Report on University Model

Submitted By

- *Aamrah Aamrah (002109107)*
- *Ajay Arumugam (002197780)*
- *Fian Rodrigues (001091872)*

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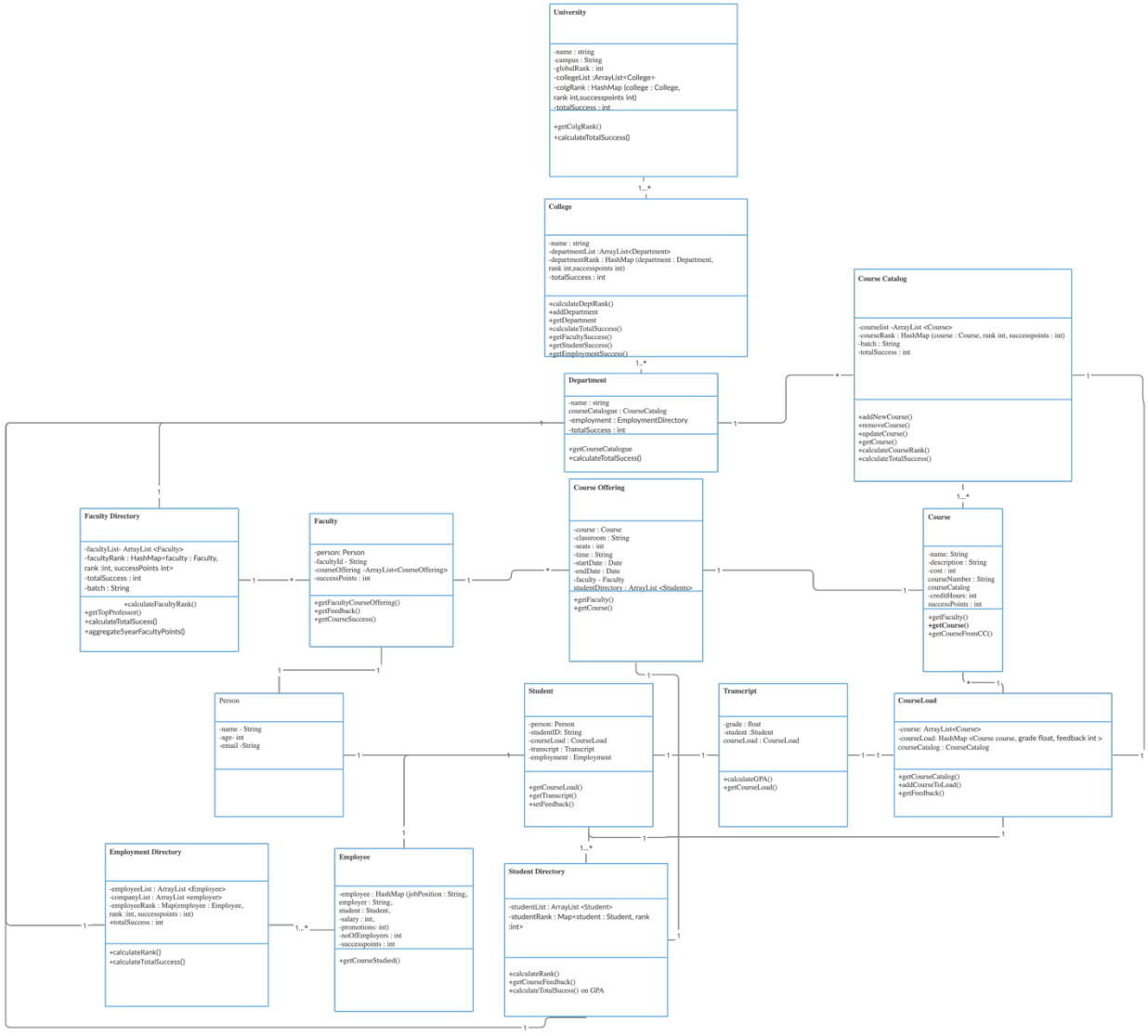
1. Objective

The main objective of this assignment is to create a university model which helps improve the quality of life through education. We will be able to achieve this by gathering information in the form of continuous feedback from the students & professors and by creating a performance management system. We will be using the following criteria to determine the solution.

a. By tracking connection of courses and their relevance to graduate growth.
b. By understanding how faculty and courses contribute to the growth of their graduates over 5 years.
c. By tracking the jobs and promotions graduates get over time and assigning rankings accordingly.
d. By designing a dashboard that enables college and university administrators to compare the performance of their academic units.
e. By defining a ranking system for students to decide where they want to go for their studies.

2. Solution

2.1. Class Diagram



2.2. Classes:

2.2.1. University

This class will represent the university as a whole. It holds a name, campus, total success and its global ranking. This class will have methods to retrieve the rank of the colleges it holds and to calculate total success of the university.
Examples of universities are: Northeastern University, Boston, University of California, Los Angeles etc.

2.2.2. College

This class will represent the colleges under the university. It holds a name, list of departments, hash map of department, rank and success-points, and total success. This class will have methods to calculate Department Rank, calculate total success, to get a department and add departments in the department list.
Examples of colleges are College of Engineering, Khoury College etc.

2.2.3. Department

This class represents the departments in a college. It holds a name, a course catalog, a directory of employment and total success.
It has a method to get course catalog and to calculate the total success of the department.
Examples of departments are Information Systems, Software Engineering etc.

2.2.4. Course Catalog

This class represents the course catalog of the department. It holds a list of courses, batch, hash map of course, rank and success-points and total success.
It has a method to get, add, remove and update a course and to calculate the course rank and total success.
Examples of course catalog are Fall 2021, Spring 2021 etc.

2.2.5. Course

This class represents the course a course catalog contains. It holds the name, description, cost, course number, course catalog, credit hours, success points of the course. It has methods to get faculty, get course and get course from course catalogue
Examples of courses are Application Engineering and Development, Web Development, Object Oriented Design, COOP etc.

2.2.6. Course Offering

This class represents the details of the course being offered. It holds the course name, classroom, seats, time, start date, end date, faculty of the course and the student directory. It has methods to get faculty and to get the course name.

Example:

Course: Application Engineering and Development
Building: West Village 103
Seats: 250 seats
Time: 1:30pm
Start date: 8th September
End date: 18th December
Faculty: Khaled Bugrara

2.2.7. Course Load

This class represents the courses taken by a student. It holds a course catalog, list of courses and a hash-map which contains course, grade and feedback of the course. It has methods to get Course Catalog and to add a course to the course load.
Example for a Course load : Web Development and Application Engineering and Development.

2.2.8. Transcript

This class represents the transcript of a student. It holds a student, course load and his/her grade. It has methods to calculate GPA and to get the Course Load.
For example: Ajay got grade 4.0.

2.2.9. Student

This class represents a student's profile. It holds a person, student id, course load, transcript, and employment. It has methods to get Course load, get Transcript and to set feedback.
For example: NUQ 0021091078.

2.2.10. Student Directory

This class represents a student profile of a person. It holds a list of students and student rank. It has methods to calculate the rank of students, to get course feedback from the students and to calculate the total success based on GPA.

For example:

Student 1: NUQ 0021091074
Rank: 1
Student 2: NUQ 0021091072
Rank: 2
Student 3: NUQ 0021091071
Rank: 3

2.2.11. Person

This class represents a person. It holds a person's name, age and their emailID.
For example: Aamrah, Ajay, Fian etc.

2.2.12. Employee

This class represents a student's job. It holds a job position, employer, student, salary, promotions and number of employers. It has a method to get the courses studied by the student. For example: Software Engineer at Microsoft.

2.2.13. Faculty

This class represents a faculty. It holds a Person, an ID, list of course offerings by the faculty and his/her success points. It has a method to get the faculty's course offering and their feedback.
For example: Khaled Bugrara, Daniel Peters, Amuthan Arulraj etc.

2.2.14. Faculty directory

This class represents a faculty profile of a person. It holds a list of faculties and the faculty rank. It has methods to calculate the rank of faculties, to get the top faculty, to calculate total success based on course and to aggregate 5-year faculty points.
For Example:

Faculty 1: NUQ 0021091074
Rank: 1
Faculty 2: NUQ 0021091072
Rank: 2
Faculty 3: NUQ 0021091071 Rank: 3

2.2.15. Employment Directory

This class represents a directory of employment. It holds a list of employees, list of companies and a map of employee and their rank. It has methods to calculate a student's success, faculty's success, and course's success.

3. Evaluation of performance

To evaluate the performance of an entity in the university model, we have defined a parameter called Success-Points. For each class, we have certain Students who will provide their feedback for courses and faculties, and we can derive success in some cases based on employment and student GPA. We will define the evaluation criteria in detail below.

Course Feedback: 1 to 10
To evaluate student success, we need aggregate success points derived from employment and GPA of the student.

3.1. Employment success

Employment success = (Student promotions + number of Employers + Wage)/3

3.1.1. Metrics

3.1.1.1. Success based on Promotions

Promotions	Success Points
0	1
1	3
2	5

3.1.1.2. Success based on Number of Employers

Number of Employers	Success Points
1	1
2	3
3	5

3.1.1.3 Success based on Wage

Wages	Success Points
10K - 20K	1
20K-25K	2
25K-50K	3
50K-100K	4
100K-150K	5

3.1.2. Pseudo Code

3.1.2.2. Number of Promotions-

If(promotions == 0)

SuccessPoints += 1

Else If(promotions == 1)

SuccessPoints += 3

Else If(promotions == 2)

SuccessPoints += 5

3.1.2.2. Number of Employers-

If(noOfEmployers == 1)

SuccessPoints += 1

Else If(noOfEmployers == 2)

SuccessPoints += 3

Else If(noOfEmployers == 3)

SuccessPoints += 5

3.1.2.3. Wage-

If (wage > 100K && wage <= 150k)

SuccessPoints += 5

Else If (wage > 50K && wage <= 100k)

SuccessPoints+= 4

Else If(wage > 25K && wage <= 50k)

SuccessPoints += 3

Else If(wage > 20K && wage <= 25k)

SuccessPoints += 2

Else If(wage > 10K && wage <= 20k)

SuccessPoints += 1

3.2. Student Success

Student success = (Employment success + GPA success) / 2

3.2.2. Metrics

3.2.2.1. Success based on GPA

Grade	Grade Point Average	Success Points
A+	**3.5-4.0**	**5**
A	**3.0-3.5**	**4**
B+	**2.5-3.0**	**3**
B	**2.0-2.5**	**2**
C	**1.0-2.0**	**1**
F	**0.0-1.0**	**0**

3.2.2. Pseudo Code

If(gpa >=3.5 && gpa<=4.0)
Successpoints+=5

Else If(gpa >=3.0 && gpa<=3.5)
Successpoints+=4

Else If(gpa >=2.5 && gpa<=3.0)
Successpoints+=3

Else If(gpa >=2.0 && gpa<=2.5)
Successpoints+=2

Else If(gpa >=1.0 && gpa<=2.0)
Successpoints+=1

Else If(gpa >=0 && gpa<=1.0)
Successpoints+=0

3.3. Course success:

Course success = Student feedback

3.3.1. Metrics

3.3.1.1 Feedback Criteria

The following criteria define success points for both Student and Course feedback.

Feedback	Rating	Success Points
Poor	1-2	1
Not satisfied	3-4	2
Average	5-6	3
Satisfied	7-8	4
Extremely satisfied	9-10	5

3.3.2. Pseudo Code

If(feedback > 8 && feedback <11)
Successpoints+ = 5

Else If(feedback > 6&& feedback <9)
Successpoints+ = 4

Else If(feedback > 4 && feedback <7)
Successpoints+ = 3

Else If(feedback > 2 && feedback <5)
Successpoints+ = 2

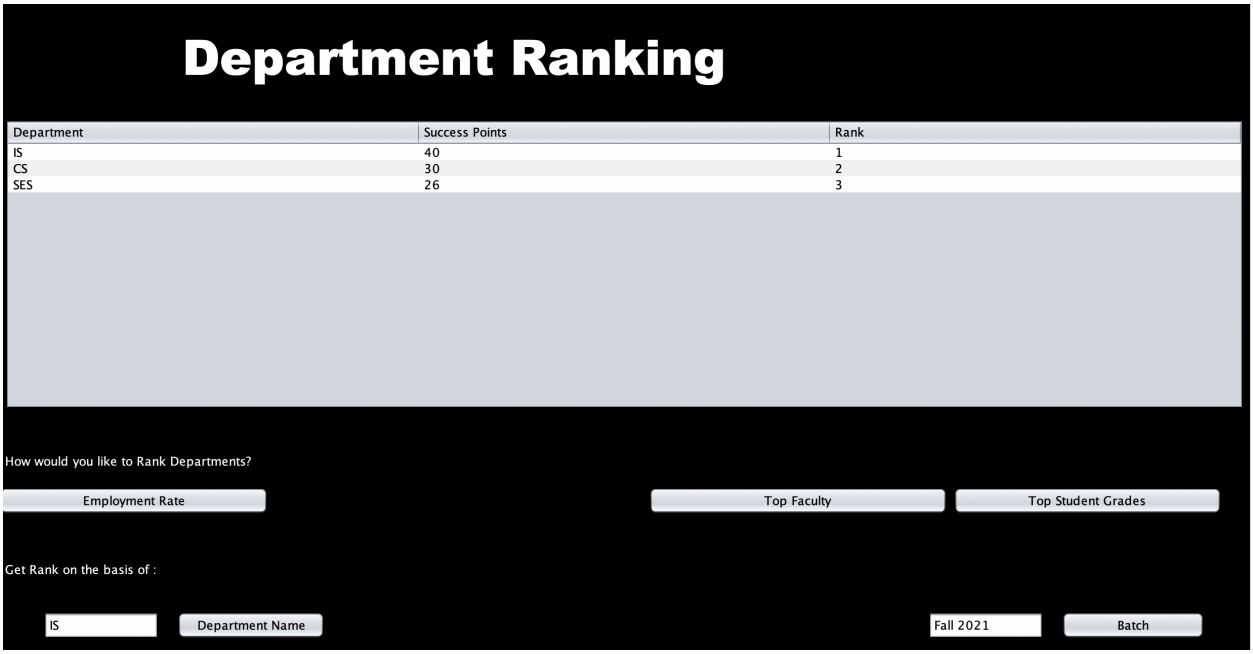
Else If(feedback > 0 && feedback <3)
Successpoints+ = 1

3.4. Faculty success

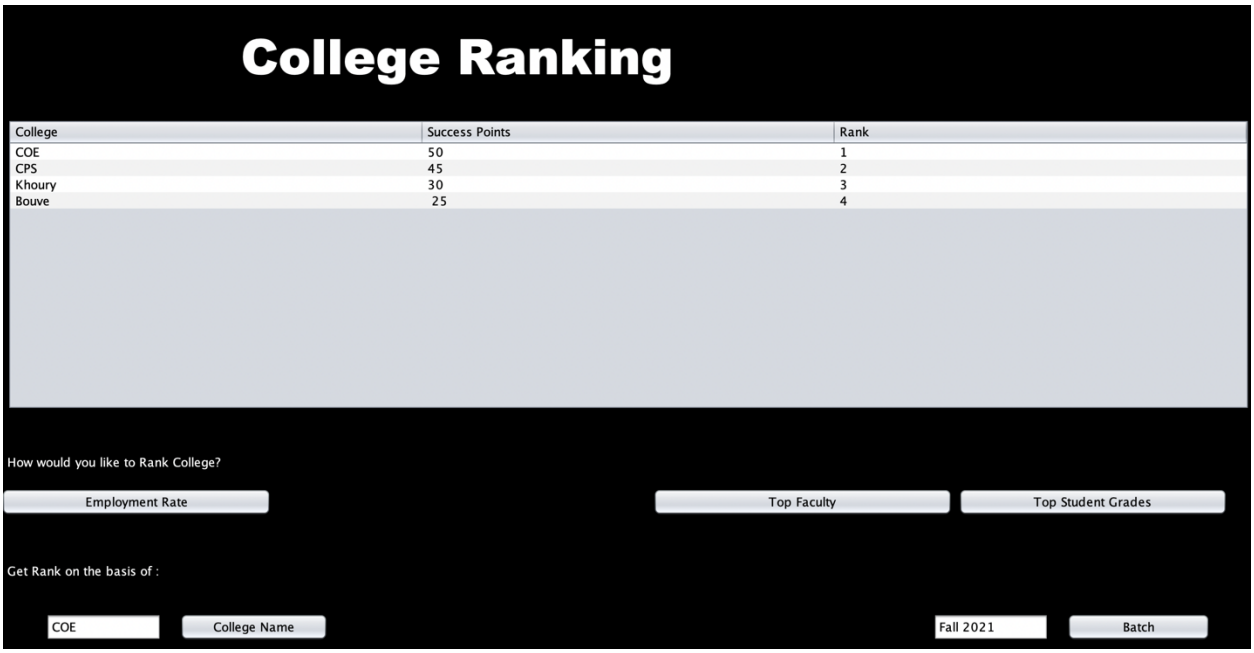
Faculty success = Course feedback + Student feedback

4. Dashboard

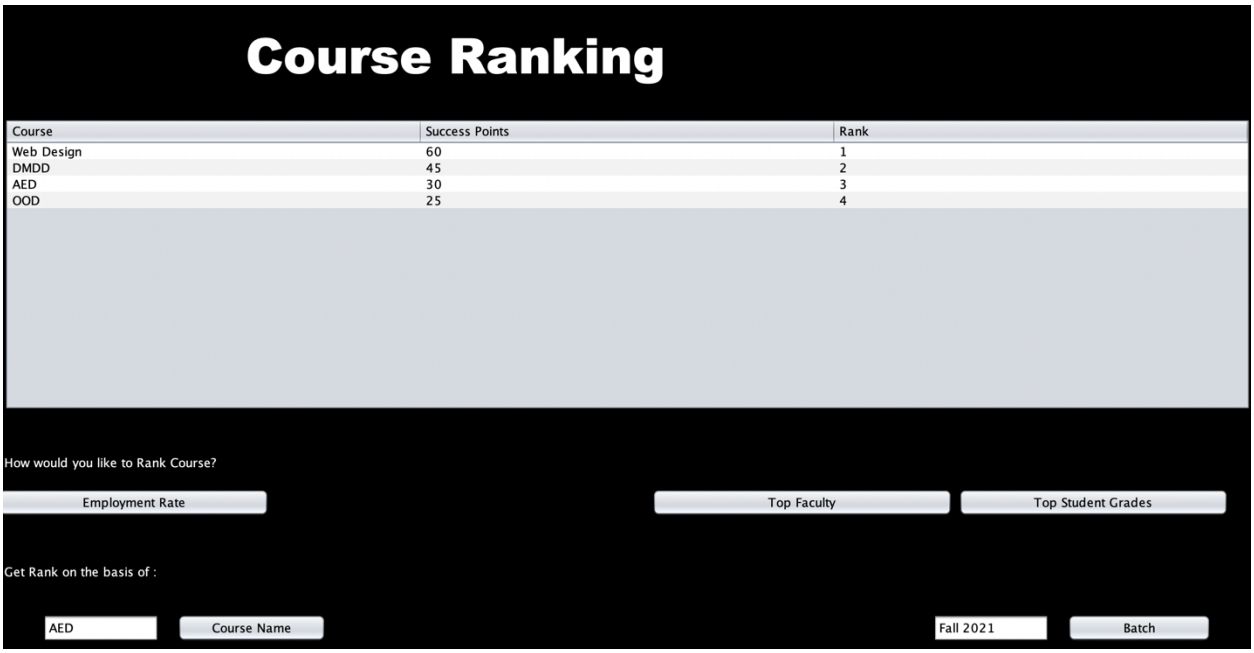
4.1. Department Ranking



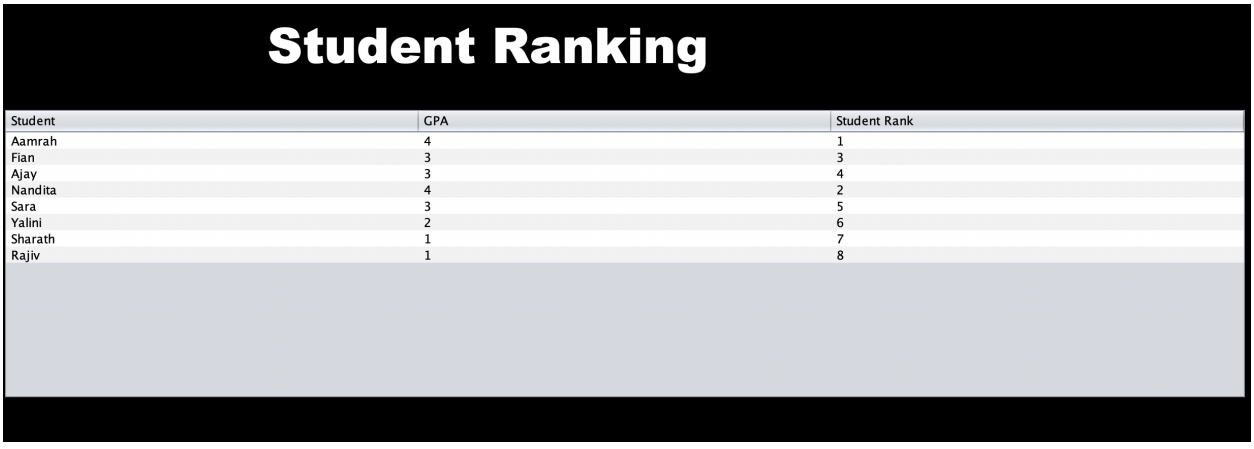
4.2. College Ranking



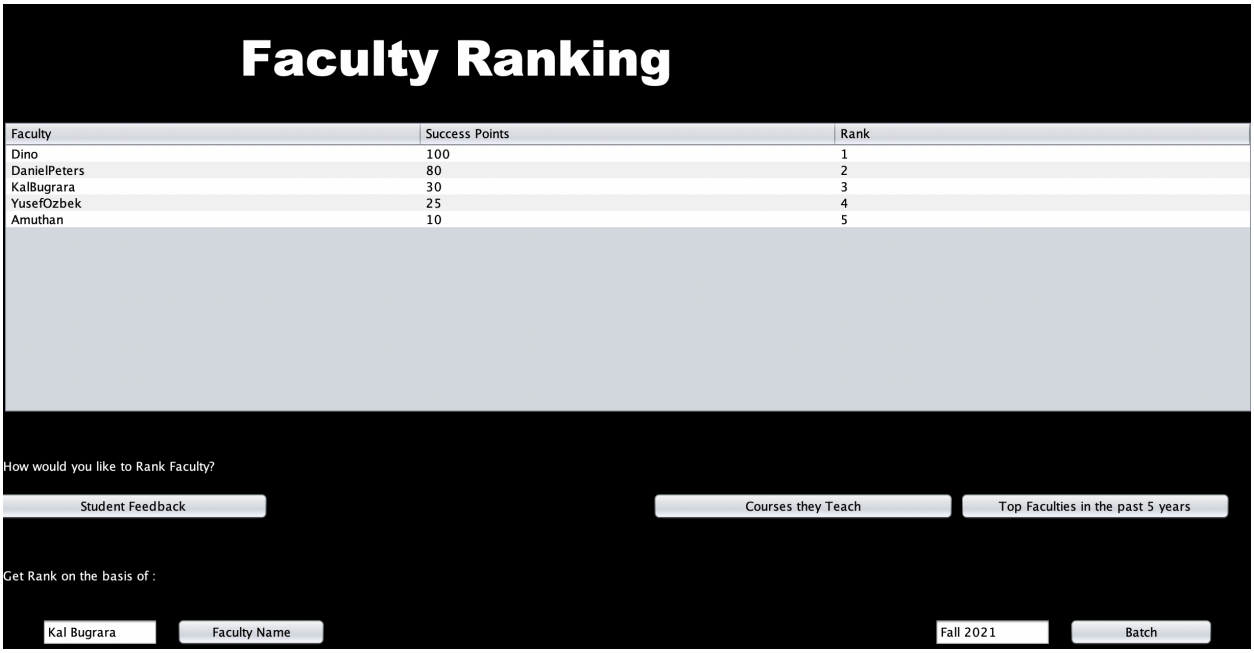
4.3. Course Ranking



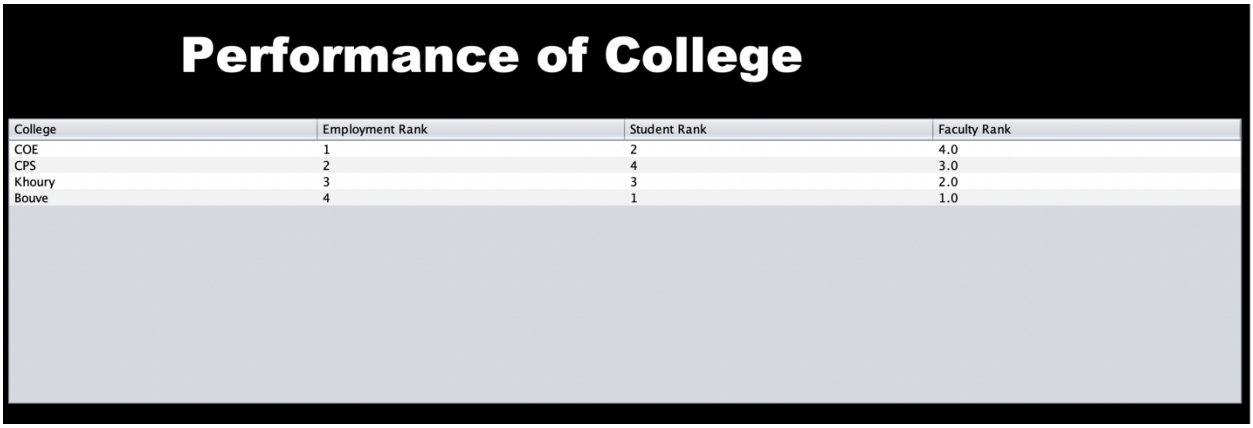
4.4. Student Ranking



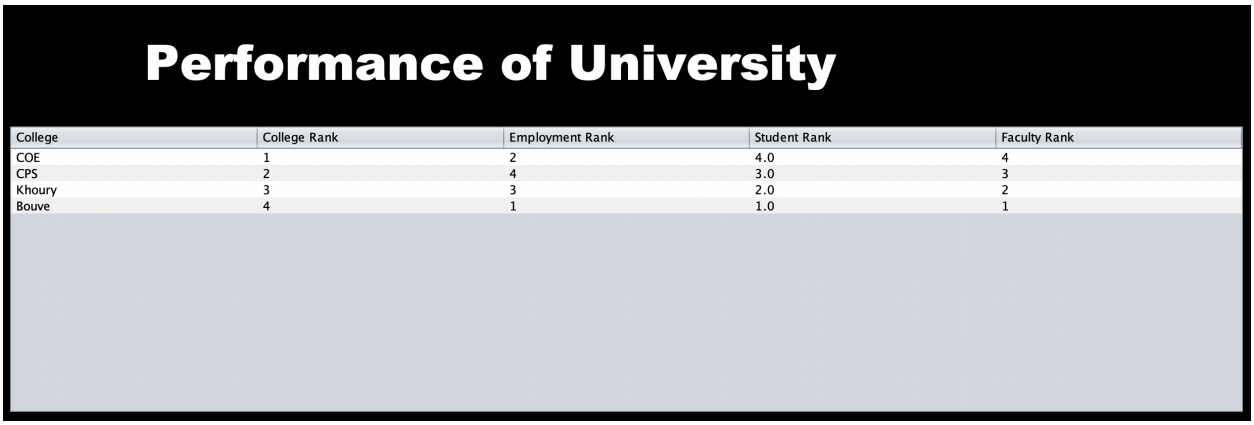
4.5. Faculty Ranking



4.6. Performance of College



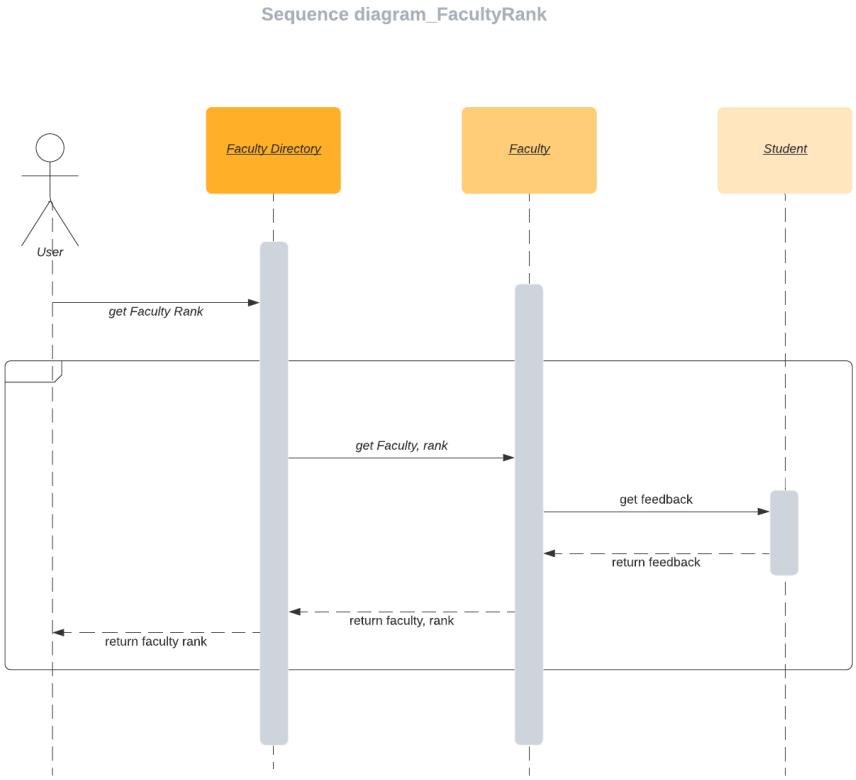
4.7. Performance of University



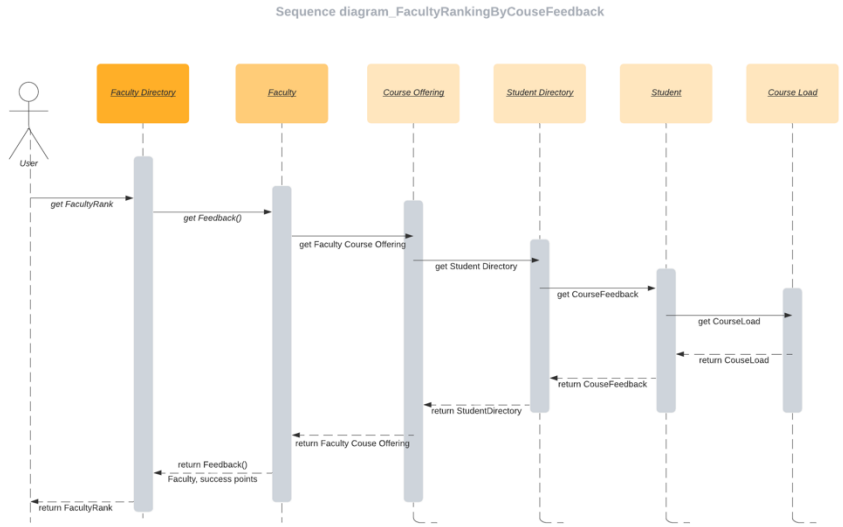
4.8. Courses Studied by Employees

5. Sequence Diagram

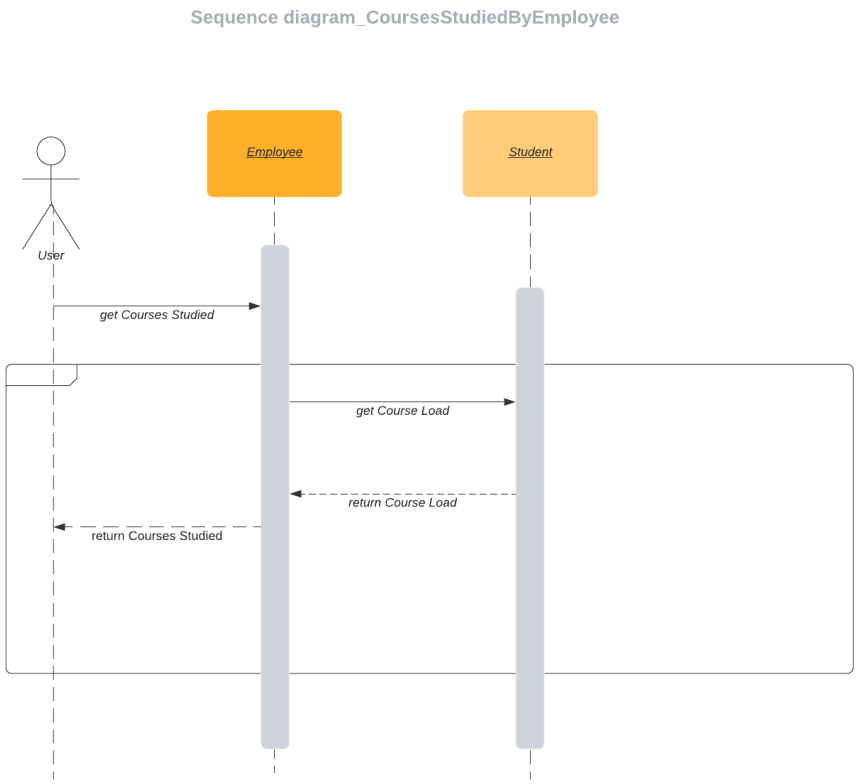
5.1. To get Faculty Ranking based on student feedback:



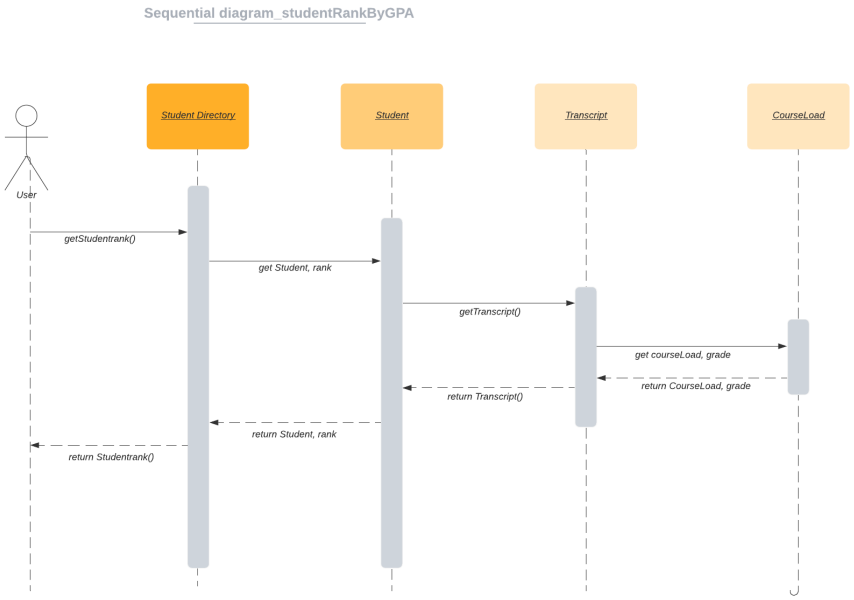
5.2. To get Faculty Ranking on the basis of course feedback:



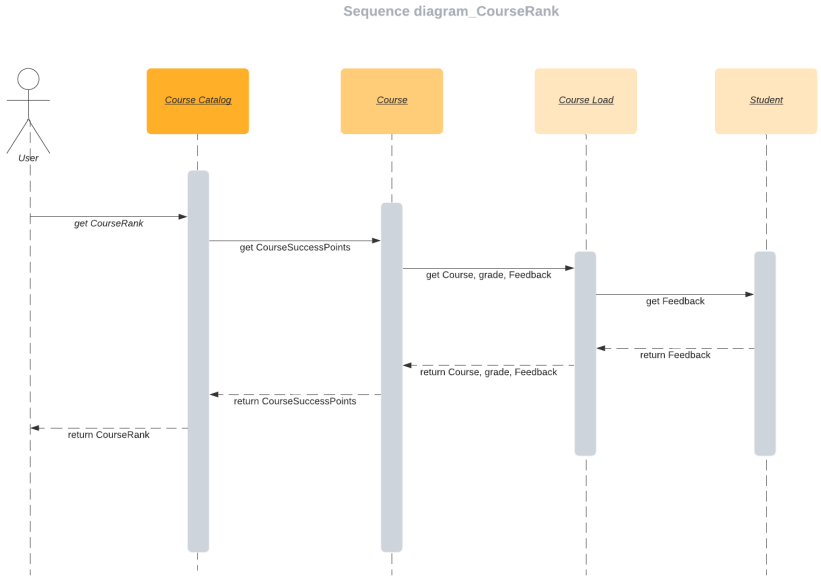
5.3. Get courses studied by Employees working at a particular company.



5.4. To get student ranking by GPA



5.5. To get course rank



5.6. To get total success points for a department.