PUJC
Punjab University Jhelum Campus
Department of Information
Technology

**Second
Deliverable**

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1 Introduction

The team's goal is to create a software application that will make life easier for teachers. Teachers can use it to log their student records and attendance, as well as their assignments. With the increasing number of students in schools, teachers are often found busy managing the attendance of their students. A teacher's assistant application is being developed, which will help teachers to manage the attendance sheet generation and reportcard generation. This application can be used by teachers to perform their daily duties more efficiently and effectively as they can now also be used for storing data in Google Drive, so that they can be accessed anywhere at any time. The name of this application isCostaz. The word Costaz is derived from two words: "co-" which is used for the assistantagent, and "ostaz" which translates to "Teacher" in Arabic. Costaz Desktop is a teacher- friendly desktop application developed to manage academic records of their students. It allows for attendance sheets generation in Excel form, report card generation for individual students, and generation of marks sheets for all students, as well as for a specific course.

1.1 Usecase Description

- **Teacher**

  It is a class because it satisfies all 6 characteristics.

  Behavior:
  1. Signup
  2. Add Class
  3. Add Course
  4. Mark Attendance
  5. Edit Records
  6. Generate Reports
  7. Share Reports

- **Google API**

  It is a class because it satisfies all 6 characteristics.

  Behavior:
  1. Authenticate User
  2. Manage Google Sheets
  3. Manage Google Drive

Use Cases:

Use Case #1.1	UC_Authentication	
Description	The actor will sign up with their Google account to get verified to use Google Drive and Google Sheets.	
Pre-Condition	• Given Email must be valid.	
Success End Condition	• Google account must be valid. • Successfully registered in application with Google account.	
Failed End Condition	• Invalid credentials.	
Actors	Teacher	
Trigger	When Actor clicks Signup button.	
Description	**Step**	**Action**
	1	Actor will open the application.
	2	The credentials will be taken in a popup screen only when the user enteredfirst time.
	3	Application account for the Actor will be created.
Extension	**Step**	**Branching Action**
		The credentials can be stored in an external database (Firebase).
Variation		**Branching Action**
	1	Actor can add a custom email in the given mail field if the Gmail account isnot login into the browser or device.
	2	Feature of "Forgot Password" can be provided.
	3	Separate features for signup and sign-in can be provided.
Exception	1	When actor puts invalid credentials.
Other Information		
Open Issues		
Due Date		

Use Case #1.2		UC_Settings	
Description		The actor will customize their experience by configuring the settings.	
Pre-Condition		• The actor must be logged in.	
Success End Condition		• Actor can successfully configure the file and exported in Google drive	
Failed End Condition		• External storage is write protected. • Due to unavailability of internet configuration file could not e uploaded toGoogle drive.	
Actors		Teacher	
Trigger		Configure file will automatically popup after sign in.	
Description	**Step**	**Action**	
	1	When actor signup with an account, a theme selection window will be triggered on-screen.	
	2	By default the theme will be selected by light.	
	3	Actor can select any between dark and light theme.	
	4	Click on the change button and the theme will be changed everywhere,accordingly.	
Extension	**Step**	**Branching Action**	
Variation		**Branching Action**	
	1	We can swap setting window from use case 1.2.	
Exception		External storage is write protected.	
Other Information			
Open Issues			
Due Date			

Use Case #1.3	UC_Navigation_Bar		
Description	The Navigation bar will be displayed on the left side of the screen		
Pre-Condition	• User must be logged in.		
Success End Condition	• Main Menu items will be displayed upon clicking on navigation barbutton.		
Failed End Condition	• Memory or processor is too much busy so the menu bar won't be able toanimate, hence shadowing the underlying items.		
Actors	Teacher		
Trigger	Click on the navigation bar icon.		
Description	**Step**	**Action**	
	1	Actor must sign-in.	
	2	Settings will be configured.	
	3	Homepage will appear and menu icon will be on the top left corner.	
Extension	**Step**	**Branching Action**	
		More items can be added in the navigation	
Variation		**Branching Action**	
	1		
Exception			
Other Information			
Open Issues			
Due Date			

Use Case #1.3.1	UC_Home	
Description	The Actor will open the default page where all the performance of classes and courses will be available in the pie charts.	
Pre-Condition	• Actor must be created class and course to see the performanceoverview of any class/course.	
Success End Condition	• Main Menu features successfully pop up on the screen by clicking onthe menu bar.	
Failed End Condition	• Failed to load main menu features due to slow internet or providingwrong information in the login section.	
Actors	Teacher	
Trigger	Click on the login/signup button.	
Description	**Step**	**Action**
	1	Actor must authenticate by Google.
	2	After successful authentication, actor redirect on the home page.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
	1	
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2	UC_Main	
Description	The Actor will open the default page where all the performance of classes and courses will be available in the pie charts.	
Pre-Condition	• Actor must be authenticated by Google Services.	
Success End Condition	• Successfully land on the main menu from navigation bar.	
Failed End Condition	• Failed to load main menu features due to slow internet	
Actors	Teacher	
Trigger	Click on the main menu button in the navigation bar.	
Description	**Step**	**Action**
	1	Actor must be authenticate by Google.
	2	Navigation bar will open in the home page.
	3	Click on the Menu Icon in navigation bar.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1		UC_Class_Add	
Description		The Actor will add the class of students on the homepage of the application.	
Pre-Condition		• Actor should be Authenticate.	
Success End Condition		• Class Create when Actor click	
Failed End Condition		• Google Drive Storage full.	
Actors		Teacher	
Trigger		When the teacher clicks on the Class Add in the application.	
Description	**Step**	**Action**	
	1	Actor will authenticate by Google API.	
	2	After that actor move to the Main Menu from the Navigation Bar	
Extension	**Step**	**Branching Action**	
Variation		**Branching Action**	
Exception			
Other Information			
Open Issues			
Due Date			

Use Case #1.3.2.2	UC_Class	
Description	The Actor will create multiple class cards according to the schedule.	
Pre-Condition	• Class should be instantiated.	
Success End Condition	• When Class will added in the List.	
Failed End Condition	• Google Drive Storage Full.	
Actors	Teacher	
Trigger	When Class will added by UC_Class_Add	
Description	**Step**	**Action**
	1	Actor will authenticate by Google API.
	2	After that actor move to the Main Menu from the Navigation Bar
	3	Class Should be instantiated.
Extension	**Step**	**Branching Action**
		• Class Performance will be display on Screen. • Total Number of students will display on screen.
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.3	UC_Class_Report	
Description	The Actor will generate the report card of students in a group.	
Pre-Condition	• Class must have Entities. • Entitles must have their Records.	
Success End Condition	• Report will create successfully.	
Failed End Condition	• Class does not have Entities. • Entitles does not have Records.	
Actors	Teacher	
Trigger	Trigger by Actor via Context Menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Generate Report in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
		• Report can be generated for Course Only. • Report can be generated for individual student only.
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.4	UC_Class_Edit	
Description	The Actor will delete a record file after it has been generated and sometimes rename a report file.	
Pre-Condition	• Class must be Exist.	
Success End Condition	• Class Successfully Edit via Context Menu.	
Failed End Condition	• Class will disconnect by Internet.	
Actors	Teacher	
Trigger	It will trigger via Context Menu by right click.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Edit in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.1	UC_Course_Add	
Description	The Actor will add the course for students in the Class Section.	
Pre-Condition	• Actor should be Authenticate.	
Success End Condition	• Course Create when Actor click on the Course Add	
Failed End Condition	• Google Drive Storage full.	
Actors	Teacher	
Trigger	When the teacher clicks on the Class Add in the application.	
Description	**Step**	**Action**
	1	Actor will authenticate by Google API.
	2	After that actor move to the Main Menu from the Navigation Bar.
	3	Create a Class by UC_Class_Add.
	4	Add a Course in the Created Class.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.2		UC_Course	
Description		The Actor will be able to create multiple course cards according to the schedule.	
Pre-Condition		• Course should be instantiated.	
Success End Condition		• When Course will added in the List.	
Failed End Condition		• Google Drive Storage Full.	
Actors		Teacher	
Trigger		When Class will added by UC_Course_Add	
Description	Step	Action	
	1	Actor will authenticate by Google API.	
	2	After that actor move to the Main Menu from the Navigation Bar	
	3	Actor will create the class by UC_Class_Add.	
	4	Course will added by UC_Course_Add.	
Extension	Step	Branching Action	
	1	• Course Performance will be display on Screen. • Total Number of students will display on screen.	
Variation		Branching Action	
Exception			
Other Information			
Open Issues			
Due Date			

Use Case #1.3.2.1.3	UC_Course_Report	
Description	The actor will generate the report card of students in a group.	
Pre-Condition	• Course must have Entities. • Entitles must have their Records.	
Success End Condition	• Report will create successfully.	
Failed End Condition	• Course does not have Entities. • Entitles does not have Records.	
Actors	Teacher	
Trigger	Trigger by Actor via Context Menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Generate Report in Context Menu.
Extension	**Step**	**Branching Action**
		• Report can be generated for Class Only. • Report can be generated for individual student only..
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.4	UC_Course_Edit	
Description	The actor will delete a record file after it has been generated, and sometimes rename a report file after it has been generated.	
Pre-Condition	• Course must be created in the Class.	
Success End Condition	• Course Successfully Edit via Context Menu.	
Failed End Condition	• Course will disconnect by Internet. • Attached Class with Course Discard by Actor.	
Actors	Teacher	
Trigger	It will trigger via Context Menu by right click.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Edit in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.5		UC_Thresholds
Description		The actor will change the limits for both the grades of individual students and the number of courses, and also set limits for the course, like total marks, marks for assignments, quizzes etc.
Pre-Condition		• Parent Class must exist. • Student must enroll in the Course.
Success End Condition		• Threshold successfully saved.
Failed End Condition		• Limitation Conflict in the thresholds.
Actors		Teacher
Trigger		• Thresholds will trigger via context menu by right click on course.
Description	Step	Action
	1	Context Menu display by Right click.
	2	Click on thresholds in Context Menu.
Extension	Step	Branching Action
Variation		Branching Action
	1	• Maximum Student Mark will set during records. (Edit)
Exception		• Thresholds page will available for more Fields.
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.6	UC_Dropdown	
Description	The Actor will select the class based on the available sections or shifts (mor/eve).	
Pre-Condition	• Actor should be in the student field.	
Success End Condition	• Successfully create via context menu in the student field.	
Failed End Condition	• Course will terminate in the class.	
Actors	Teacher	
Trigger	When the Actor click on the context menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on dropdown in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.7	UC_Dropdown_Report		
Description	The Actor will generate a report for their students that include the student's name and roll number, as well as all the marks they obtain in that class. The report will also include the GPA of those marks.		
Pre-Condition	• Dropdown must have Entities.		
Success End Condition	• Report will create successfully.		
Failed End Condition	• Dropdown does not have Entities.		
Actors	Teacher		
Trigger	Trigger by Actor via Context Menu.		
Description	**Step**	**Action**	
	1	Context Menu display by Right click.	
	2	Click on Generate Report in Context Menu.	
Extension	**Step**	**Branching Action**	
Variation		**Branching Action**	
Exception			
Other Information			
Open Issues			
Due Date			

Use Case #1.3.2.1.8	UC_Dropdown_Edit	
Description	The Actor will delete the report file once it's generated, and rename the generated report and share it with the students.	
Pre-Condition	• Course must be created in the Class.	
Success End Condition	• Course Successfully Edit via Context Menu.	
Failed End Condition	• Disconnect by Internet. • Attached Class with Course Discard by Actor.	
Actors	Teacher	
Trigger	Actor via Context Menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Edit in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.1.1	UC_Add_Field	
Description	The Actor will add the multiple fields according their entities records.	
Pre-Condition	• Course should be instantiated.	
Success End Condition	• Successfully field added by actor.	
Failed End Condition	• Field related class discarded by actor. • Field related course discarded by the actor.	
Actors	Teacher	
Trigger	Actor on add while being in the course section.	
Description	**Step**	**Action**
	1	Actor will create the class.
	2	Course will add in the created class.
	3	Click on the plus button for create field.
	4	Enter the details of every student individually.
Extension	**Step**	**Branching Action**
		• Performance will also display on screen.
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.1.2	UC_Student_Feild	
Description	The Actor will visualize the student's name, roll no, rank and CGPA.	
Pre-Condition	• It is evaluated by add field.	
Success End Condition	• When Course will added in the List.	
Failed End Condition	• Lost Student Records.	
Actors	Teacher	
Trigger		
Description	**Step**	**Action**
	1	Create the Class by Add Class.
	2	Add the Specific Course related to the created class.
	3	Student field appeared on the screen.
	4	Enter the student detail individually in fields.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

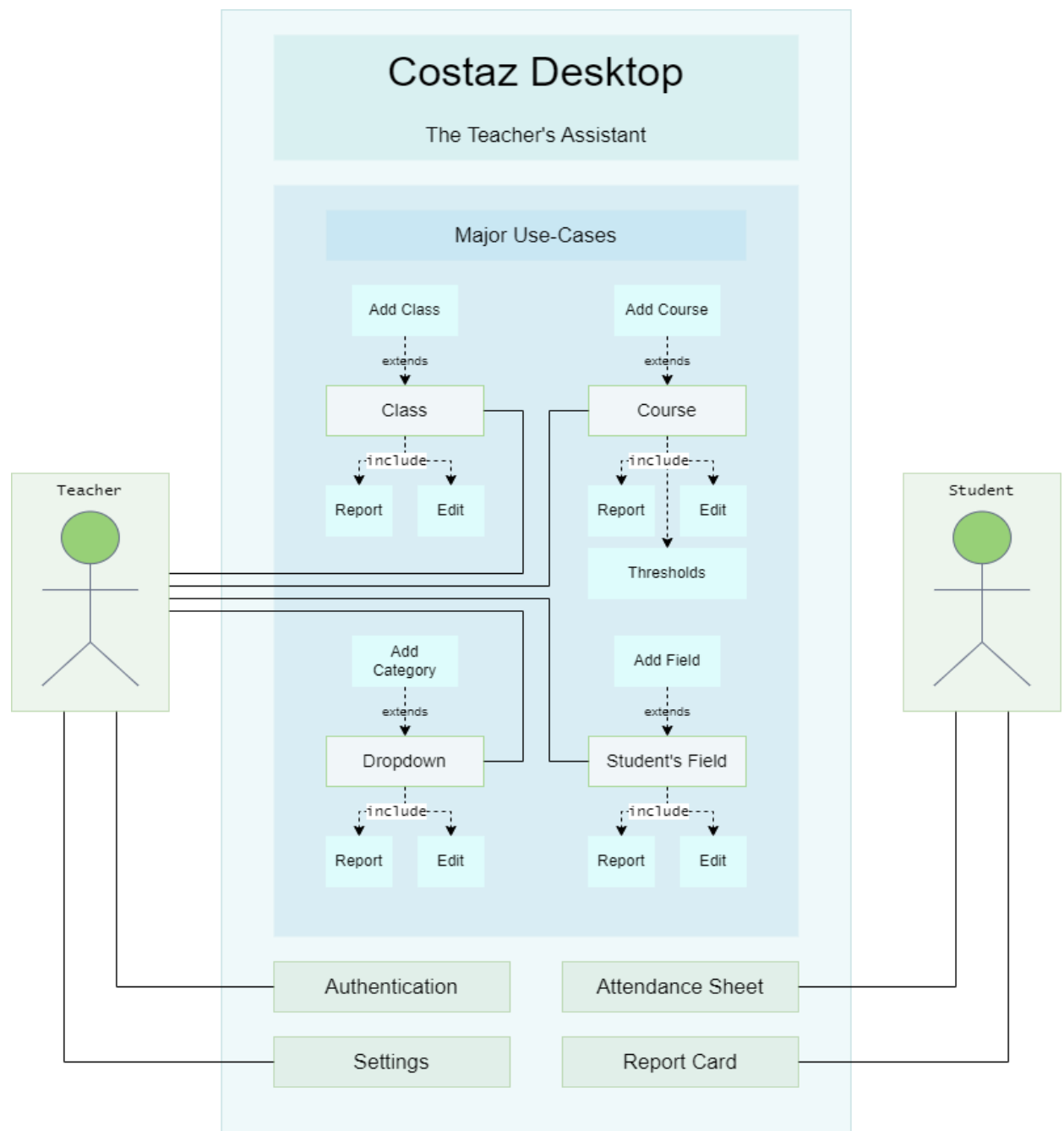| Use Case #1.3.2.1.1.3	UC_Student_Field_Report	
Description	Actor will create a report of students based on their attendance, performance, and grades and generate student reports by clicking left on the Generate button on the screen.	
Pre-Condition	• Student Field must have records..	
Success End Condition	• Report will create successfully.	
Failed End Condition	• Dropdown does not have Entities.	
Actors	Teacher	
Trigger	Trigger by Actor via Context Menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Generate Report in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.1.4	UC_Student_Field_Edit	
Description	The Actor will visualize the attendance and performance, create and generate reports, and reset and delete the field of the student by just clicking right on the mouse.	
Pre-Condition	• Record must be created in the fields.	
Success End Condition	• Field Successfully Edit via Context Menu.	
Failed End Condition	• Student Field will disconnect by Internet. • Attached Class with Course Discard by Actor.	
Actors	Teacher	
Trigger	Trigger by Actor via Context Menu.	
Description	**Step**	**Action**
	1	Context Menu display by Right click.
	2	Click on Edit in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

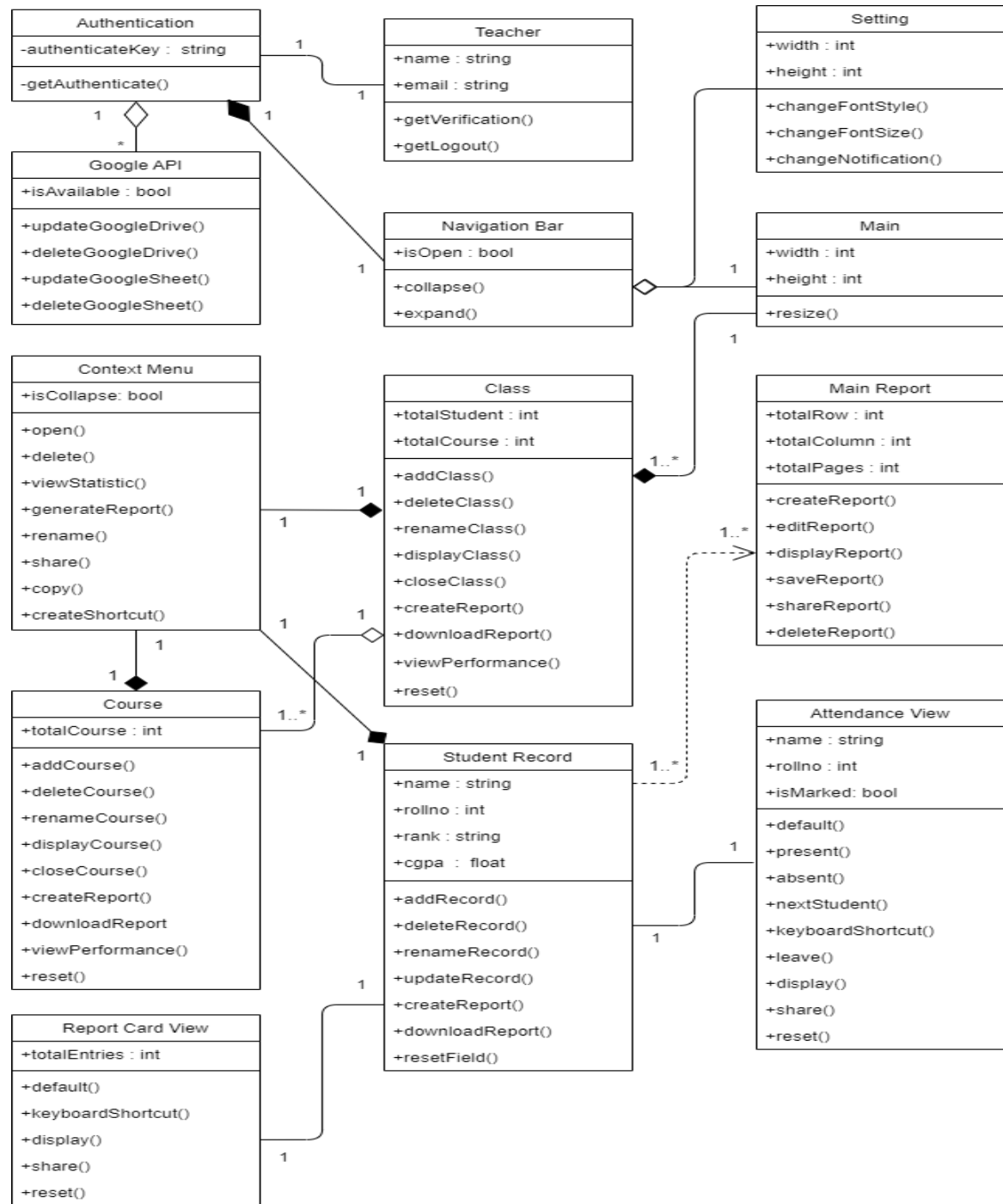| Use Case #1.3.2.1.1.6	UC_Attendance_View	
Description	The Actor will either mark the attendance individually or by selecting all	
Pre-Condition	• Student Entitles must be exist.	
Success End Condition	• Actor successfully marks the Attendance.	
Failed End Condition	• Internet Disconnected.	
Actors	Teacher	
Trigger	Primary Actor on Student Field. (click)	
Description	**Step**	**Action**
	1	Actor click on the student field in the Google sheet.
	2	Dropdown Menu will appear on Screen.
	3	Attendance will mark each student individually.
Extension	**Step**	**Branching Action**
		• Performance of each student show on the screen.
Variation		**Branching Action**
Exception		
Other Information		
Open Issues		
Due Date		

Use Case #1.3.2.1.1.7	UC_Report_Card_View	
Description	The Actor will visualize the student's report card, which will show a graphical representation of all the student's performances in the pie charts. The charts are made from attendance records, class activities and marks received.	
Pre-Condition	- Parent entity of record card must exist. - Student record available. - Internet Available.	
Success End Condition	Report Card Generated Successfully.	
Failed End Condition	Student Record not exists.	
Actors	Teacher	
Trigger	Trigger by Actor via Context Menu in the student field.	
Description	**Step**	**Action**
	1	Context Menu display by Right click in the student field.
	2	Click on Generate Report Card in Context Menu.
Extension	**Step**	**Branching Action**
Variation		**Branching Action**
		- Actor can create specific report according to Class. - Actor can generate specific report according to course.
Exception		
Other Information		
Open Issues		
Due Date		

1.2 Usecase Diagram (refined and updated)
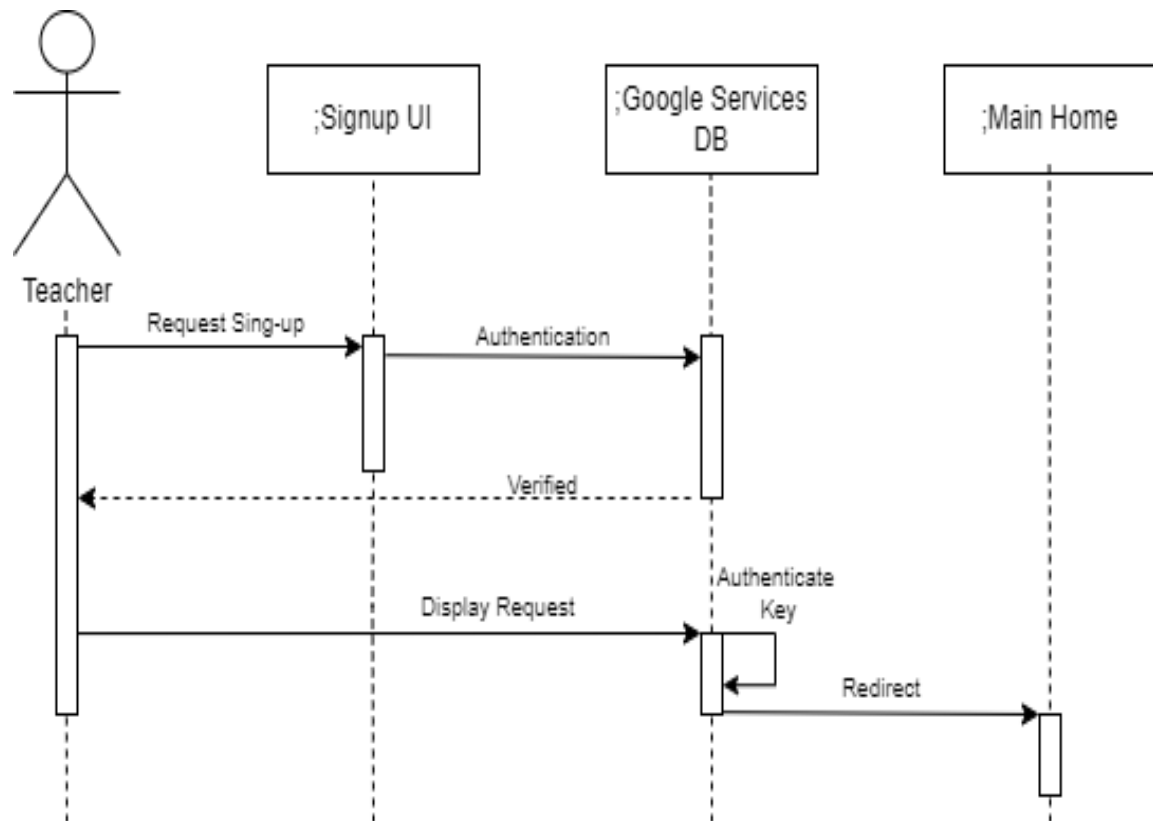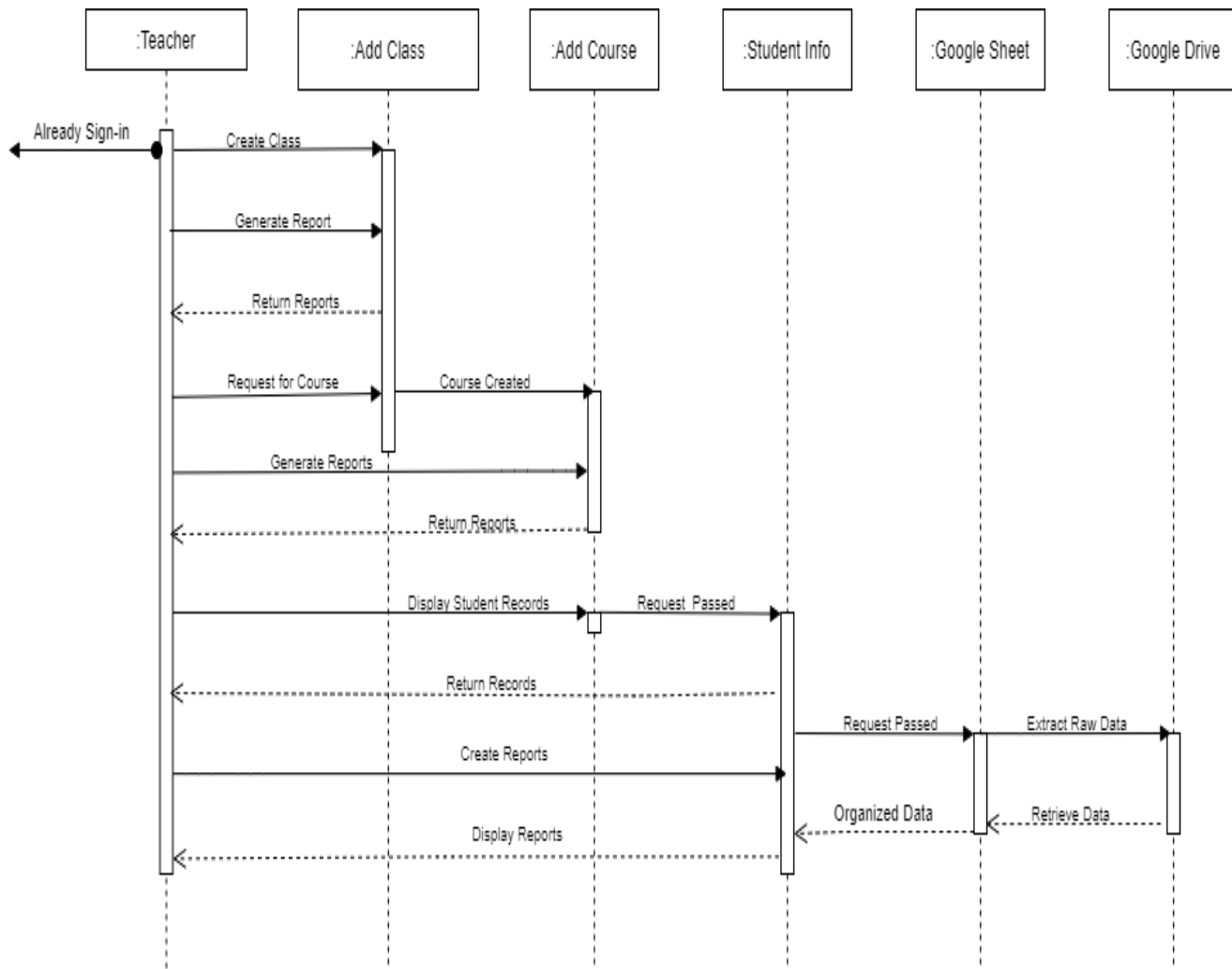
1.3 Domain Model
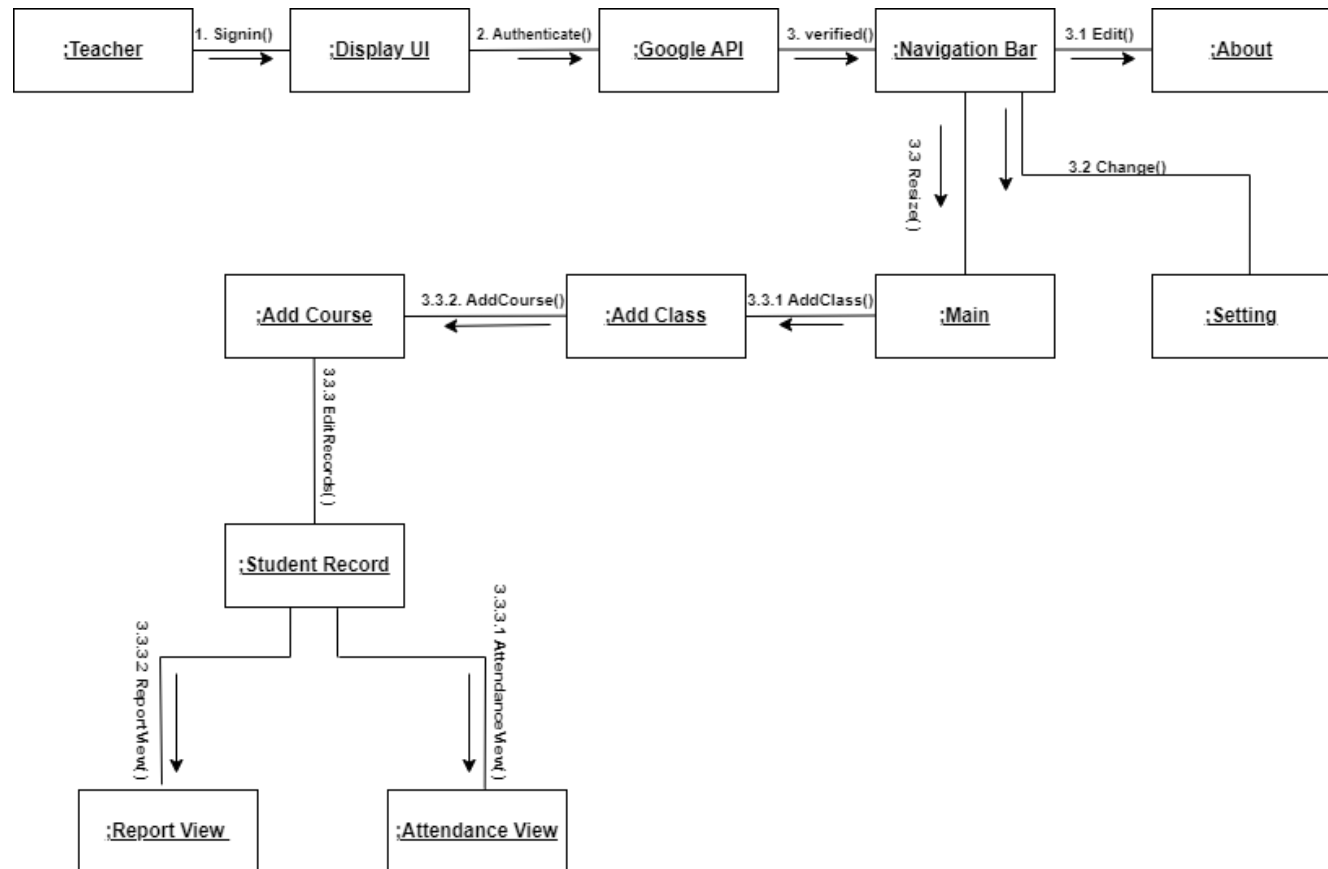
1.4 Sequence Diagram

- **Signup**

● **Teacher Assistance**

1.5 Collaboration Diagram

1.6 Operation Contracts

Name: Authenticate()

Responsibilities: Allow user to sign-up with their Google account to get verified anduse Google drive and Google sheets.

Cross References: UC_Authentication.

Exceptions: Invalid credentials.

Preconditions:
   o   Given email must be valid.

Post conditions: The user will properly register in the application and land on thehome screen after successful authentication.

Name: Resize()

Responsibilities: Allow the user to open the default page where all the performance

of classes and courses will be available in the pie charts.

Cross References: Use Case: UC_Main

Exceptions: Failed to load main menu features due to slow internet connection.

Preconditions:
- o User must be authenticate by Google Services.

Post conditions: User can easily land on the main menu
fromnavigation bar.

Name: Add_Class()

Responsibilities: Allow the user to create multiple classes according to their schedule.

Cross References: Use Case: UC_Class

Exceptions: Authentication failed or Google drive storage is full for more classes.

Preconditions:
- o Class should be instantiated.

Post conditions: Teacher can create multiple classes by right click
oruse the Add Class button on the class card.

Name: Add_Course()

Responsibilities: Allow the teacher to create multiple classes according to their schedule.

Cross References: Use Case: UC_Course

Exceptions: Google drive storage full during the course creation.

Preconditions:
- o Course should be instantiated.

Post conditions: Teacher can easily create multiple course by right
click or press on the add button on the course card.

Name: Edit_Records()

Responsibilities: Allow the teacher to edit and visualize student name, roll no, rankand CGPA

Cross References: Use Case: UC_Student_Field

Exceptions: Student records deleted or lost from the
teacher.**Preconditions:**
- o Course should be instantiated.

Post conditions: Teacher can easily add field and add
details ofstudents in the fields.

Name: Attendance_View()

Responsibilities: Allow the teacher to mark the attendance individually or by

selecting all students.

Cross References: Use Case: UC_Attendance_View

Exceptions: Internet disconnect during the attendance session.**Preconditions:**

- o Student entities must be exist the field.

Post conditions: Teacher marks the attendance successfully and performance and performance of each student will also show on the screen.

Name: Report_View()

Responsibilities: Allow user to visualize student report card which will show a cleargraphical representation of various easy to read charts. These are made from attendance records, class activities and marks received.
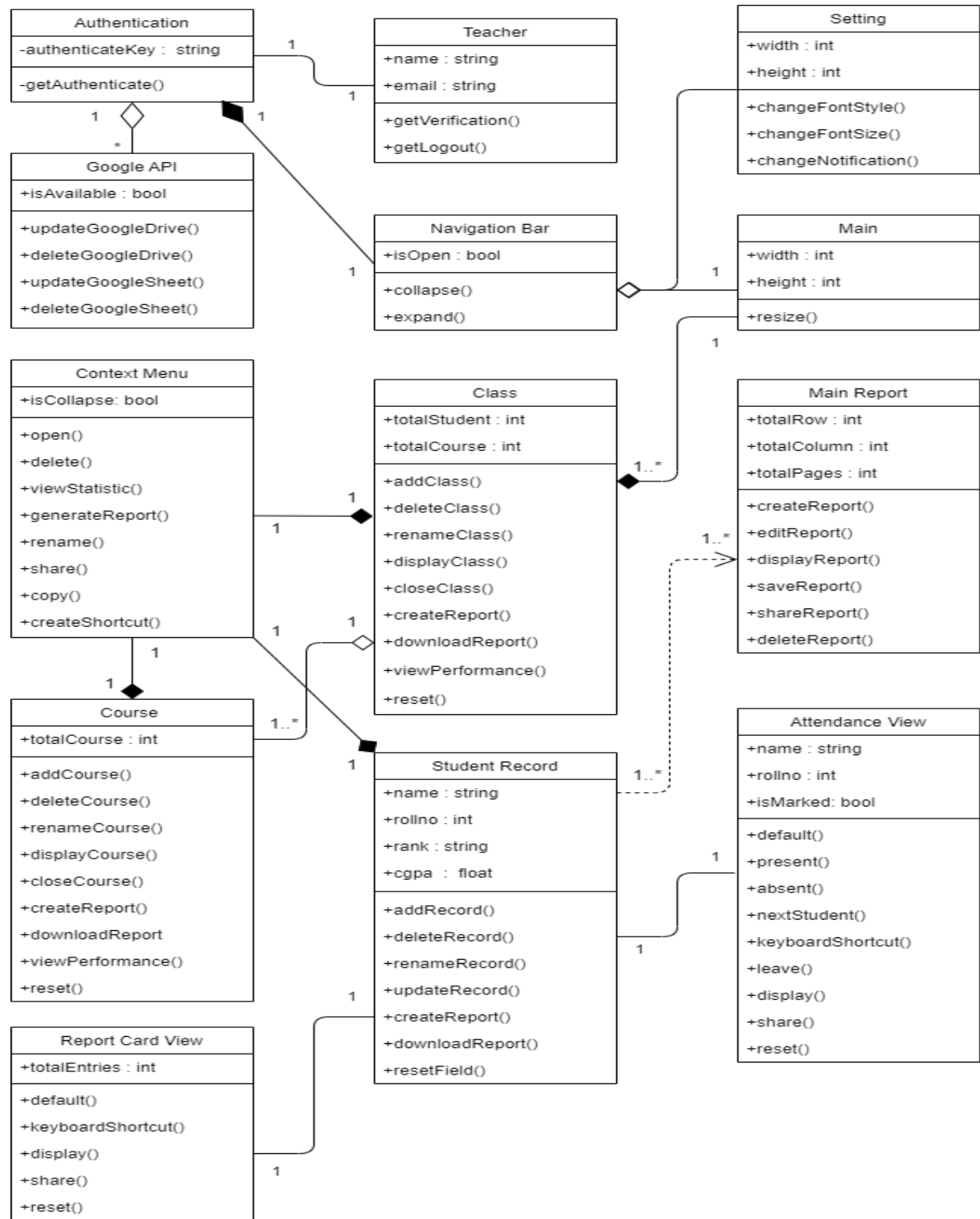
Cross References: Use Case: UC_Report_Card_View**Exceptions**: Student records unavailable in the field. **Preconditions:**

- o Parent entity of record card must exist.
- o Student record must be available in the field.

Post conditions:

Report card successfully generated. It can be downloaded by teacher orshared with student in the read-only mode.

1.7 Design Class Diagram

1.8 Data Model