

ASSIGNMENT 3

PROFESSOR AS A SERVICE

Team Members:

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Objective:

To provide career-oriented students with quality education designed by using software engineering techniques to reduce tuition cost while improving the quality of education anywhere in the world. We want to hold people accountable for improving the quality of life for the masses through education, learning to learn, and feedback. We have designed a system that collects and calculates data obtained from students' feedback and track students' performance and provides them relevant degree from a third-party authority.

Proposed Solution:

As indicated by this digital platform where Professor is a service and has the autonomy to decide which courses he is going to teach and their respective schedules. Students from all over the world can login to the digital platform and view as they please. Also, professors can login and operate remotely anywhere in the world. In this model Administrator has access to professor, student, course, degree catalogs and to the certification authority. A feedback system is designed for the students to give rating to their respective professors which in turn will be used to calculate reputation index of the professors. The ratings from students will be fetched and processed by the administrator to maintain anonymity.

Degree completion requirements:

GPA	Should be greater than 2
Credits	Total 32 credits
Duration	Minimum of 18months

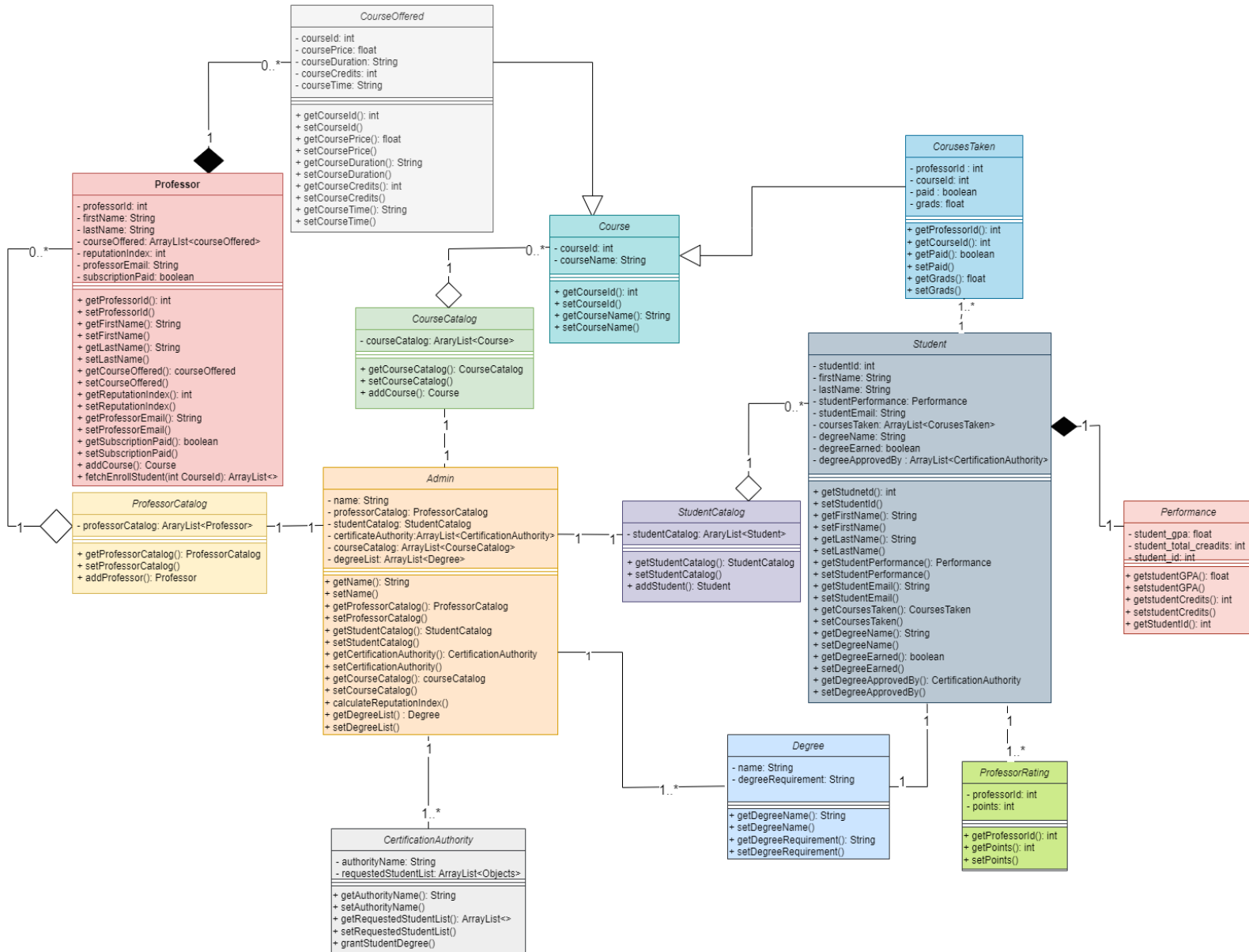
Professor Reputation Index:

Ratings from students (in stars)	Reputation Index
5	Highly recommended
4	Most likely Recommended
3	Likely recommended
2	Recommended
<2	Not Recommended

Student Grading by Professor:

GPA	Grades
>3.8	A+
3.5-3.7	A
3.2-3.4	B+
2.8-3.1	B
<2	F

Professor As a Service Class Diagram



Admin:

Admin has various accesses with respect to students, professors and certifying authorities. Admin is also responsible to calculate the reputation index for each professor which is the average of the ratings provided by all the students to the professor.

Methods:

```
getName() :String
setName() :String
getProfessorCatalog() :ProfessorCatalog
setProfessorCatalog() :ProfessorCatalog
getStudentCatalog() :StudentCatalog
setStudentCatalog() :StudentCatalog
getCertificationAuthority() : List<CertificationAuthority>
setCertificationAuthority() : List<CertificationAuthority>
getCourseCatalog() :CourseCatalog
setCourseCatalog() :CourseCatalog
calculateReputationIndex() :
getDegreeList() :Degree
setDegreeList() :Degree
```

Student Catalog:

A register claimed by the Administrator. A track of all student records which comprises of student data, courses decided on, performance and degree awarded and so forth are contained in the Student Catalog.

Methods:

```
getStudentCatalog () :List<List<Objects>>
setStudentCatalog () :List<List<Objects>>
addStudent() :Student
```

Student:

An individual logging in the digital platform that offers set of courses offered by Professors. Has a total track history about the courses undertaken for the degree. Has a performance record needed to award degree and also has certifying authority that approves degree once it is awarded.

Methods:

```
getStudentID() :int
setStudentID() :int
getFirstName() :String
setFirstName() :String
getLastName() :String
setLastName() :String
getStudentEmail() :String
setStudentEmail() :String
getStudentPerformance() : Performance
setStudentPerformance() : Performance
getCoursesTaken() :List<CoursesTaken>
setCoursesTaken() :List<CoursesTaken>
getDegreeName() :String
```

```
setDegreeName() :String
getDegreeEarned(): boolean
setDegreeEarned(): boolean
getDegreeApprovedBy() : List<CertificationAuthority>
setDegreeApprovedBy() : List<CertificationAuthority>
```

Professor Catalog:

It is the list of all the Professors that provide various courses on the digital platform.

Methods:

```
getProfessorCatalog () :List<ProfessorCatalog>
setProfessorCatalog () :List<ProfessorCatalog>
addProfessor() :Professor
```

Professor:

The professor manages their own courses as well as what they want to teach and when to teach them.

Methods:

```
getProfessorID() :int
setProfessorID() :int
getFirstName() :String
setFirstName() :String
getLastName() :String
setLastName() :String
getProfessorEmail() :String
setProfessorEmail() :String
getCourseOffered() :List<CourseOffered>
setCourseOffered() :List<CourseOffered>
getReputationIndex() :int
setReputationIndex() :int
getSubscriptionPaid() :boolean
setSubscriptionPaid() :Boolean
addCourse(): Course
fetchEnrollStudent(): List<>
```

Course Catalog:

It is the list of all the courses that are offered by the digital platform. This list is deduced from the courses that all professors want to offer.

Methods:

```
getCourseCatalog () :List<CourseCatalog>
setCourseCatalog () : List<CourseCatalog>
addCourse(): Course
```

Course Offered:

It holds the information about the course/courses a professor is offering. Professor has the autonomy to decide time and price of the course.

Methods:

getCourseId () :int

setCourseId () :int

getCoursePrice () :float

setCoursePrice () :float

getCourseDuration () :String

setCourseDuration () :String

getCourseCredits () :int

setCourseCredits () :int

getCourseTime () :String

setCourseTime () :String

Course:

A series of lessons in which a student is enrolled for completion of his/her degree. Professor is responsible to manage their courses and decides when and what to teach.

Methods:

getCourseId() :int

setCourseId() :int

getCourseName() :String

setCourseName() :String

Courses Taken:

Holds the information about the courses that a student has picked under a particular professor and whether the tuition fees has been paid or not.

Methods:

getProfessorId() :int

getCourseId() :int

getPaid(): Boolean

setPaid(): Boolean

getGrades(): float

setGrades(): float

Professor Rating:

A rating structure for the faculty by students based on the performance and effectiveness of the teaching strategies adopted by the Professor during the length of the course. A general feedback score for every teacher is determined and calculated using average of all the students' feedback which is the Reputation Index of the professor.

Methods:

getProfessorId() :int

getPoints() :int

setPoints() :int

Degree:

This class has details about the degrees that are offered by the digital platform and the pre-requisites to earn the degree by a student.

Methods:

```
getDegreeName() :String  
setDegreeName() :String  
getDegreeRequirement() :String  
setDegreeRequirement () :String
```

Certification Authority:

This class has information about various authorities that are responsible to approve student degrees.

Methods:

```
getAuthorityName() :String  
setAuthorityName() :String  
getRequestedStudentList(): List<>  
setRequestedStudentList()  
grantStudentDegree()
```

Performance:

Has student id and contains their GPA and the total credits they have earned. This will be used while awarding degree to them.

Methods:

```
getStudentId(): int  
getStudentGPA () :float  
setStudentGPA () :float  
getStudentCredits () :int  
setStudentCredits () :int
```

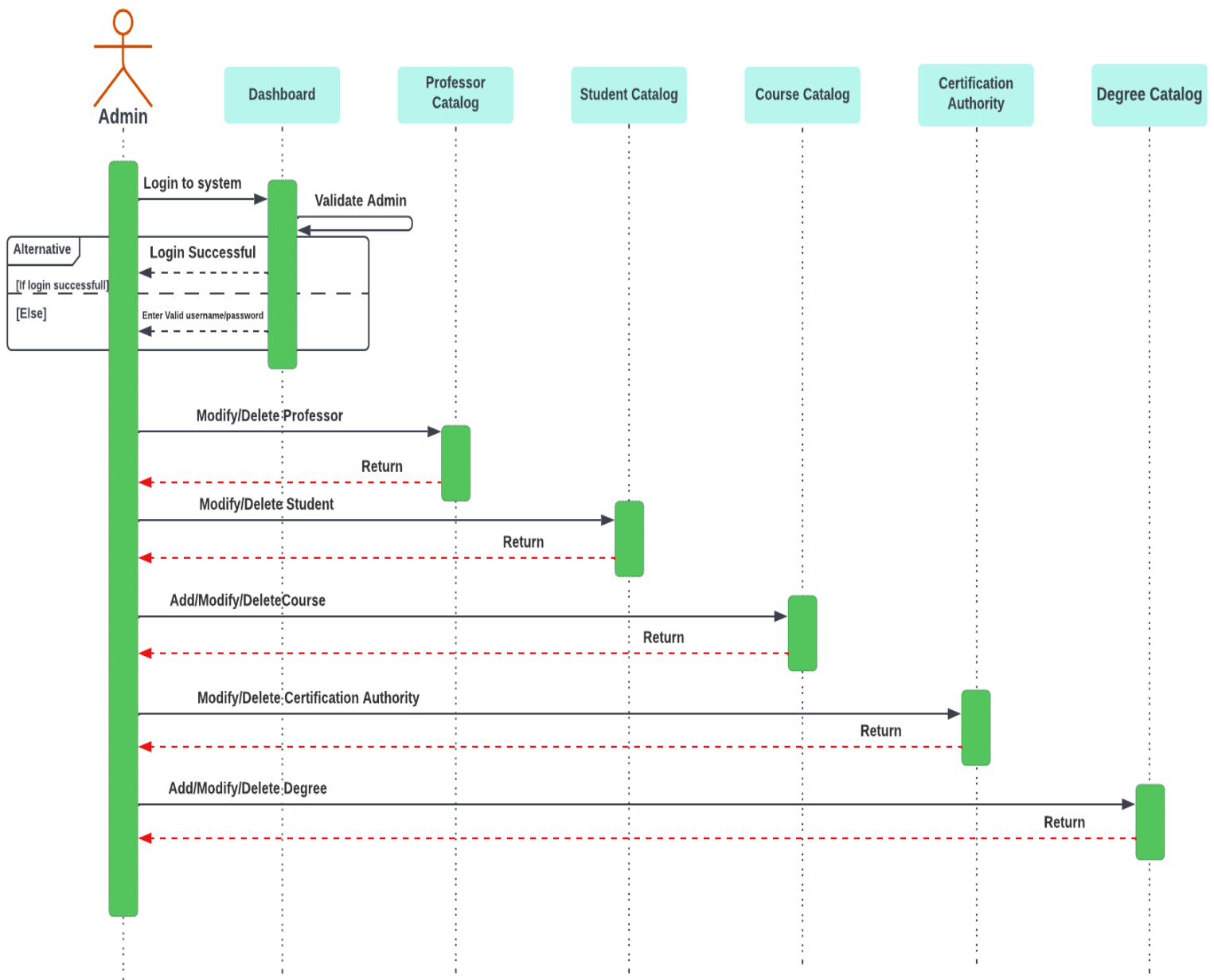
Sequence diagrams depicting how to navigate the digital platform object model

1. Administrator Sequence Diagram

Administrator logs in to the system and has the following functionalities:

- Can modify and delete a professor from the catalog.
- Can modify and delete a student from the catalog.
- Can add, modify and delete a course from the catalog.
- Can modify and delete certification authorities.
- Can add, modify and delete the degree offered from the degree catalog.

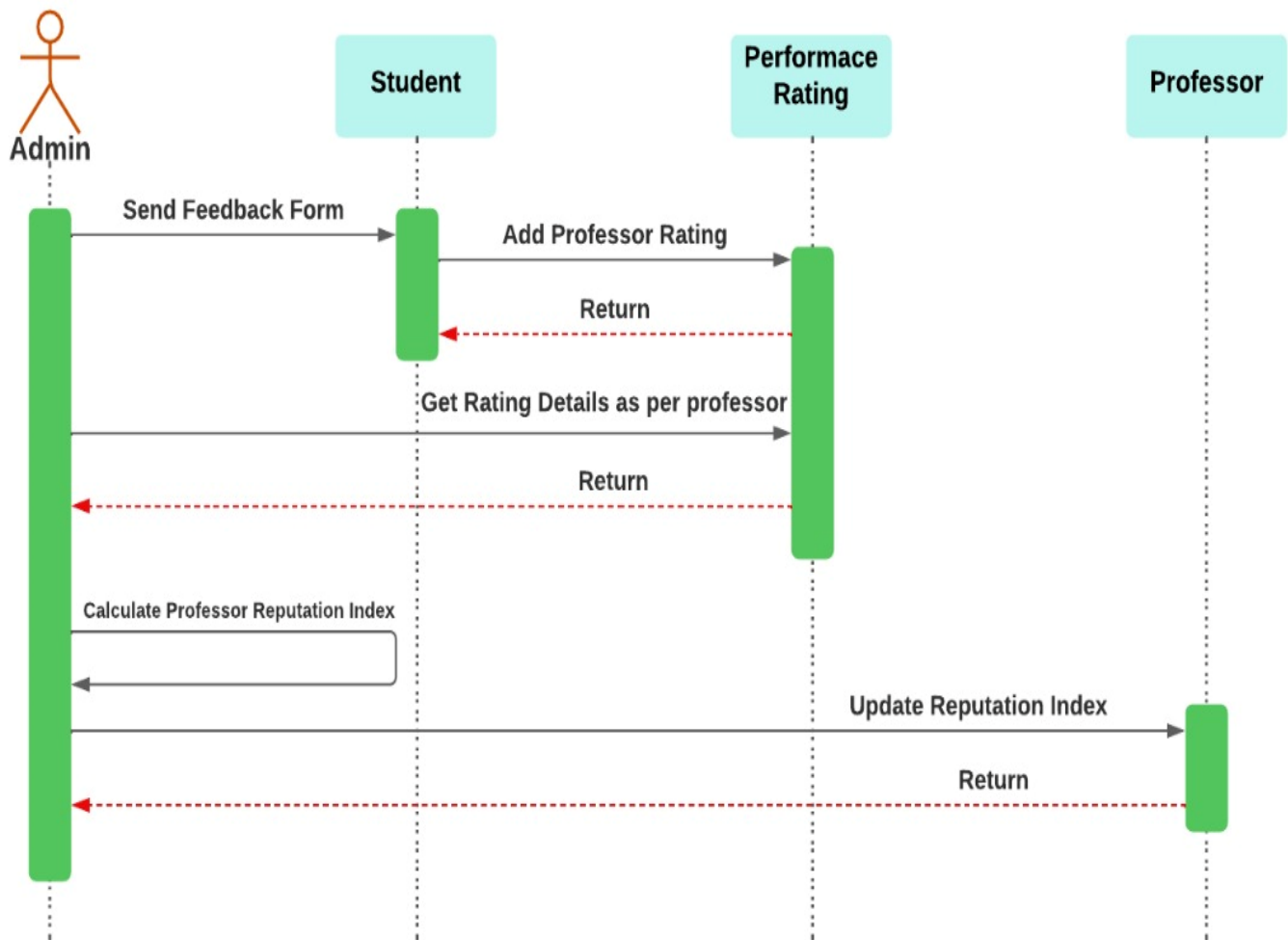
Sequence Diagram for Administrator



2. Feedback And Reputation Index Sequence Diagram

To maintain quality education and also help new students decide which professor to choose, application has feedback option. Students can give feedback (0-5stars) to their professors and using that, administrator can evaluate a reputation index of the respective professor.

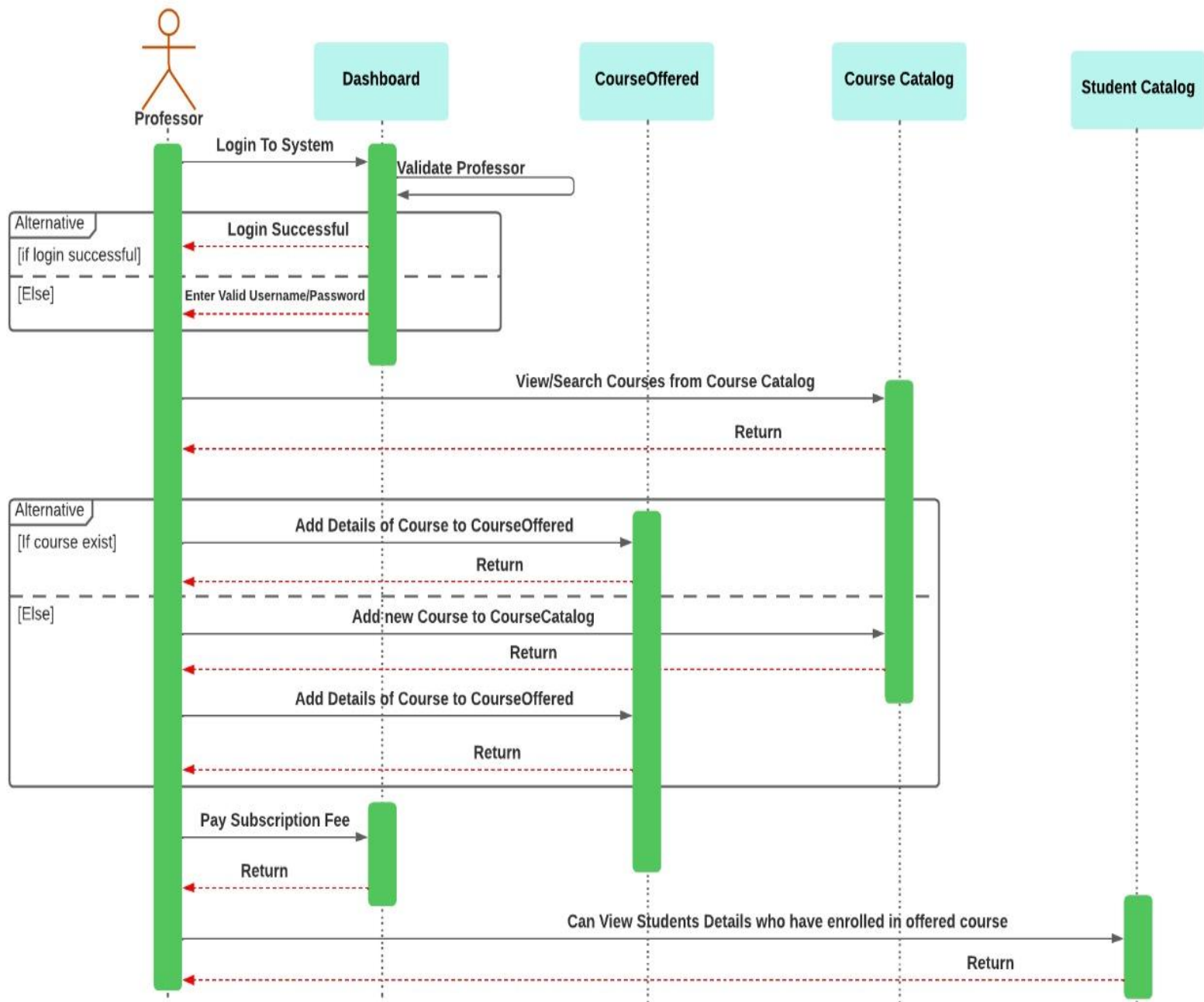
Sequence Diagram for Feedback and Reputation Index



3. Sequence Diagram for Professor

Professor can login and also pay the subscription fee to the digital platform via dashboard. Since the system is designed to provide autonomy to the professor, they can select a course from the existing course catalog or can also add a new course which they want to teach. Professors can also view the details of those students who have enrolled for the courses they are offering.

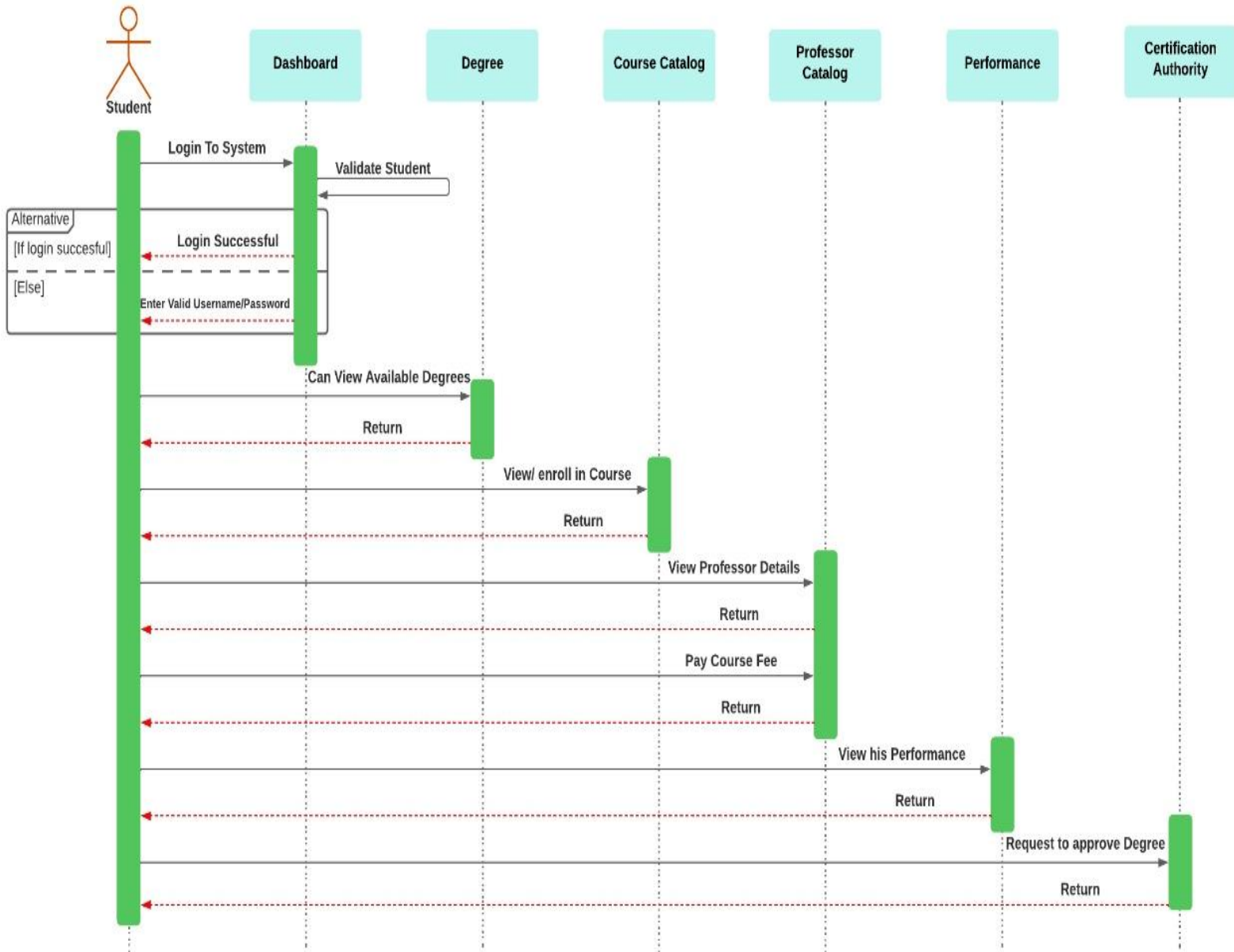
Sequence Diagram for Professor



4. Sequence Diagram for Student:

Students can login to the system via dashboard. They can decide the degree course they would like to pursue and enroll themselves to subjects they want to learn as part of the degree. They can also view the professor details, the courses they offer, course schedule and professors' reputation index. Students can view their performance i.e. course credits and GPA. They can also send request to the certification authorities for their degree approval/recognition.

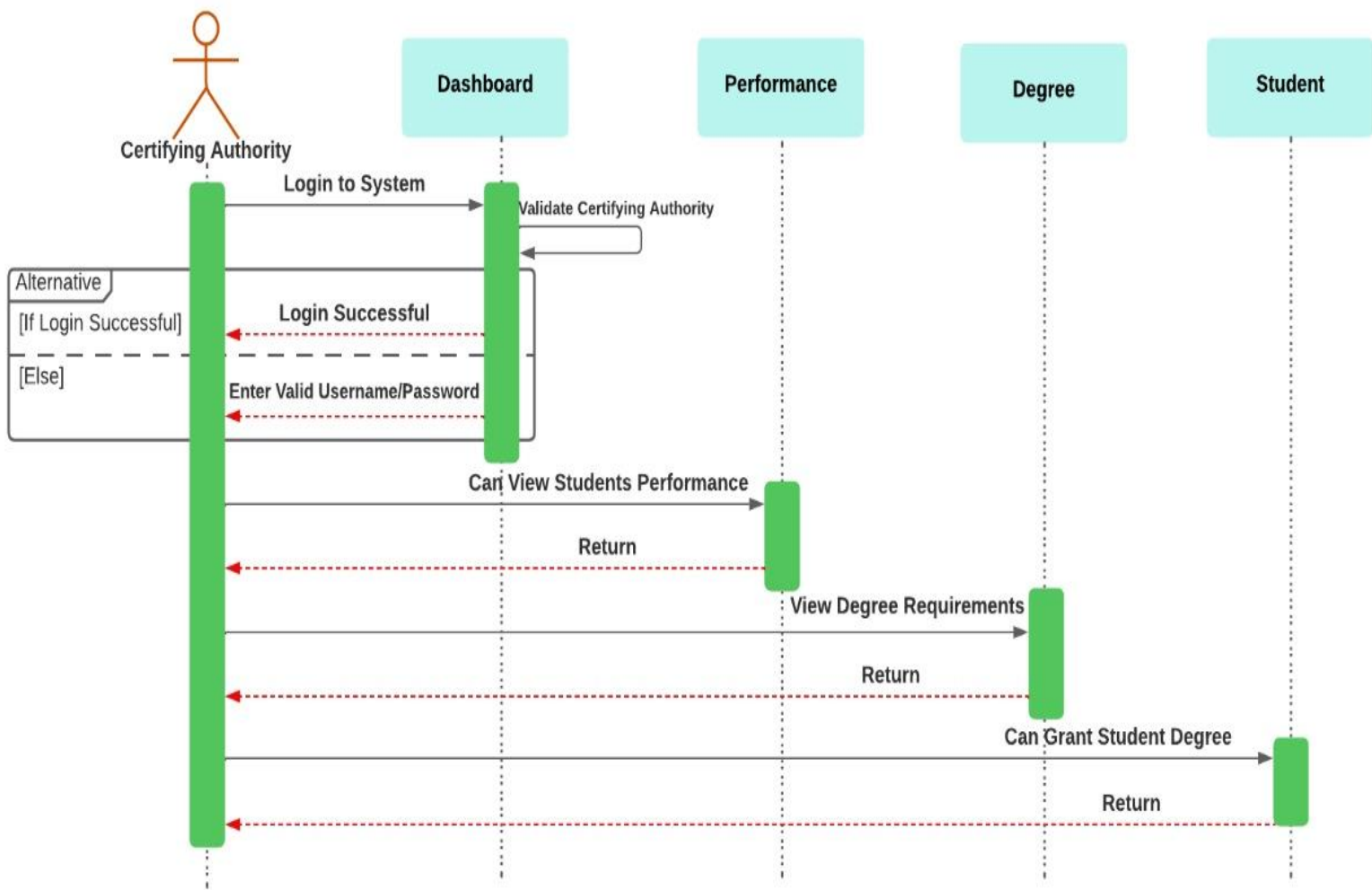
Sequence Diagram for Student



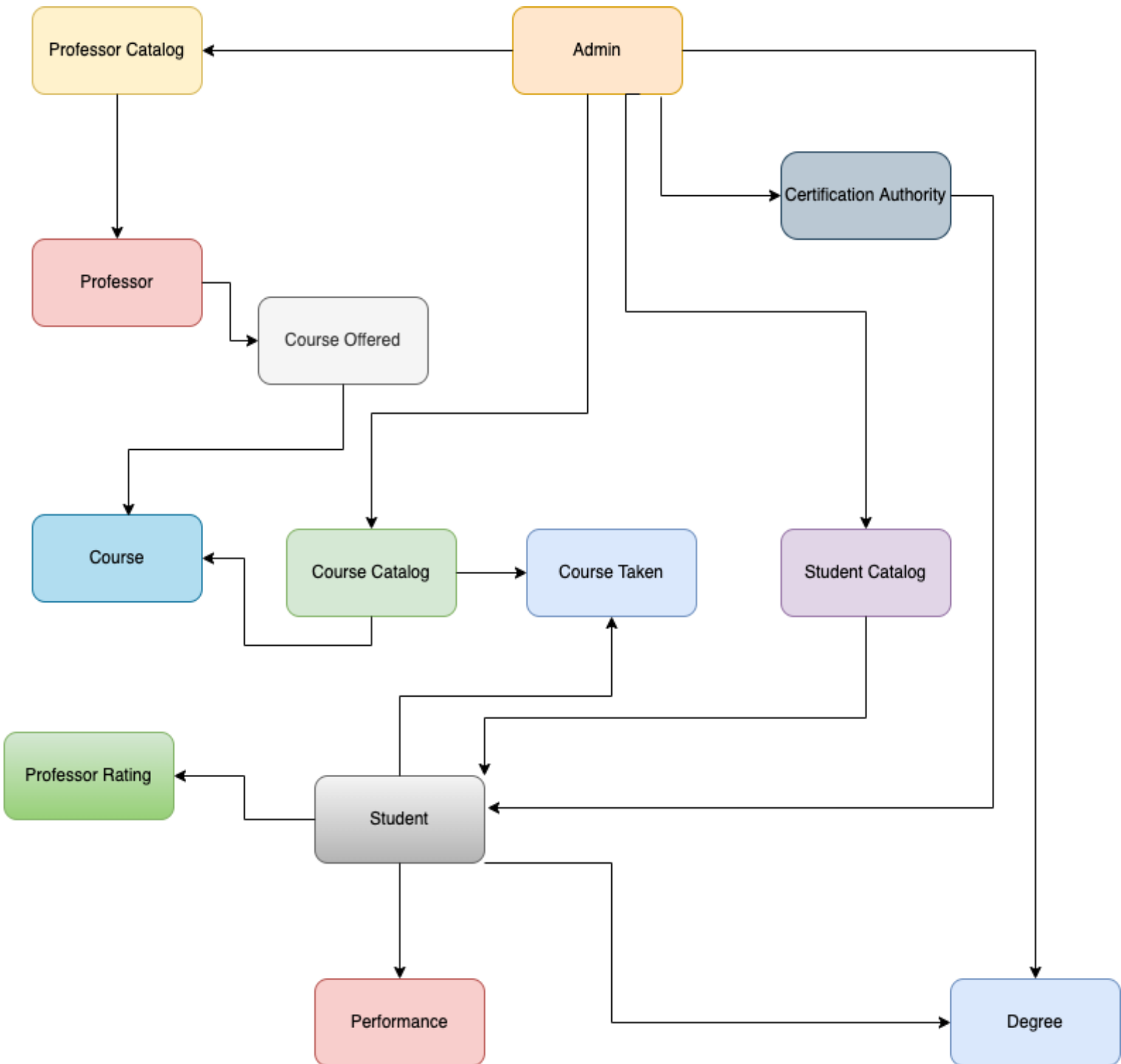
5. Sequence Diagram for Certification Authority:

Certifying authorities can login to digital platform through the dashboard. They can view students' performance and can approve or reject their degrees based on the degree requirements.

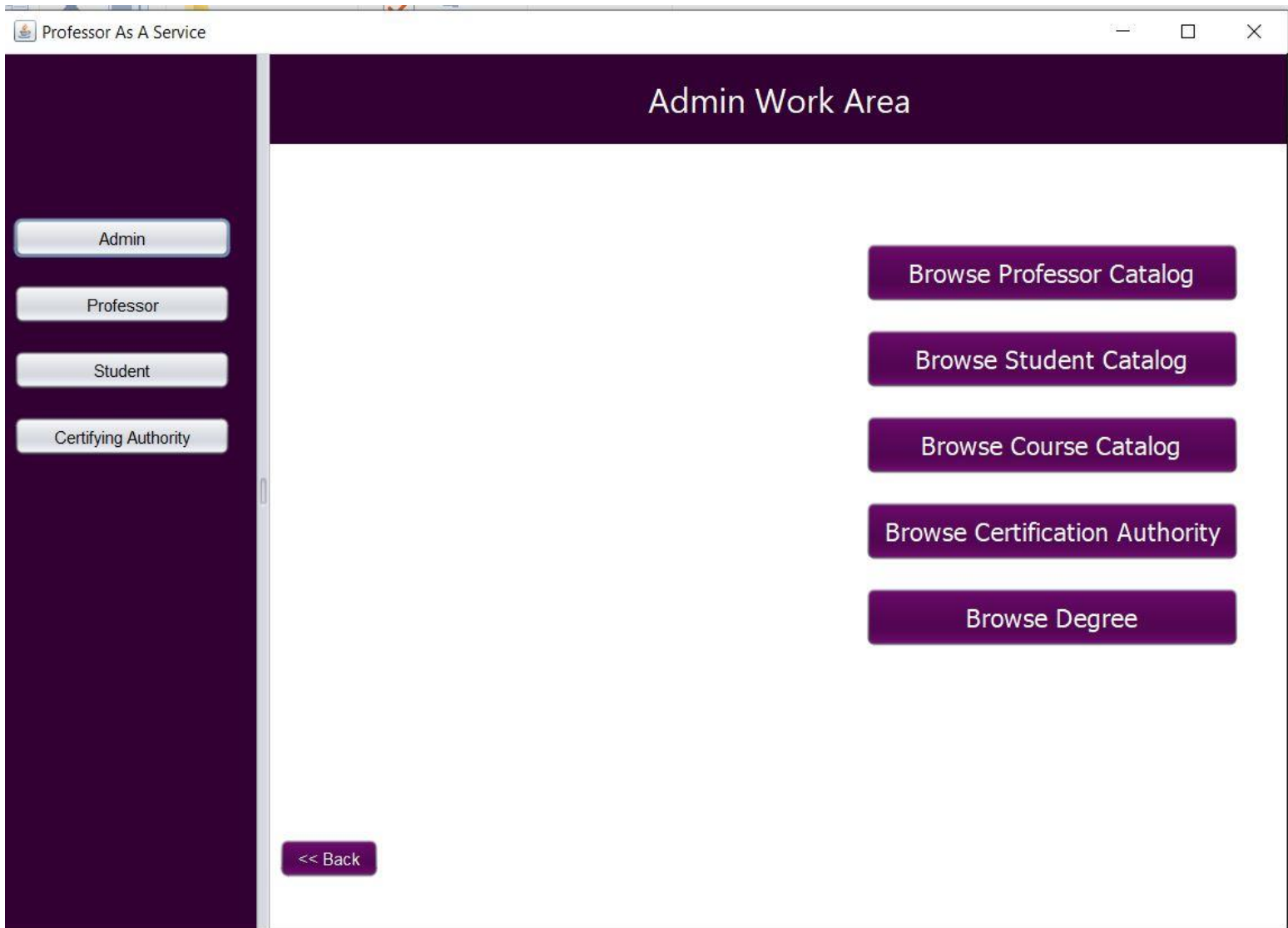
Sequence Diagram for Certifying Authority



Object Model Diagram:



Admin Dashboard:



Professor Catalog:

Professor As A Service



Professor Catalog

Professor Details :

Professor Id	Professor Name	Professor Email
357473	Khaled Bugrara	kal.bug@northeastern.edu
357474	Emad Aboelela	e.aboelela@northeastern.edu
357475	Gregory D. Abowd	dean@coe.northeastern.edu
357476	Ali Abur	abur@ece.neu.edu
357477	Brain Albrecht	b.albrecht@northeastern.edu
357478	Christopher Amato	c.amato@northeastern.edu

View Professor

Update Professor

Delete Professor

<< Back

Admin

Professor

Student

Certifying Authority

Professor Details:

Professor As A Service

Professor Details

Admin

Professor

Student

Certifying Authority

Professor Id :

357473

First Name :

Khaled

Last Name:

Bugrara

Email:

kal.bug@northeastern.edu

Reputation Index:

5

Subscription Paid:

Yes

Courses Offered :

Course Id	Price	Duration	Credits	Time
AE534	\$500	4 month	4	4 hours
TS865	\$250	4 month	4	4 hours

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Student Catalog:

Professor As A Service



Student Catalog

Student Details :

Id	Name	Email
2192290	Vishesh Rawat	rawat.v@northeastern.edu
2191782	Sai Swarna Raghuraman	saiswarna.r@northeastern.edu
1099996	Deep Anand Vaidya	vaidya.de@northeastern.edu
2194664	Noordeep Gill	gill.no@northeastern.edu
2122149	Sethu Surya Teja	pagolu.s@northeastern.edu
2921511	Vivek Mannava	mannava.v@northeastern.edu
2929388	Sumeet Sunil Deshpande	deshpande.su@northeastern....
2928176	Yash Firke	firke.y@northeastern.edu

View Student

Update Student

Delete Student

<< Back

View Student:

Professor As A Service



Student Details

Student id : 2192290

Student Performance :

First Name : Vishwesh

Overall GPA : 3.72

Last Name : Rawat

Credits Completed : 32

Email : rawat.v@northeastern.edu

Degree Name : Masters in Data Analytics

Degree Approved By

Boston Certification Author...

Degree Earned : Yes

Course Taken :

Professor ID	Professor Name	Course ID	Fee Paid	Grades
357473	Khaled Bugrara	AE534	Yes	A
357474	Emad Aboelela	DM255	Yes	A+

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Course Catalog:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Course Catalog

Course Details :

Course Id	Course Name
BD432	Big Data Analytics
AE534	Application Engineering and Dev...
AC756	Accounting
PDA476	Predictive Data Analytics
TS865	Technology Strategy
DM255	Database Management
WD654	Weg Designing

Course ID:

Update Course

Delete Course

Course Name:

Add Course

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Degree Details:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Degree

Degree Details :

Degree Name	Degree Requirement
Masters in Information Systems	32 Credits, GPA: 3.50, Course duration 18month
Masters in Engineering Management	32 Credits, GPA: 2.40, Course duration 18month
Masters in Business Analytics	32 Credits, GPA: 2.75, Course duration 18month
Masters in Technology Management	32 Credits, GPA: 3.20, Course duration 18month
Masters in Data Analytics	32 Credits, GPA: 3.00, Course duration 18month

Degree Name :

Update Degree

Delete Degree

Degree Requirement :

Add Degree

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Certification Authorities:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Certification Authority

Certifying Authority Details :

Authority Name
Boston Certification Authority
Illinois Certification Authority
Texas Certification Authority
North Dakota Certification Auth...
Washington Certification Autho...

Update Authority

Delete Authority

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Professor's Screen:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Professor Details

ID : 002925

Name : Khaled Bugarara

Reputation Index : 5

Email : kal.bug@northeastern.edu

Subscription Paid : Yes

Pay Subscription Fee

Courses Offered :

Course Id	Price	Duration	Credits	Time
AE534	\$500	4 month	4	4 hours
TS865	\$250	4 month	4	4 hours

Add Course

Update Course

Delete Course

Enrolled Student

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Professor's Screen to Add Course:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Add Course Details

All Available Courses :

Course Id	Course Name
BD432	Big Data Analytics
AE534	Application Engineering and Dev...
AC756	Accounting
PDA476	Predictive Data Analytics
TS865	Technology Strategy
DM255	Database Management
WD654	Weg Designing

Course ID:

Course Name:

Price :

Duration :

Credits :

Time :

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Add Course

Professor's Screen to View Student's details:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Enrolled Students Details

Course Id : 5600

Course Name : Application Engineering and Development

Enrolled Student List :

Student Id	Student Name	Student Email	Fees Paid	Grades
2192290	Vishwesh Rawat	rawat.v@northeastern.e	Yes	A
2191782	Sai Swarna	saiswarnar@northeastern.edu	Yes	B
2964461	Aishwarya Wagdarkar	wagdarker.a@northeastern.edu	No	-

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Student's Screen:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Student Details

ID : 002192290

Degree Requirement : 32 Credits

Name : Vishwesh Rawat

Total Credits Completed : 32 Credits

Degree Name : MS in Data Analytics

Degree Earned : Yes

Email : rawat.v@northeastern.edu

Current GPA : 3.72

Courses Taken :

Course Id	Course Name	Professor Id	Professor Name	Fees Paid	Grades
AE534	Application Engine...	357473	Khaled Bugarara	Yes	A
DM255	Database Manage...	357474	Emad Aboelela	Yes	A+

Register for a Course

Request for Degree Approval

Pay Course Fee

Give Feedback

View Degree List

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Student's Screen for Course Registration:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Course Registration

Search Course By : All

Courses List :

Course Id	Course Name	Professor Id	Professor Name	Reputation Index	Credits
BD432	Big Data Analytics	357474	Emad Aboelela	4	4
AE534	Application Engin...	357473	Khaled Bugrara	5	4
AC756	Accounting	357475	Gregory D. Abowd	4	4
PDA476	Predictive Data A...	357478	Christopher Amato	5	4
TS865	Technology Strat...	357473	Khaled Bugrara	5	4
DM255	Database Manag...	357474	Emad Aboelela	4	4
DM255	Database Manag...	357476	Ali Abur	3	4
WD654	Weg Designing	357477	Brain Alerecht	5	4

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Student's Screen to View Degree:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Degree

Degree Details :

Degree Name	Degree Requirement
Masters in Information Systems	32 Credits, GPA: 3.50, Course duration 18mo...
Masters in Engineering Management	32 Credits, GPA: 2.40, Course duration 18mo...
Masters in Business Analytics	32 Credits, GPA: 2.75, Course duration 18mo...
Masters in Technology Management	32 Credits, GPA: 3.20, Course duration 18mo...
Masters in Data Analytics	32 Credits, GPA: 3.00, Course duration 18mo...

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Student's Screen for Degree Recognition Request:

Professor As A Service

Request For Degree Approval from Certifying Authority

Admin

Professor

Student

Certifying Authority

Certifying Authority :

Authority Name
Boston Certification Authority
Illinois Certification Authority
Texas Certification Authority
North Dakota Certification Auth...
Washington Certification Autho...

Request

Degree Approved By :

Authority Name
Boston Certification Authority

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Certifying Authority Screen:

Professor As A Service

Admin

Professor

Student

Certifying Authority

Certifying Authority Details

Name : Texas Certification Authority

Requested Student List :

Student Id	Degree	Degree Requirement	Students total credits	Students GPA
2192290	Masters in Data Analytics	32 Credits, GPA: 3.00, Course duration 18mont..	32	3.72
2191782	Masters in Information Systems	32 Credits, GPA: 3.50, Course duration 18mont..	32	3.50
2194664	Masters in Engineering Manage...	32 Credits, GPA: 2.40, Course duration 18mont..	32	3.00
2122149	Masters in Data Analytics	32 Credits, GPA: 3.00, Course duration 18mont..	32	3.00
2921511	Masters in Information Systems	32 Credits, GPA: 3.50, Course duration 18mont..	32	2.90

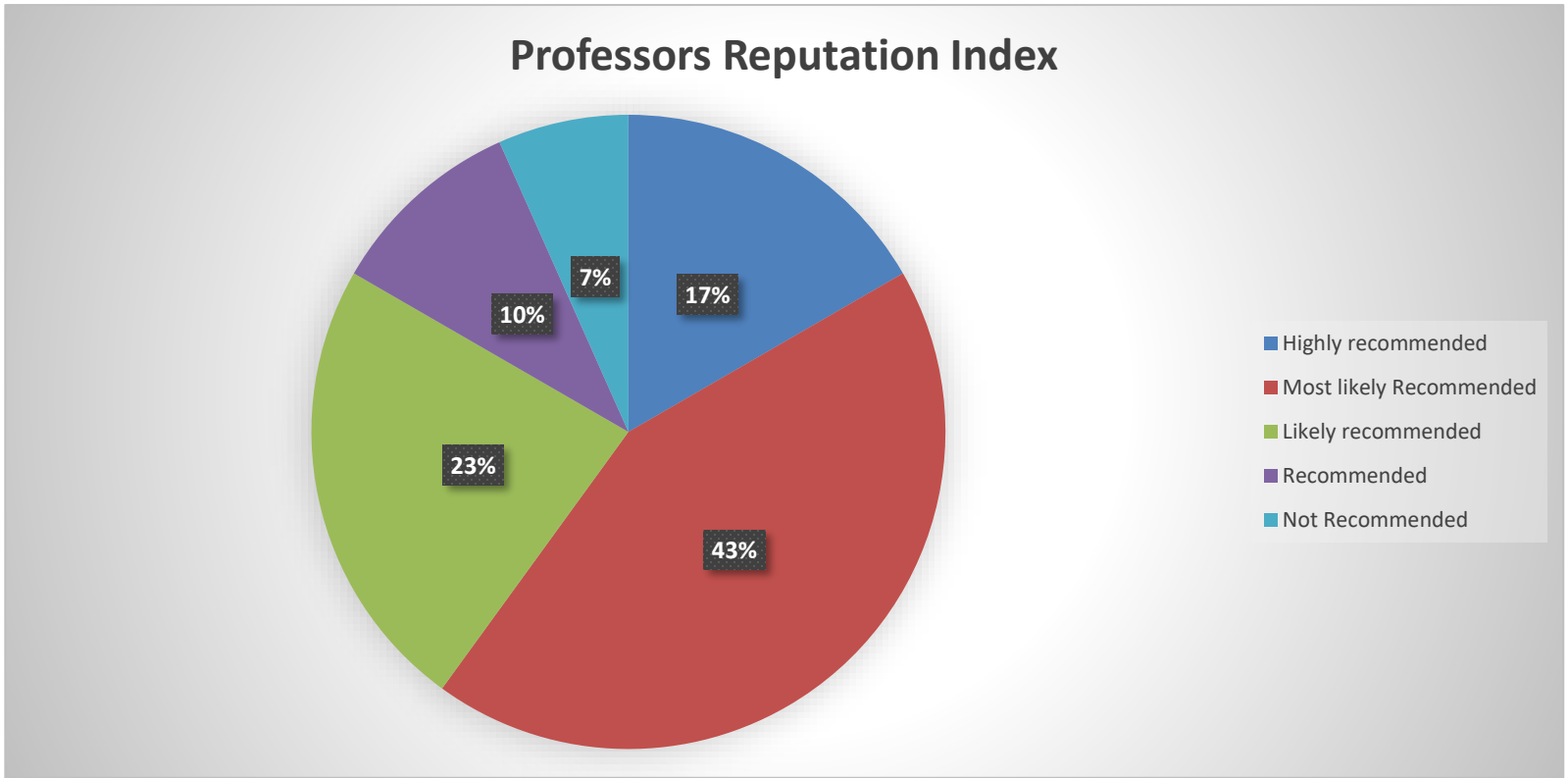
Approve

Reject

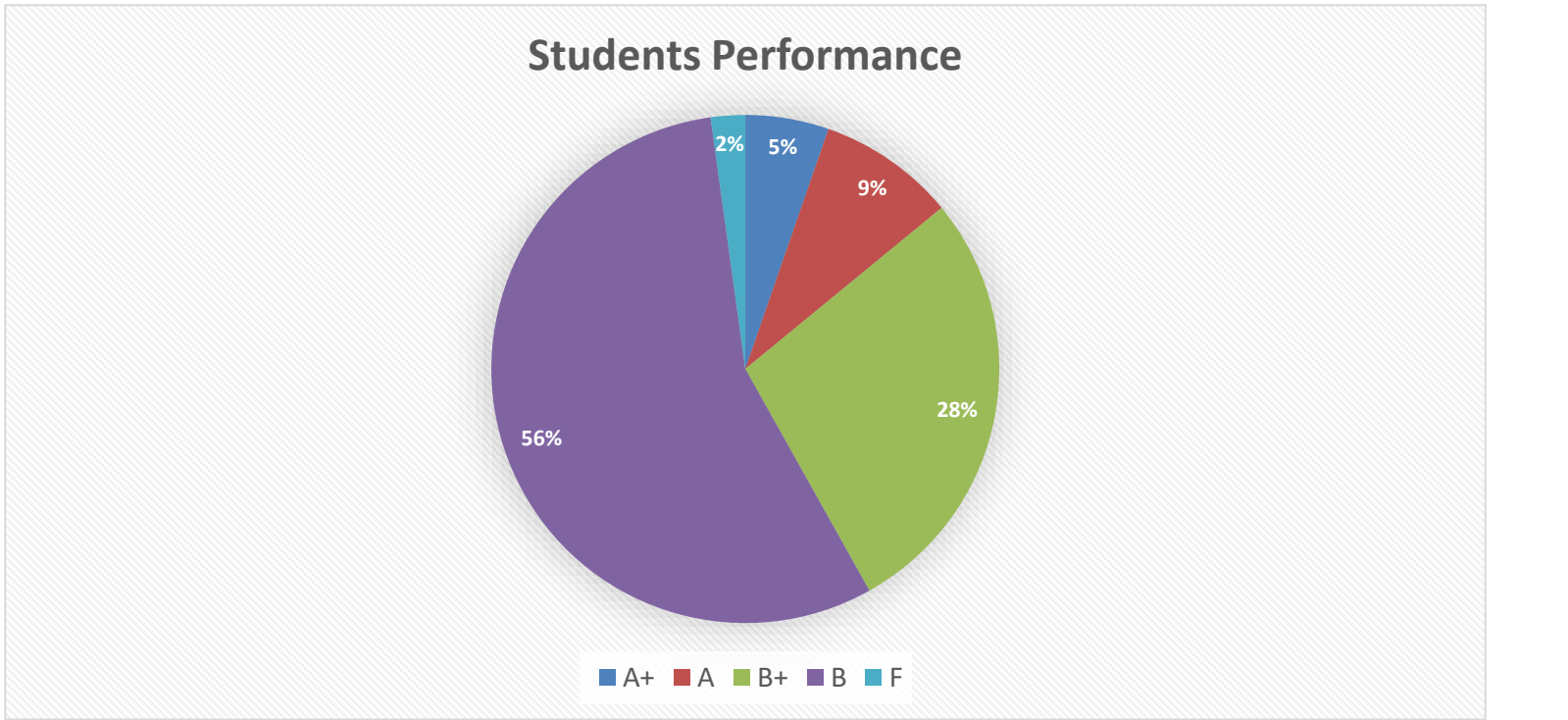
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Administrator has access to view statistics in the form of graphs on a single button press.

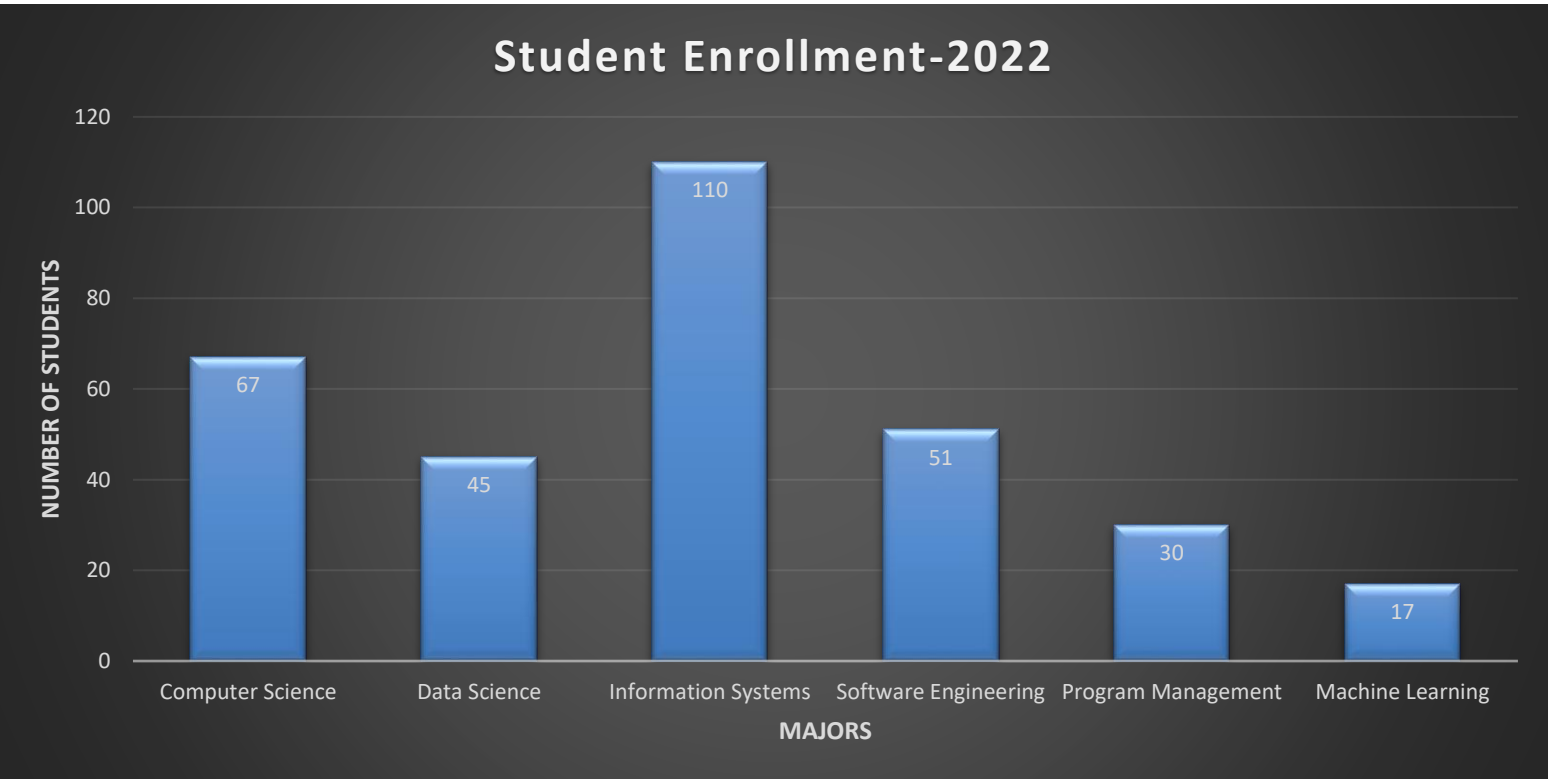
1. Statistics for Professors' Reputation Index:



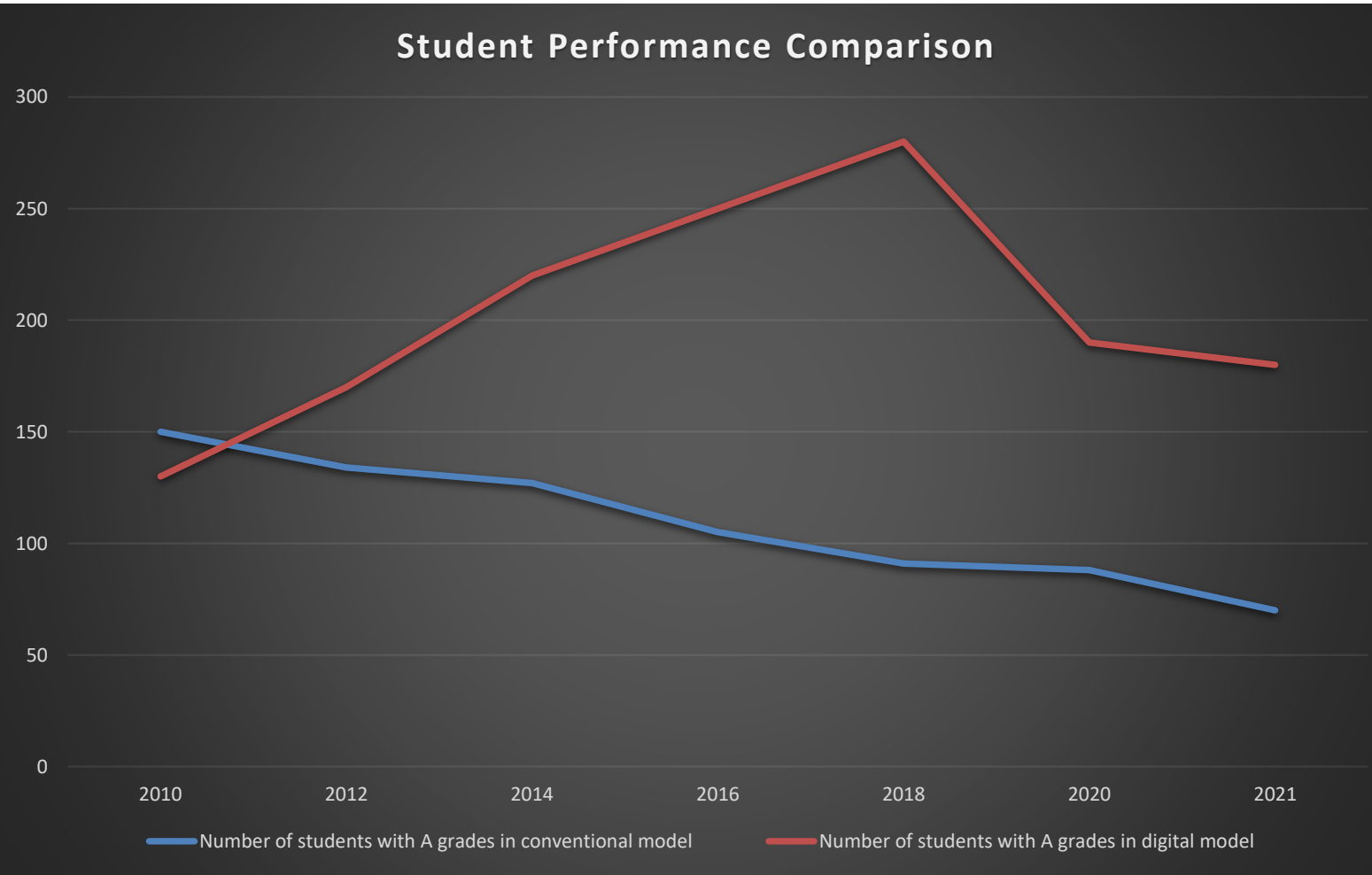
2. Percentage of students with different grades in a given year:



3. Number of Students enrolled in various degree program:



4. Year wise comparison of students in conventional education model v/s digital learning:



Assessment of Digital Educational Platforms for Future and Less Fortune:

The reasons why online learning is advantageous:

- **Flexibility:**

Digital platform enables professors and students to set their own learning pace, since this model is designed in a way where students and professors can login anytime from any part of the world.

- **Wide selection:**

There may be a course that is offered by more than one professor and student has the choice to study from any of those teachers. Students also gets infinite skills and subjects to learn.

- **Cost-Effective:**

Since there is no infrastructure required for digital learnings, the cost goes down. Moreover, cost to commute, cost of study material etc is also not included.

- **Wider Reach:**

More students can access this platform as compared to conventional educational institutions because there is no such limitation on the number of seats available. Additionally, students from across the globe can login without relocating and thus promotes inclusion of diverse people.

- **Reduced carbon footprint:**

Requires 90% less energy and produces 85% fewer CO₂ emissions, hence environment friendly approach.

- **Convenient and healthy in pandemic situation:**

During situations like the ongoing covid pandemic it is recommended that students and professors opt for online education methods.