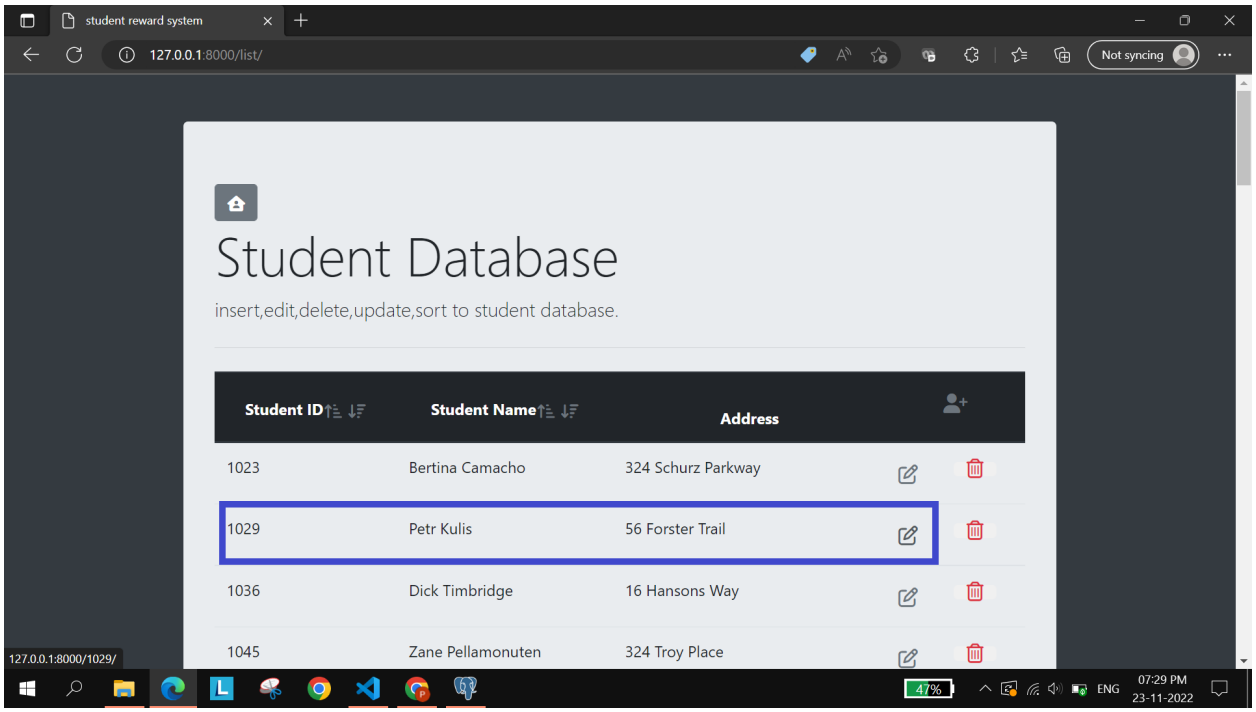


→ Table after deletion:

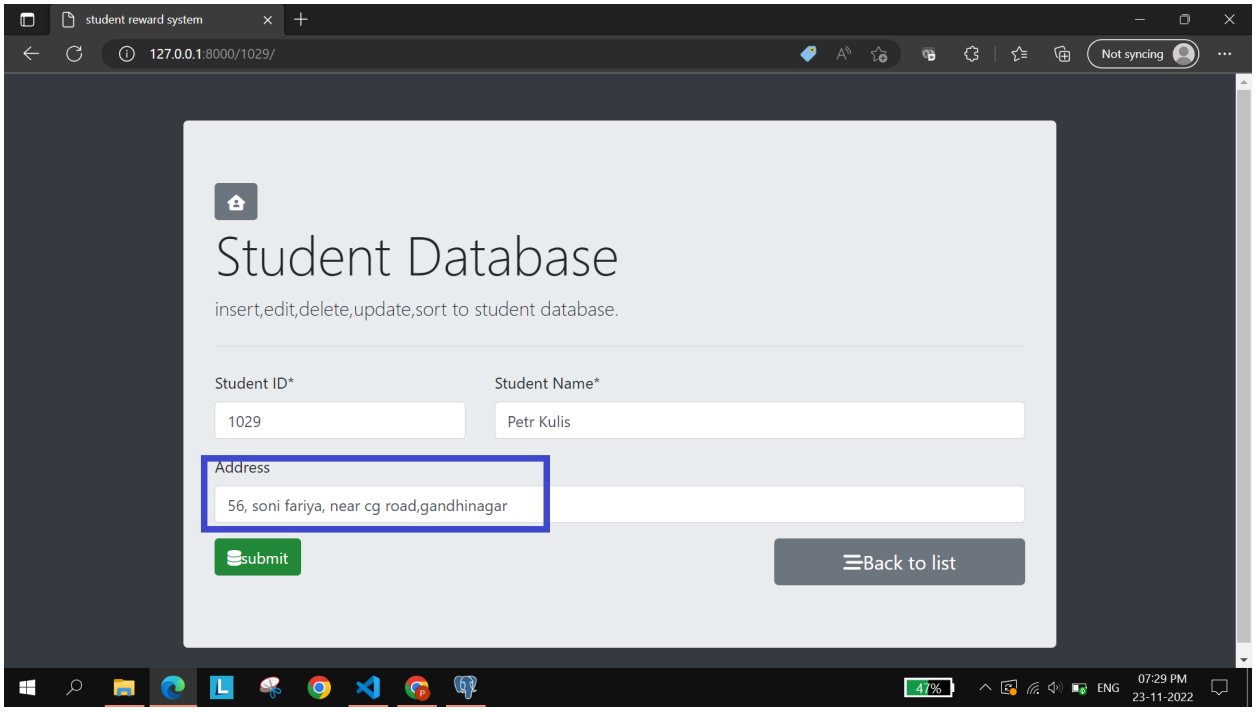


c) updating Student information:

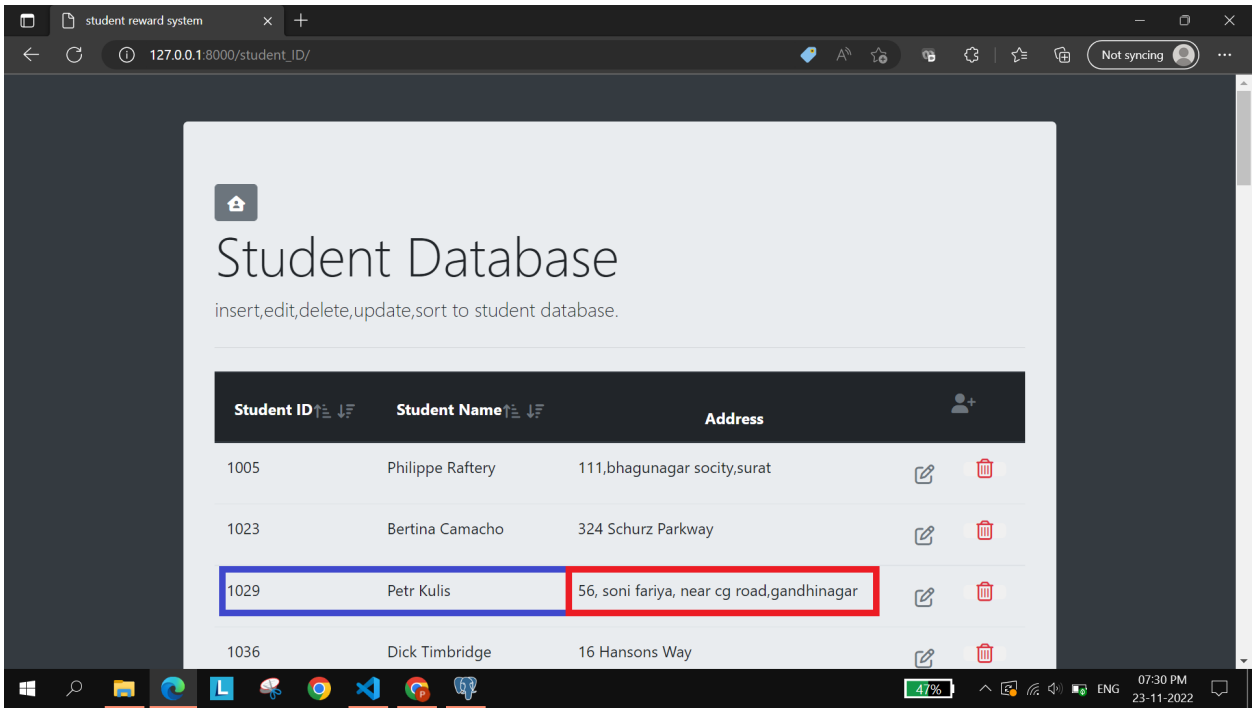
→ Updating data of following student:



→ The address field is being updated.

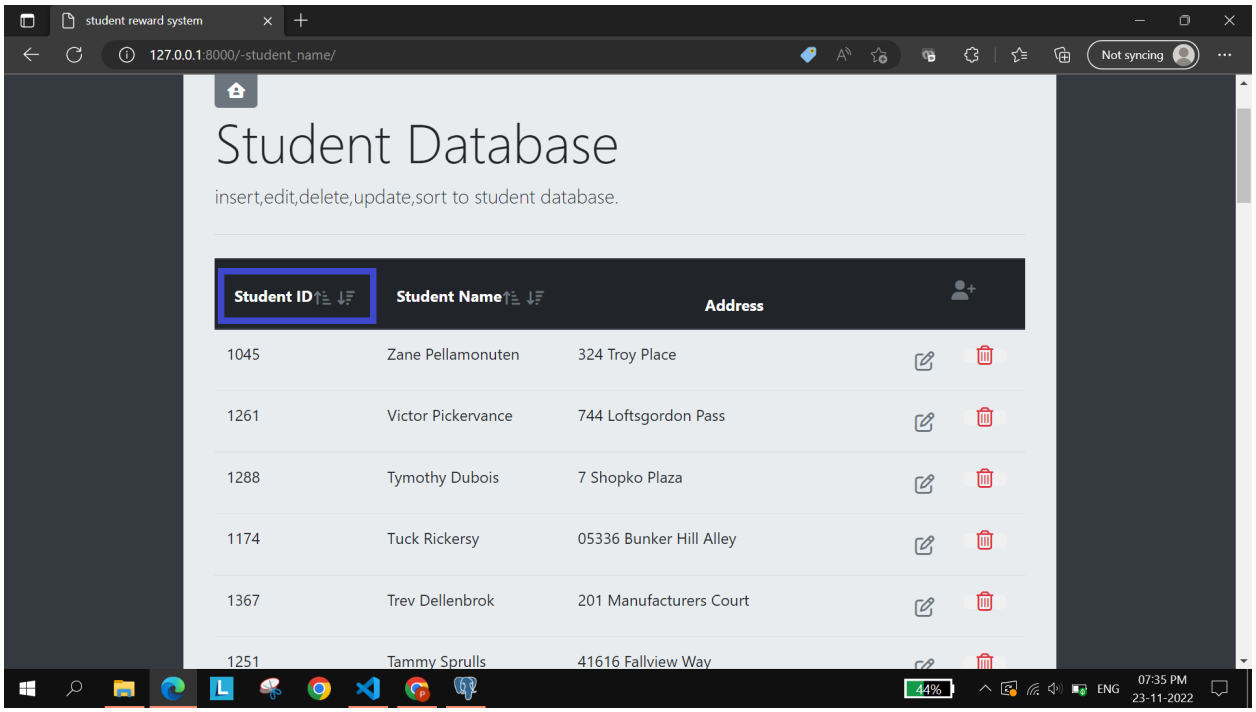


→ The updated information is stored in the database.

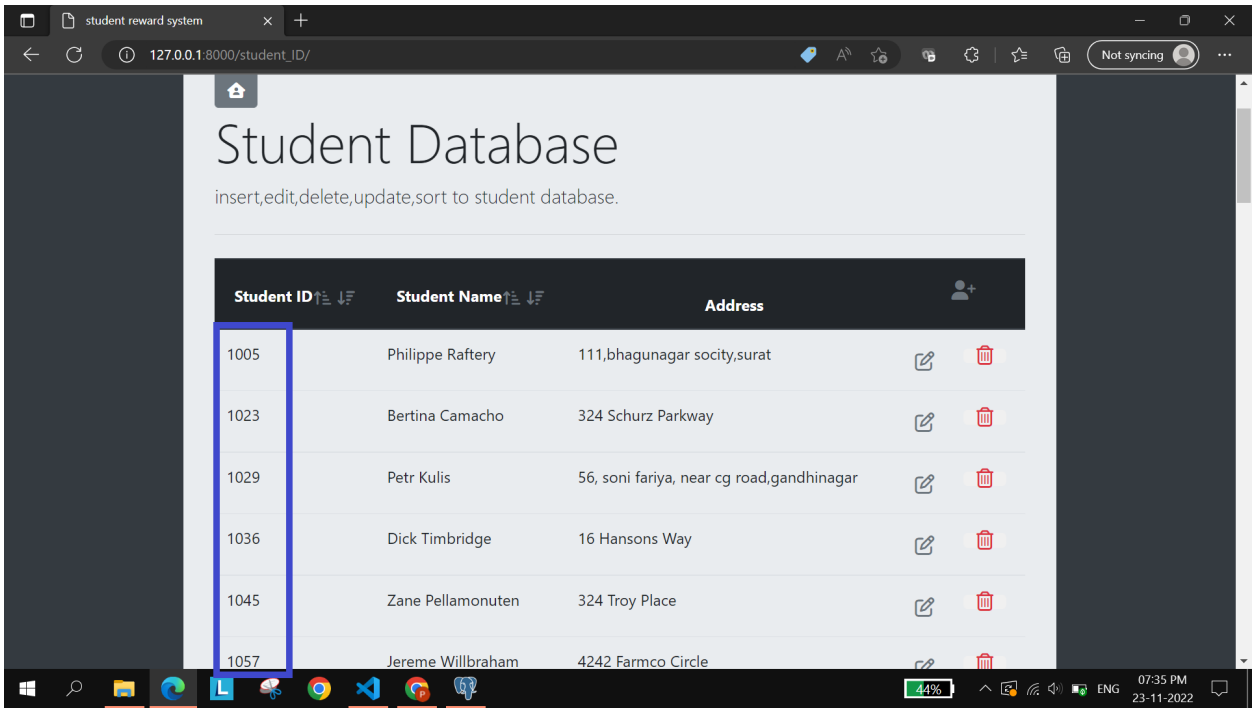


d) Sorting The Table:

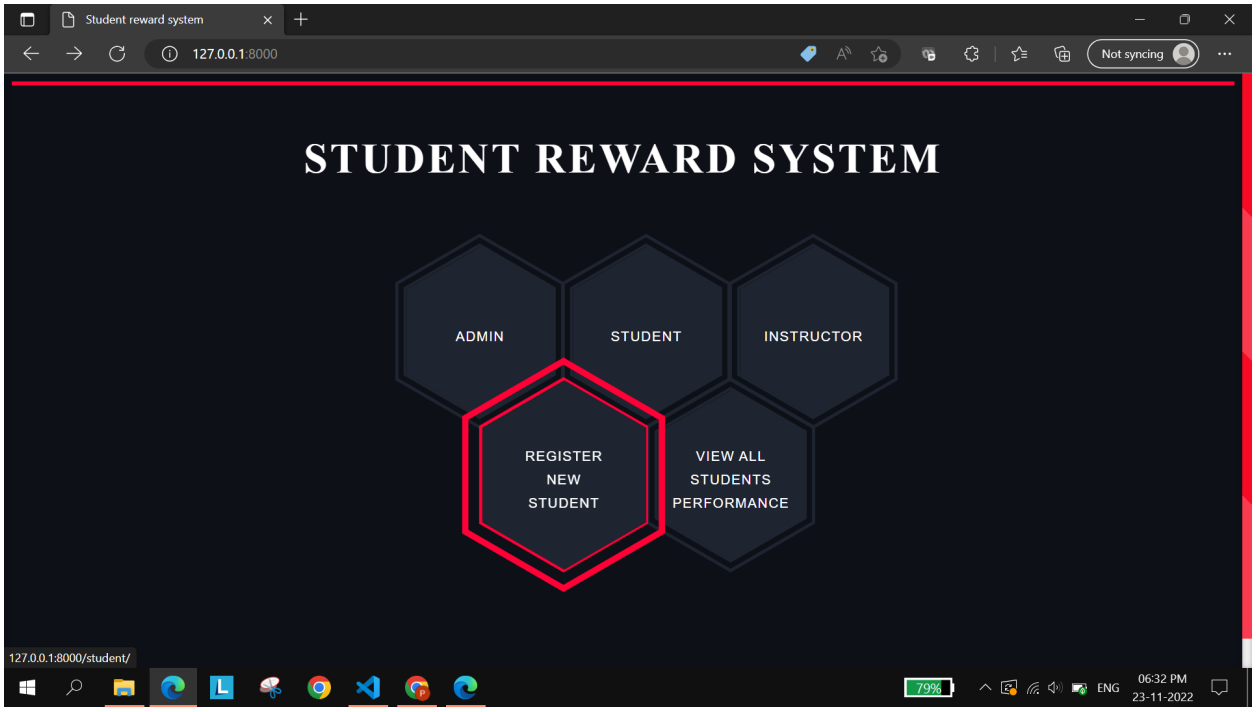
→ Sorting the table Student_ID wise:



→ Sorted table (Student_ID wise):



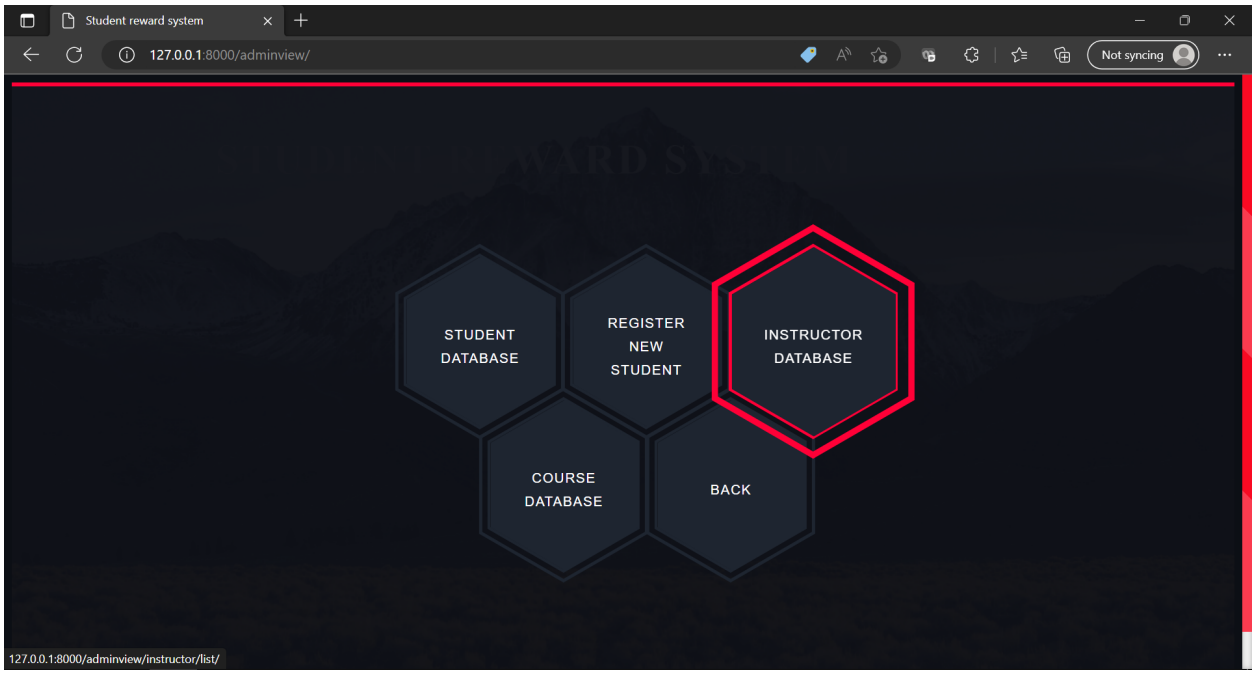
ii) Register New Student:

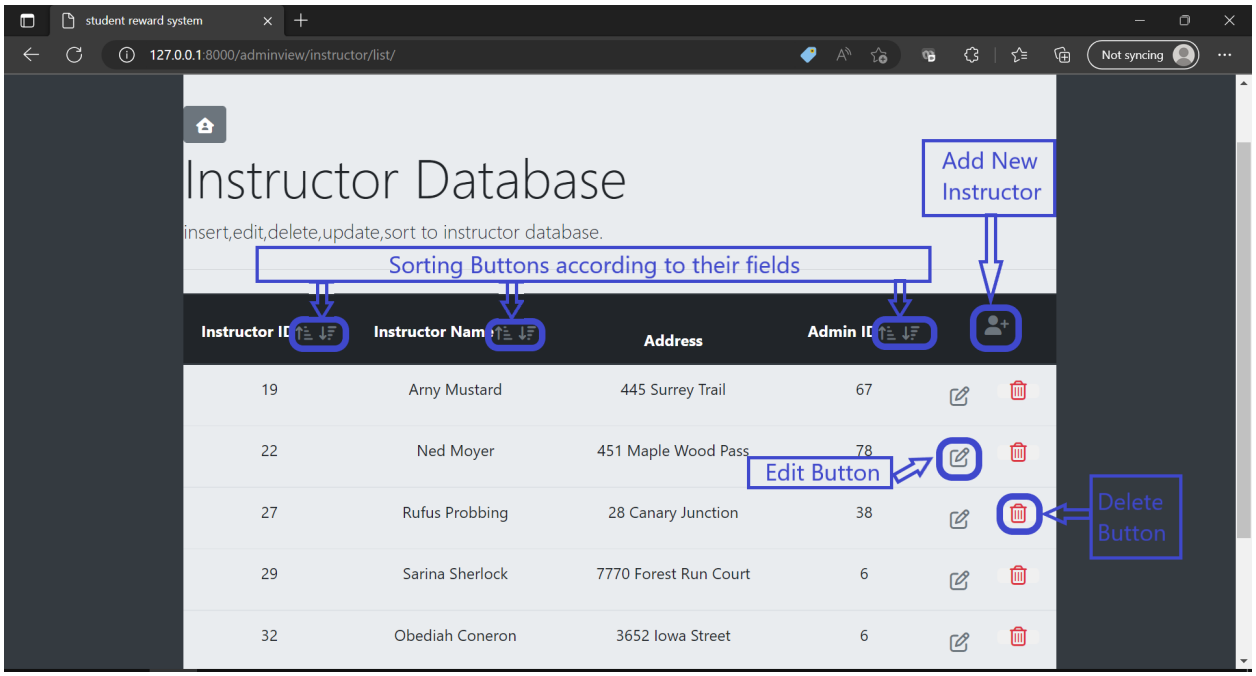


→ Admin can directly register new students in the database by this functionality and it will be the same as insertion in the Student database.

iii) Instructor Database:

- Admin will be able to see the details of each instructor and can edit ,insert and delete the information of instructors.
- The sorting buttons will sort the table based on respective fields.

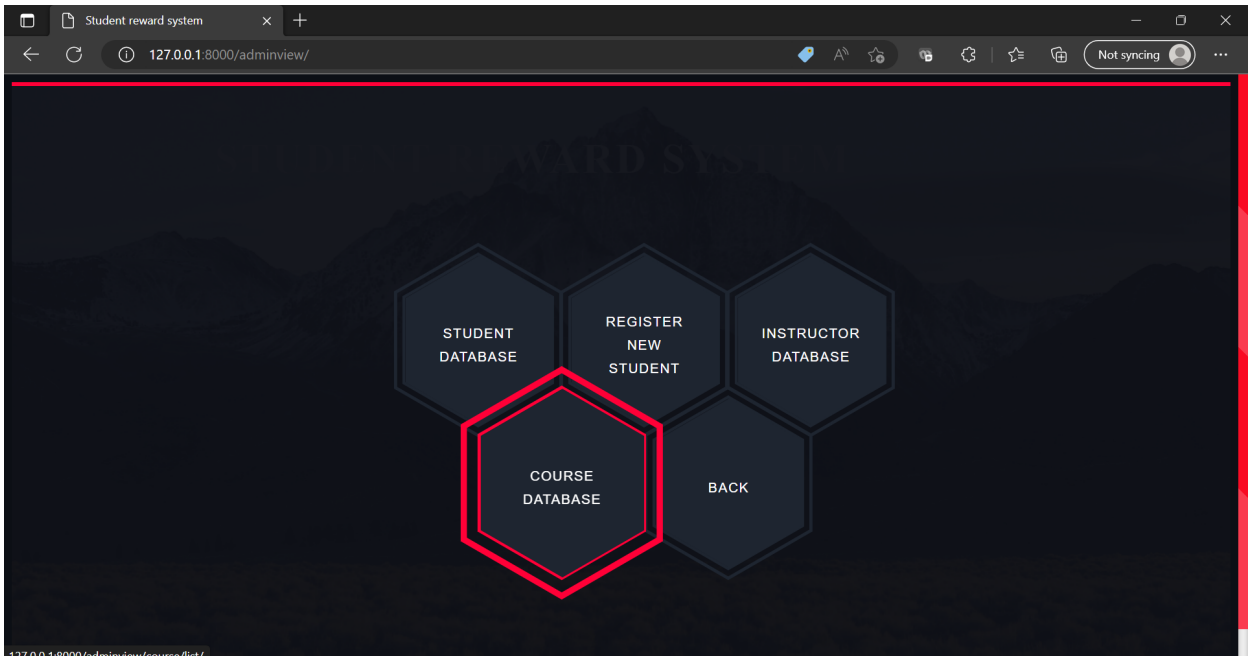


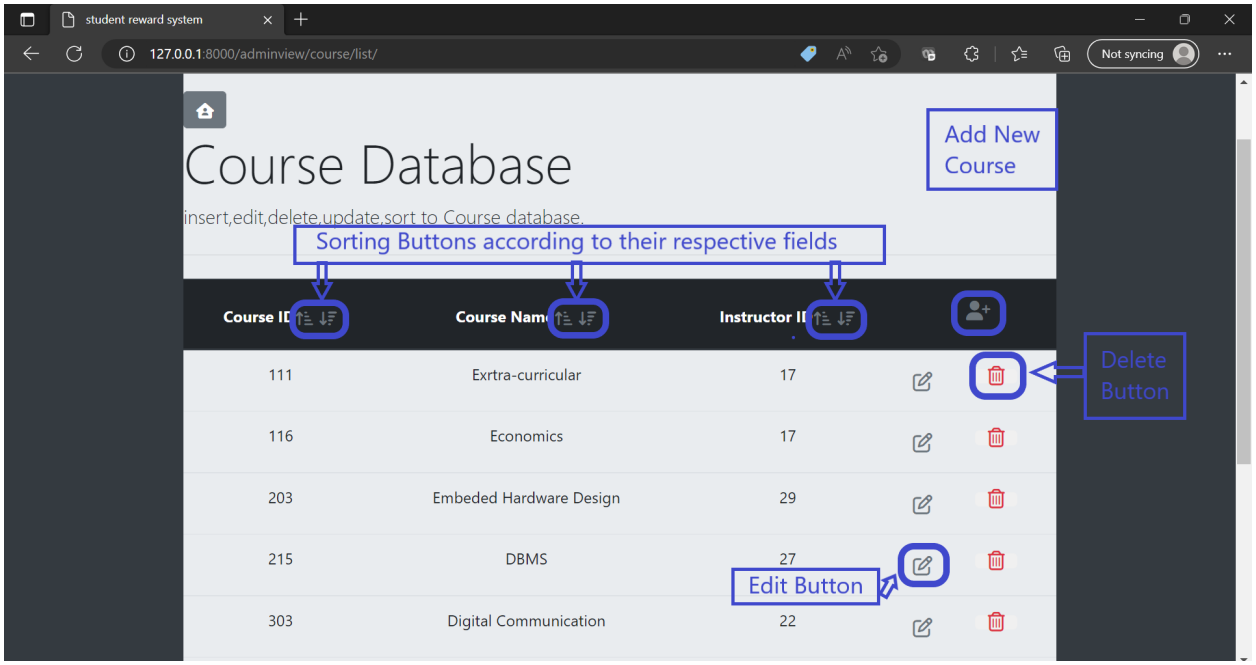


→ All the operations can be performed in the same manner as described in the Student Database.

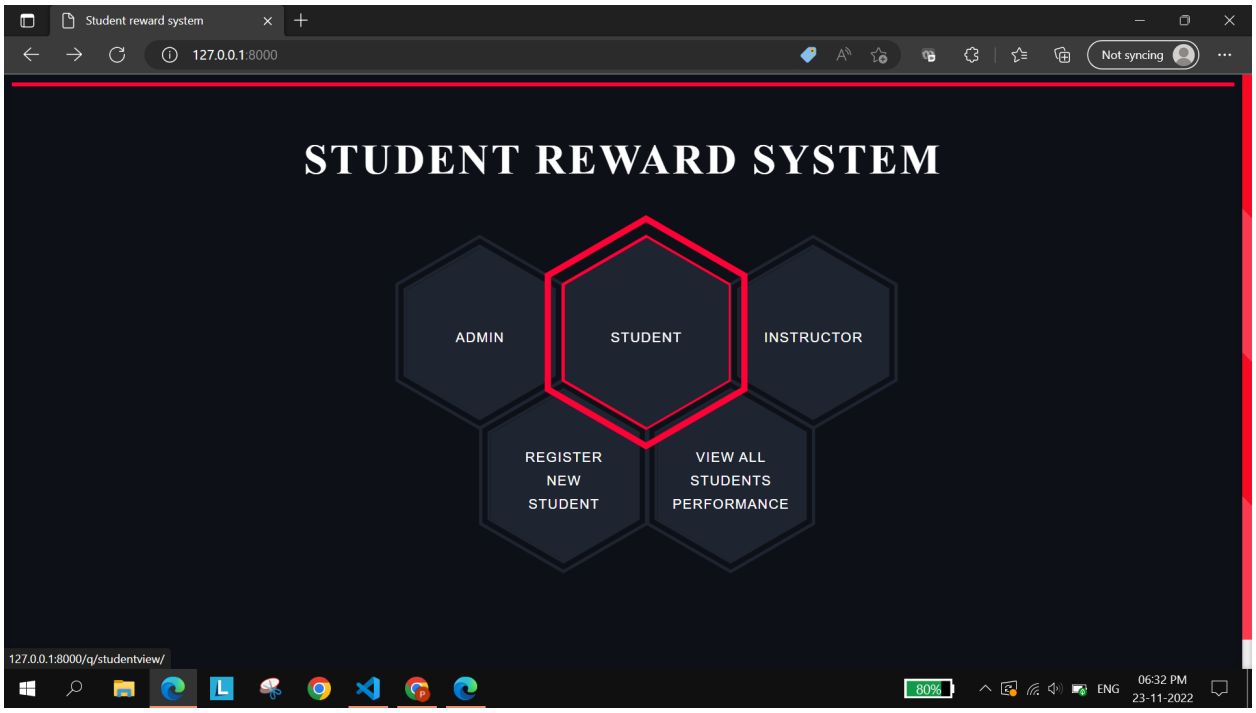
iv) Course Database:

- Admin will be able to see the details of each Course and can edit ,insert and delete the information of courses.
- The sorting buttons will sort the table based on respective fields.

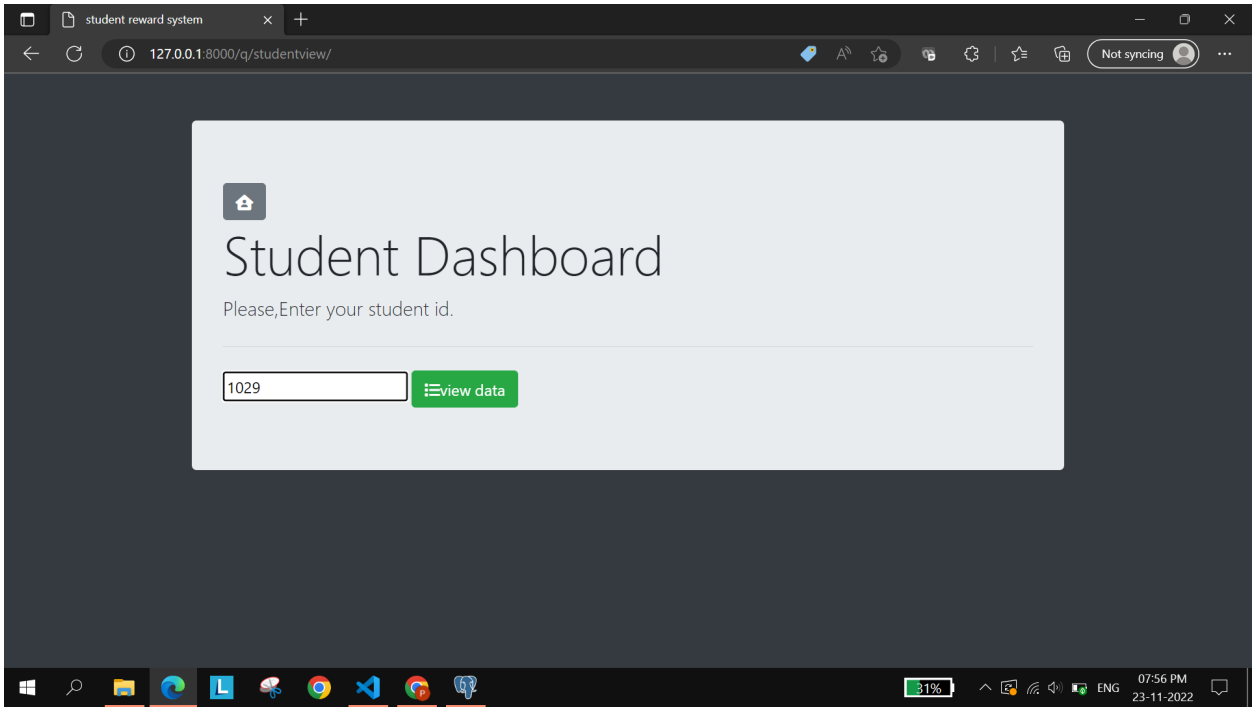




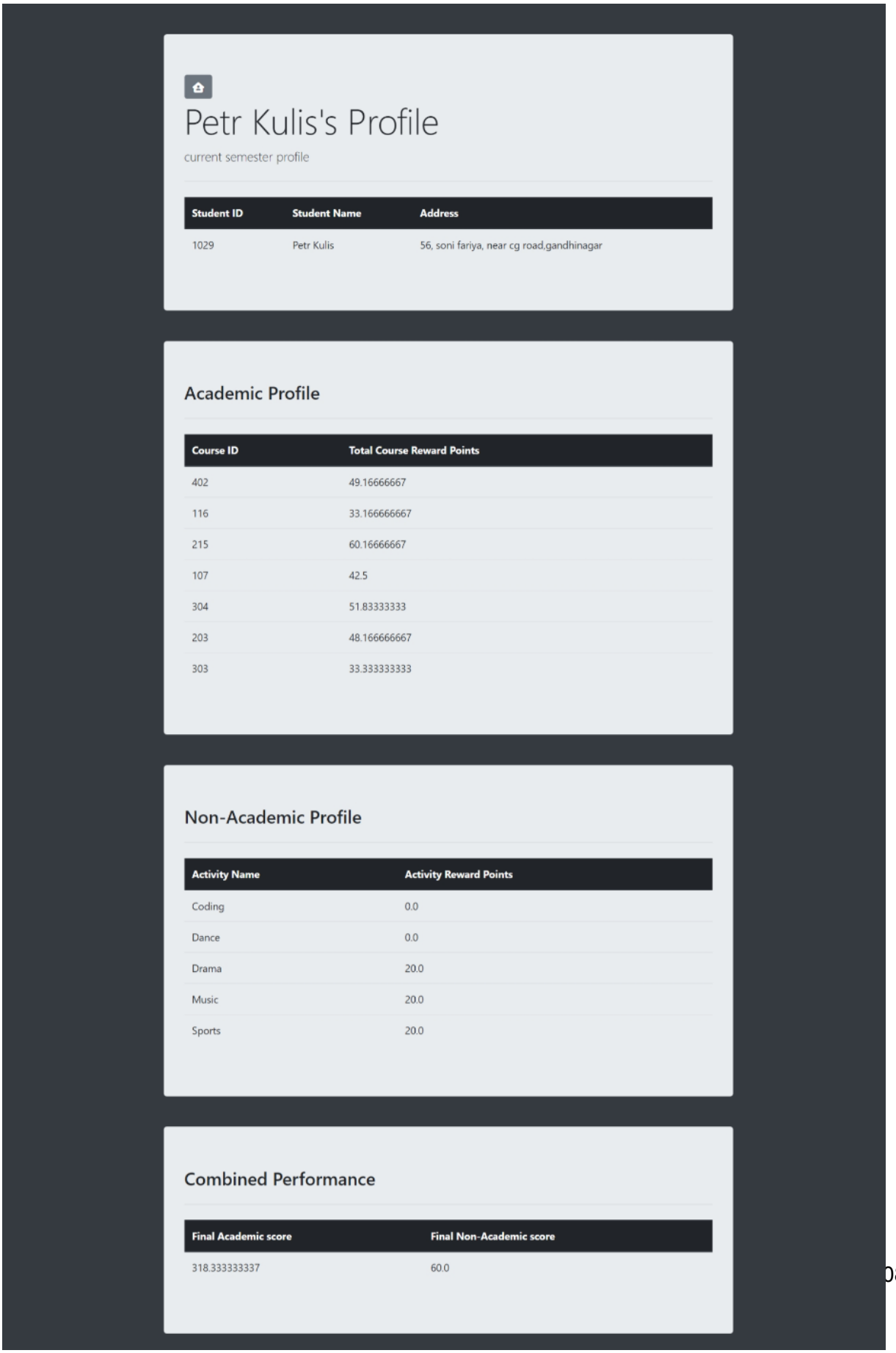
3) Student View:



→ Enter Student_ID to show its details:



→ Profile of Student with Student_ID = 1029.



Petr Kulis's Profile

current semester profile

Student ID	Student Name	Address
1029	Petr Kulis	56, soni fariya, near cg road,gandhinagar

Academic Profile

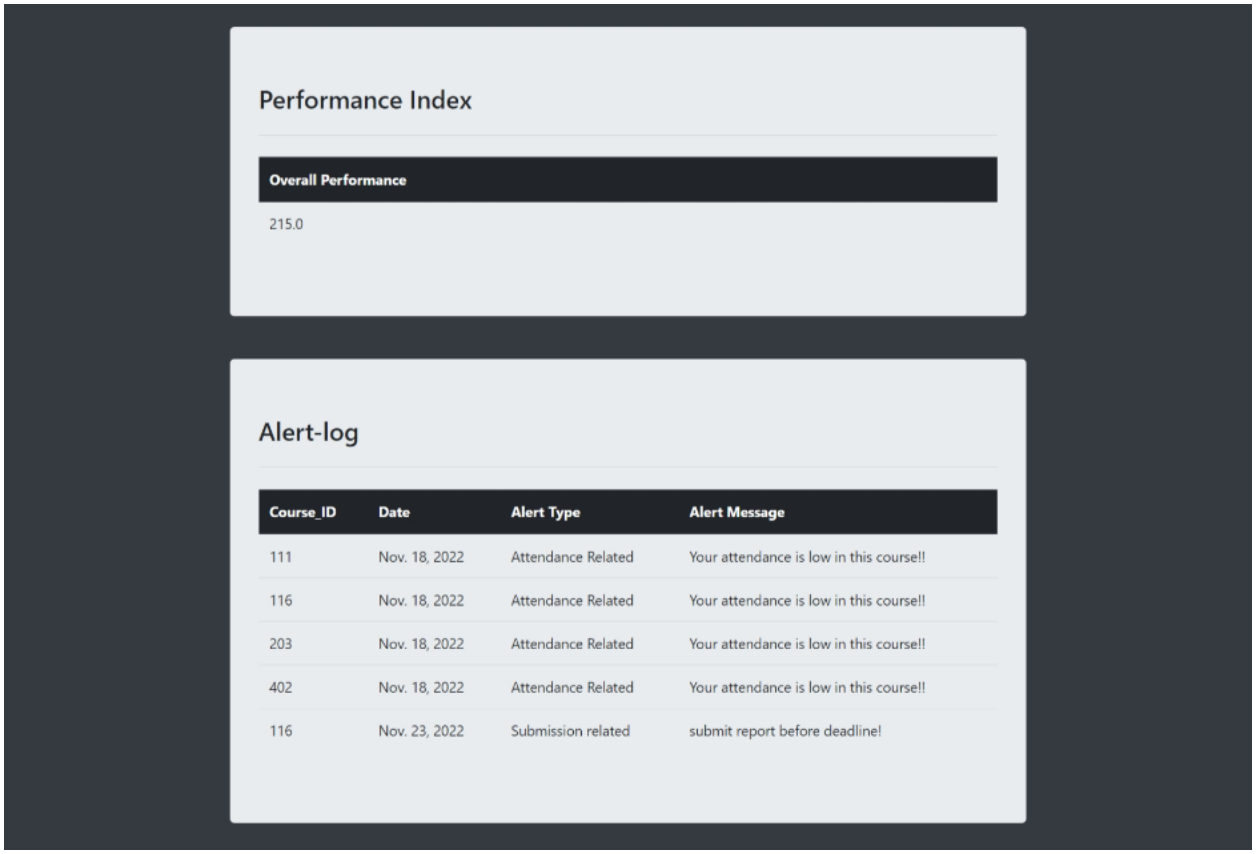
Course ID	Total Course Reward Points
402	49.16666667
116	33.166666667
215	60.16666667
107	42.5
304	51.83333333
203	48.166666667
303	33.333333333

Non-Academic Profile

Activity Name	Activity Reward Points
Coding	0.0
Dance	0.0
Drama	20.0
Music	20.0
Sports	20.0

Combined Performance

Final Academic score	Final Non-Academic score
318.333333337	60.0



Performance Index

Overall Performance
215.0

Alert-log

Course_ID	Date	Alert Type	Alert Message
111	Nov. 18, 2022	Attendance Related	Your attendance is low in this course!!
116	Nov. 18, 2022	Attendance Related	Your attendance is low in this course!!
203	Nov. 18, 2022	Attendance Related	Your attendance is low in this course!!
402	Nov. 18, 2022	Attendance Related	Your attendance is low in this course!!
116	Nov. 23, 2022	Submission related	submit report before deadline!

→ Here all the data is displayed with the **use of sql queries.**

Some of the sample queries used are as following.

1) **Show Academic Course-wise total Reward points of student whose Student_ID = 1029.**

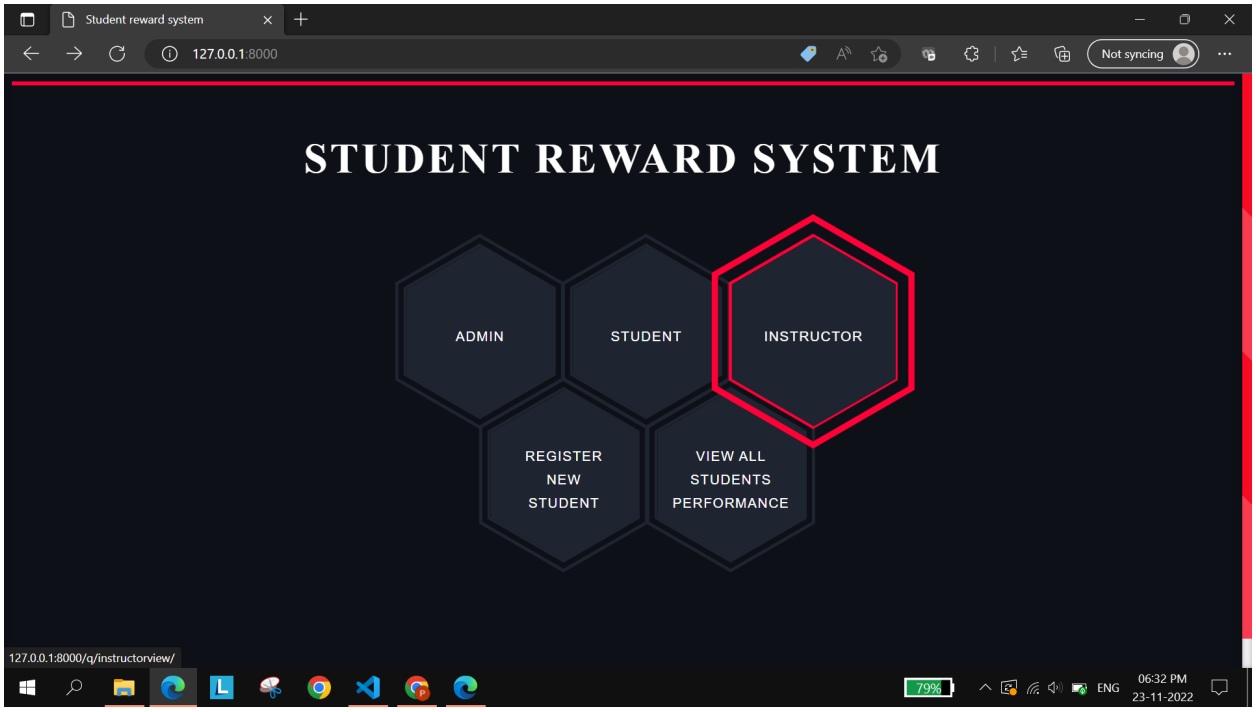
```
SELECT "course_ID", SUM(reward_points)
FROM srsapp_academic_reward
WHERE "student_ID"=1029
GROUP BY "course_ID";
```

2) **Show Total Academic Reward points and total Non-academic reward points of student whose Student_ID = 1029.**

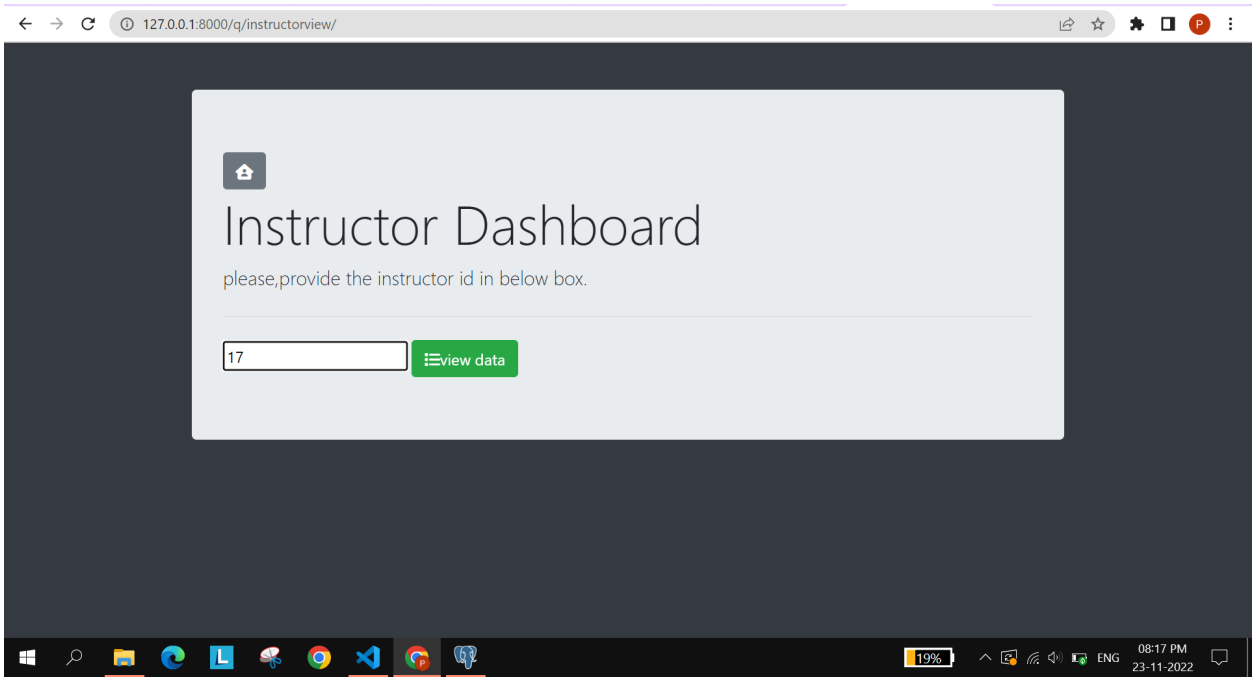
```
SELECT *
FROM academic_score_final NATURAL JOIN  non_academic_score_final
```

```
WHERE academic_score_final."student_ID" = 1029;
```

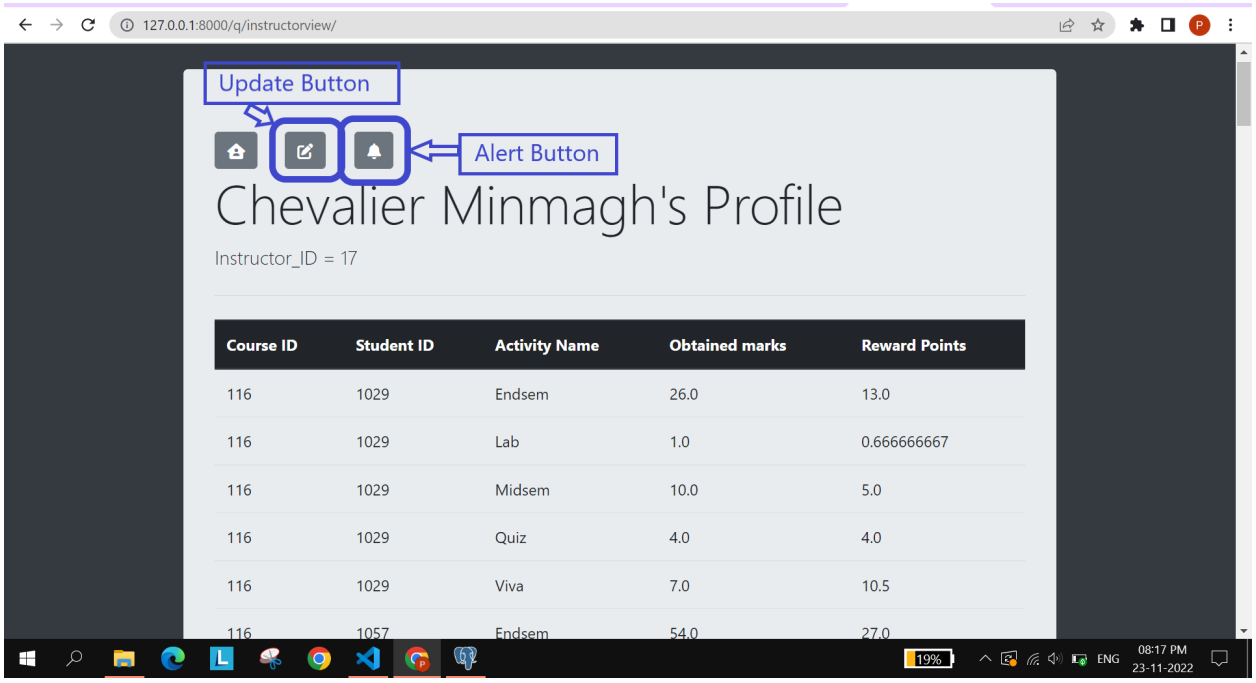
4) Instructor View:



→ Enter Instructor_ID to view the dashboard of a particular instructor.

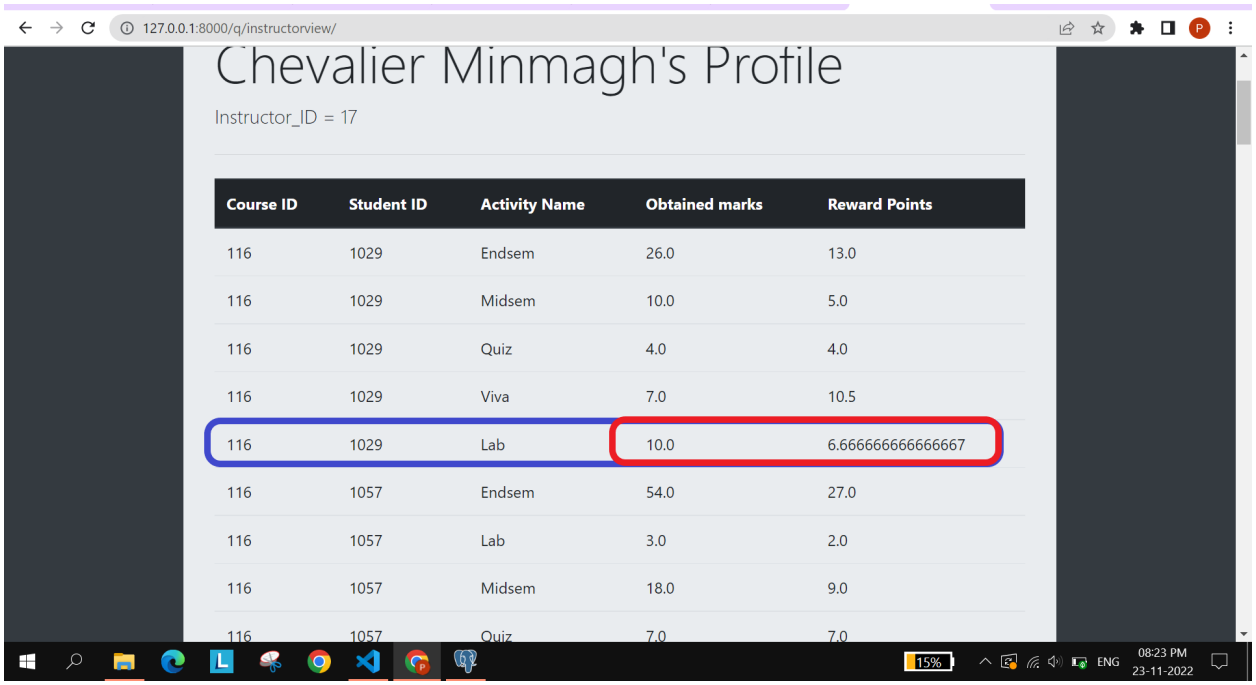


→ Dashboard of Instructor with Instructor_ID = 17.
→ Instructors can update mark send alerts to a student.

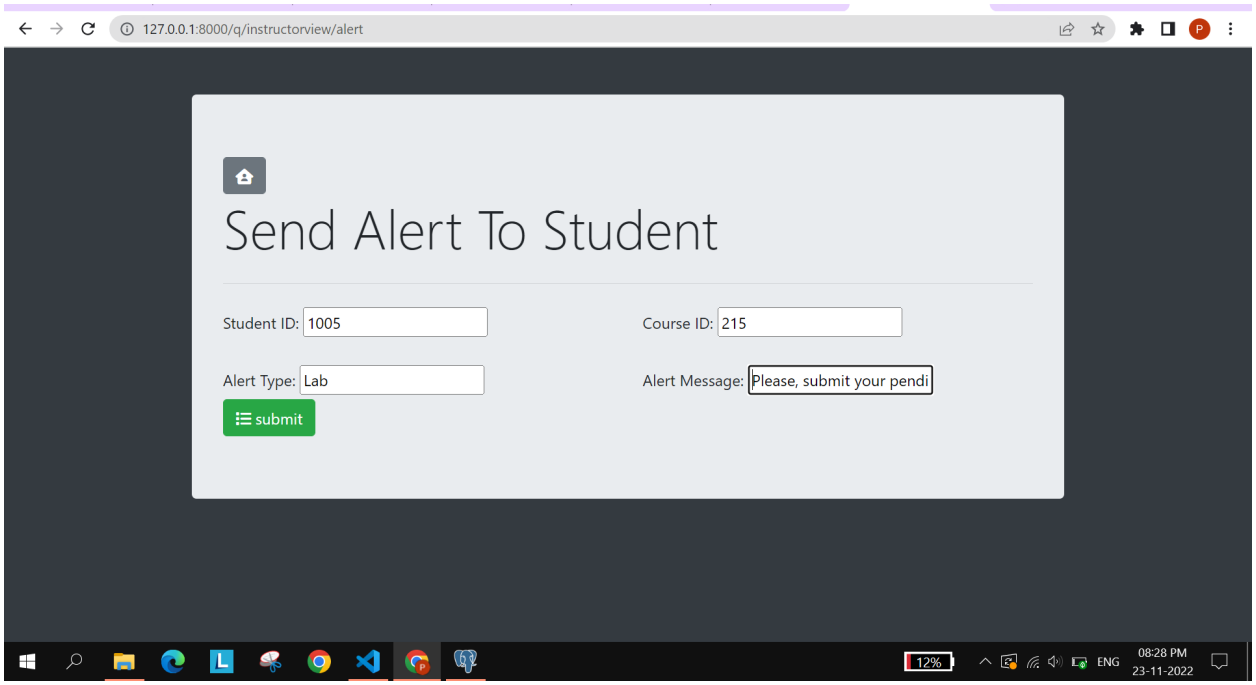


a) Updating Student's marks:

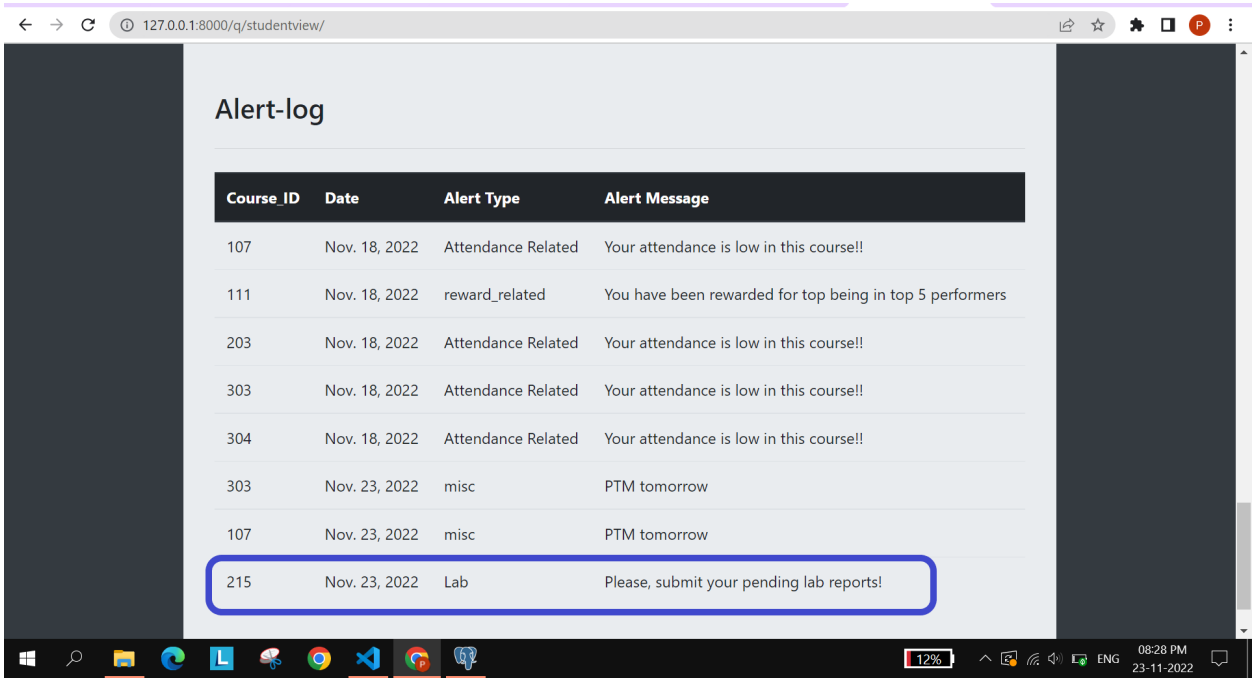
→ Student's marks are updated and the reward points are calculated accordingly with use of triggers.



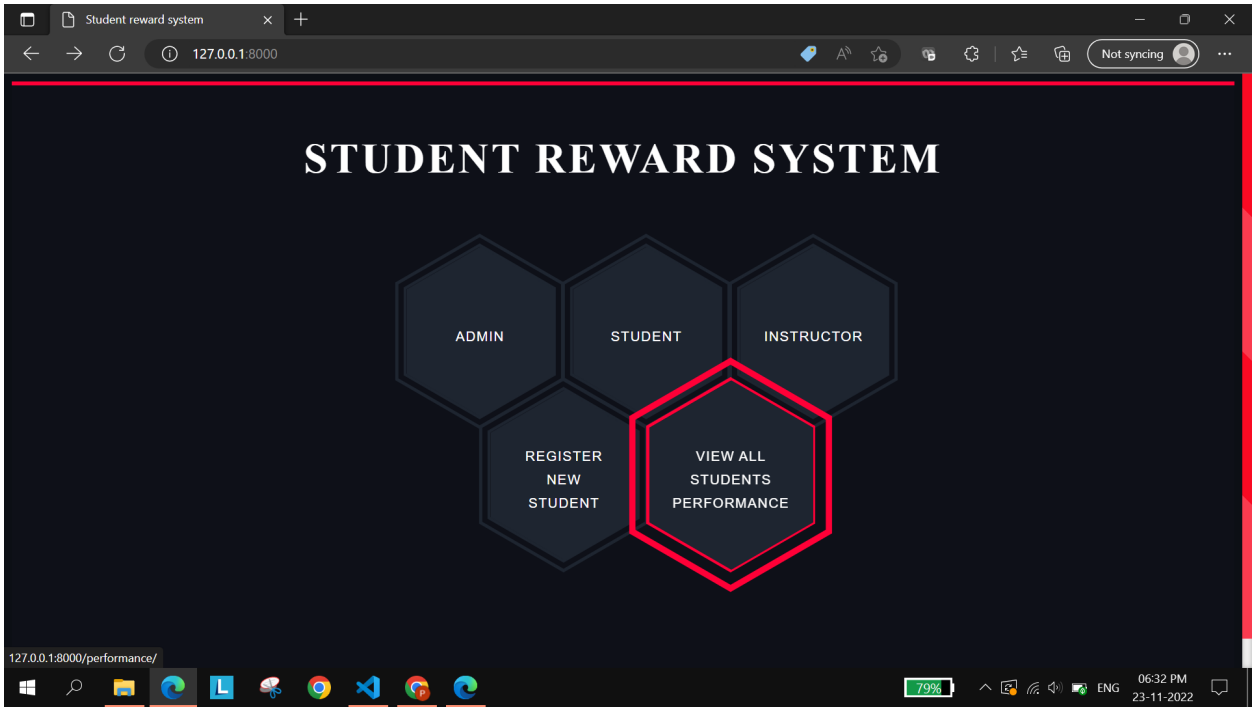
b) Sending Alerts to students:



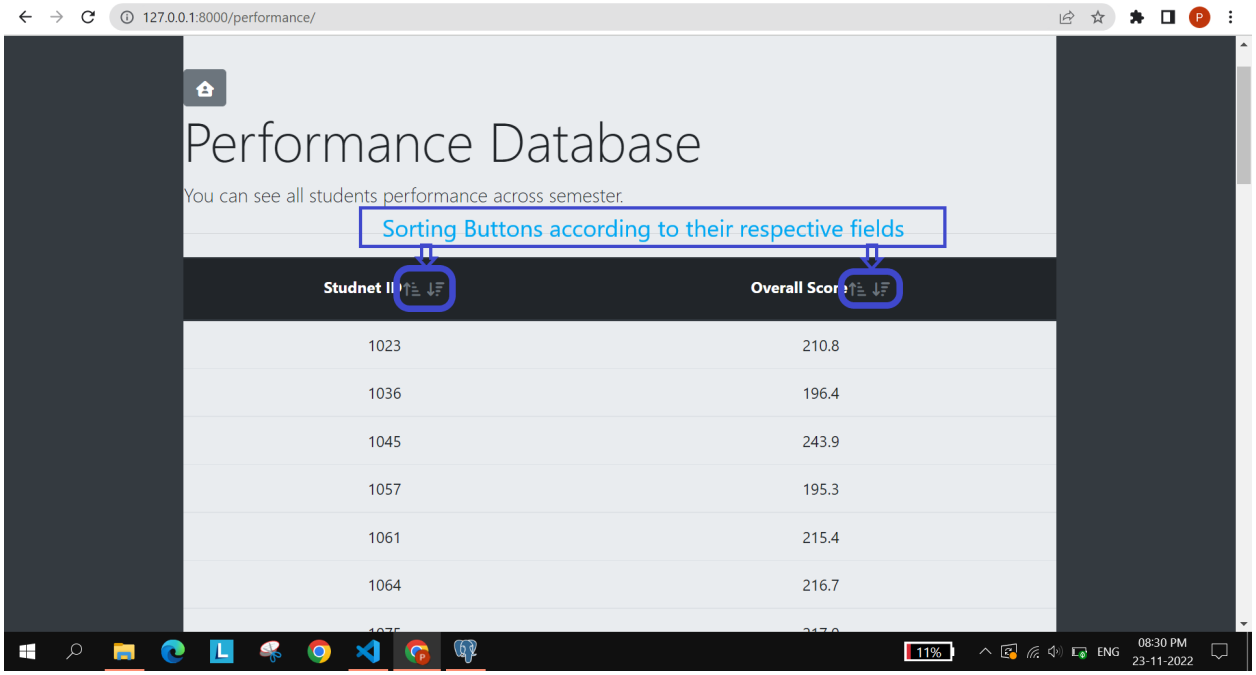
→ The alert is successfully sent and is stored in the alert-log of the respective student.



5) Performance Page:



→ We can see the final performance of students on this page and by using sort buttons, top performers and weak performers can be identified.



Github Repository Link:

https://github.com/Het99/STUDENT_REWARD_SYSTEM