



## Student Performance Monitoring System Advanced

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**CSE303**  
**Database Management System**  
**FINAL REPORT**  
**Group 03**  
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## Contents

<b>Chapter 1: Introduction.....</b>	<b>3</b>
BACKGROUND OF THE ORGANIZATION.....	4
BACKGROUND OF THE PROJECT .....	4
OBJECTIVE OF THE PROJECT .....	4
SCOPE OF THE PROJECT .....	5
<b>Chapter 2: Requirement Analysis.....</b>	<b>5</b>
RICH-PICTURE (AS-IS) .....	5
SIX ELEMENTS ANALYSIS (AS-IS) .....	7
PROCESS DIAGRAM (AS-IS) .....	11
PROBLEM ANALYSIS .....	13
RICH PICTURE (TO-BE).....	22
SIX ELEMENTS ANALYSIS (AS-IS & TO-BE).....	23
PROCESS DIAGRAM (TO-BE).....	29
<b>Chapter 3: Logical System Design.....</b>	<b>32</b>
BUSINESS RULE .....	32
ERD.....	32
ENTITY RELATIONSHIP DIAGRAM TO RELATIONSHIP SCHEMA .....	33
NORMALIZATION .....	34
DATA DICTIONARY .....	40
<b>Chapter 4: PHYSical System Design.....</b>	<b>51</b>
INPUT FORMS.....	51
OUTPUT FORMS.....	53
<b>Chapter 5: CONCLUSION .....</b>	<b>71</b>
PROBLEM AND SOLUTION .....	71
ADDITIONAL FEATURES AND FUTURE DEVELOPMENT.....	72
REFERENCE AND APPENDIX .....	73

# **CHAPTER 1: INTRODUCTION**

## **BACKGROUND OF THE ORGANIZATION**

Independent University, Bangladesh (IUB) established in 1993 is the leading private university in Bangladesh with an explicit focus on Research and Global partnerships. IUB's mission is to achieve the goals of higher education and of sustainable economic growth in the country through a two-way relationship between community and university. Its goals are to produce graduates of international standards within the local environment, with knowledge and relevant skills to provide leadership in enterprise, public service and welfare; encourage and support useful research; create knowledge; and provide further learning opportunities.

IUB currently have six academic schools:

- School of Business
- School of Engineering and Computer Science
- School of Environmental Sciences and Management
- School of Liberal Arts and Social Sciences
- School of Life Sciences
- School of Public Health

IUB is rapidly expanding its portfolio and is in the process of introducing Architecture and Biotechnology. The University curriculum and course of study are progressively revised and adjusted on the basis of their relevance to national needs and the global market demand. [1]

## **BACKGROUND OF THE PROJECT**

The Student Performance Monitoring System focuses on performance monitoring of student's continuous assessments and examination scores in order to predict their final achievement status upon graduation. The main idea is to evaluate the COs achieved and mapped PLOs achieved by each student in each of the enrolled courses as that would be necessary for monitoring the student performance. Also, school-wise, department-wise and program-wise student performance trends based on CGPA with respect to a given period of time/semesters.

## **OBJECTIVE OF THE PROJECT**

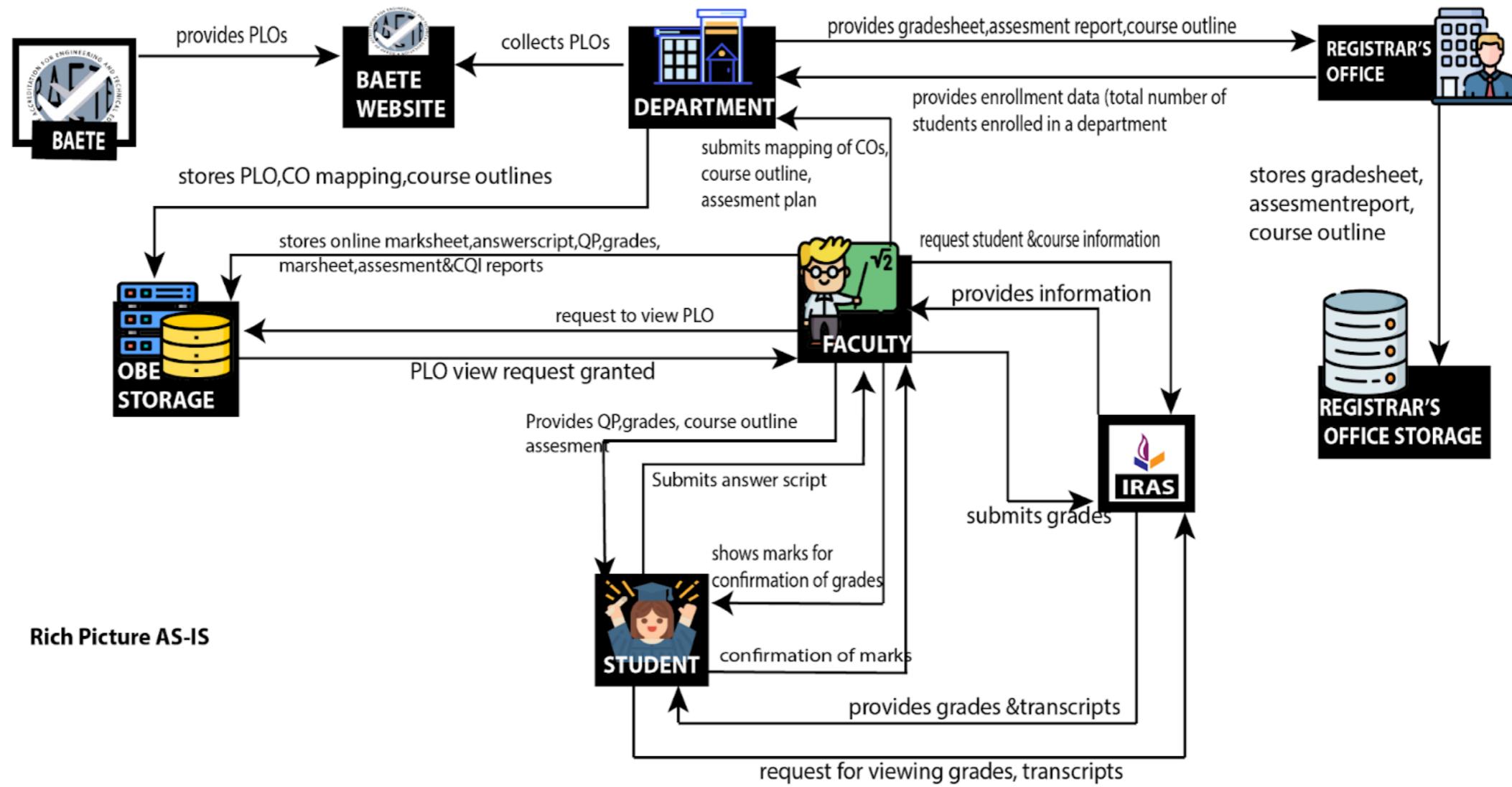
- Objective of this Project is to provide insight about how learning might improve in a given program-whether it be online, in a classroom, or happening in another context.
- To provide insight into what students are actually learning in relation to the big ideas of the courses and the program they aim to complete.
- To automate the process of monitoring student performance so as to reduce the manual processing involved in it.
- To analyse how student populations are learning inside of their programs so that the departments can focus more strategically on equity and success.
- To analyse and visualize graphs and charts of individual achievements of PLOs and COs of each students.
- VC-wise, dean-wise, or head-wise student performance trend based on the GPA of the students under the school/program corresponding to the leadership team.

## **SCOPE OF THE PROJECT**

Scope of the project is as we are changing an existing system, we have to ensure that the proposed system will be more effective than the existing one. The proposed system would include evaluating the COs achieved, mapping the COs with the PLOs achieved and storing them as records, all of these were done manually in the existing system. The records can also be used to generate reports for analysis purpose. The system can be accessed by the instructors, students, Higher Management (VC, Deans, Heads). It is very inefficient to maintain detailed records of student's performance, and therefore there is a need of an improved and automated student performance monitoring system. Primarily we focused on IUB as the organization for which we are doing this project but the project has the potential of being useful to UGC as well, and future prospects seems likely to also cater to all universities that conform to OBE regulations.

## **CHAPTER 2: REQUIREMENT ANALYSIS**

### **RICH-PICTURE (AS-IS)**



## SIX ELEMENTS ANALYSIS (AS-IS)

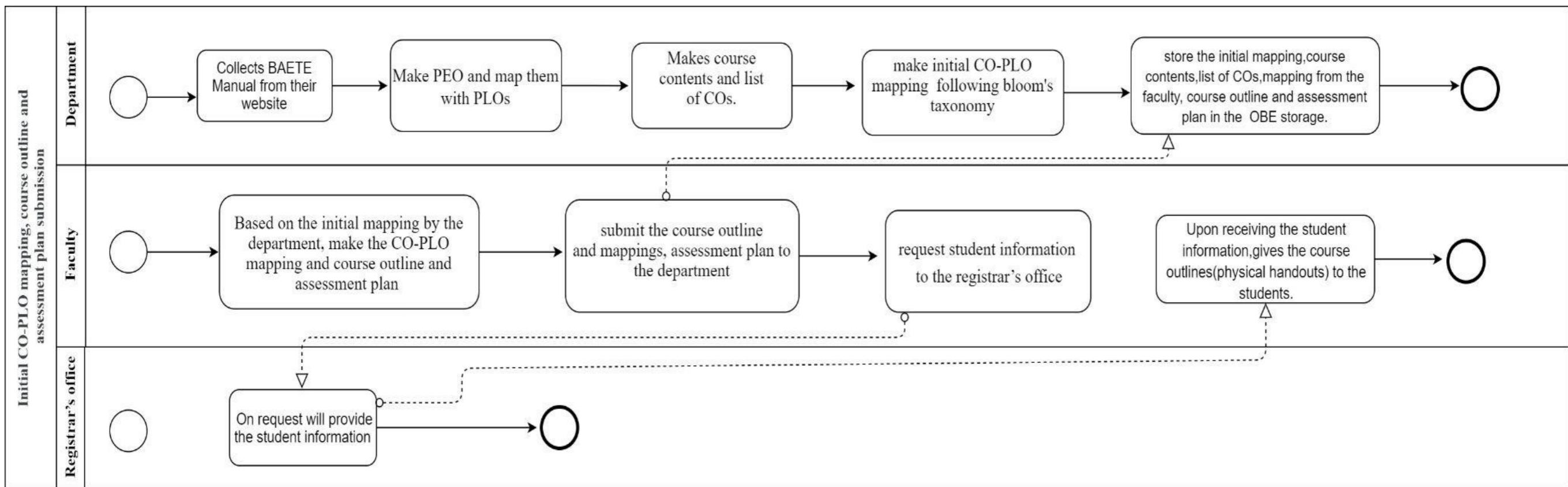
Process	System Roles					
	Human	Non- Computing Hardware	Computing Hardware	Software	Database	Network & Communication
<b>Initial CO-PLO mapping, course outline and assessment plan submission</b>	<p><b>Department officials</b></p> <ul style="list-style-type: none"> <li>a) Collects BAETE Manual from the website.</li> <li>b) Reads the directions of PEOs (found in BAETE Manual) and makes their own list of PEOs.</li> <li>c) Maps those PEOs with PLOs/POs (found from BAETE manual)</li> <li>d) Makes course contents (those courses which are offered by the department only) and depending on those contents the department makes the list of COs.</li> <li>e) Maps COs with PO/PLO by following domain level of bloom's taxonomy</li> <li>f) The department then stores it to the OBE storage.</li> </ul> <p><b>Faculty members</b></p> <ul style="list-style-type: none"> <li>a) Faculty makes a new course outline following CO-PLO mapping based on online resources and initial outline from the department.</li> <li>b) Following the guidelines of the department makes PLOs/POs-COs mappings of his/her course, the course outline and assessment plan.</li> </ul>	<p><b>Pen and Paper</b></p> <ul style="list-style-type: none"> <li>a) To note down the rough mappings, course contents, course outlines and OBE assessment report outline before going the formal way (Word,Excel,pdf etc.)</li> <li>b) To print the BAETE manual, course contents, course outline and OBE assessment report outline on a paper as a booklet form.</li> </ul>	<p><b>Computer</b></p> <ul style="list-style-type: none"> <li>a) Used to visit BAETE website, reading manuals, making all the mappings and outlines, citation of templates and standard templates or will go through the past course outline materials (found in CSE website/ OBE storage).</li> </ul> <p><b>Printer</b></p> <ul style="list-style-type: none"> <li>a) To print the BAETE manual and to print out the COs for hardcopy storage backup in case something happens to the digital version.</li> </ul>	<p><b>Operating System</b></p> <ul style="list-style-type: none"> <li>a) Any OS used by the users, e.g., Windows, Mac, Linux</li> </ul> <p><b>Chrome/ Firefox/ Edge</b></p> <ul style="list-style-type: none"> <li>a) Used for browsing BAETE manual online researching.</li> </ul> <p><b>PDF viewer</b></p> <ul style="list-style-type: none"> <li>a) To view BAETE manual, past OBE resources in PDF form.</li> </ul> <p><b>Microsoft Word</b></p> <ul style="list-style-type: none"> <li>a) Used to write the PEOs, COs, PLOs and their mappings, course contents, course outlines, OBE assessment report outline.</li> </ul> <p><b>Adobe Acrobat</b></p> <ul style="list-style-type: none"> <li>a) Used to view and make PDF files.</li> </ul>	<p><b>OBE Storage (google drive/Manual storage)</b></p> <ul style="list-style-type: none"> <li>a) For submitting the mappings report, going through the past course outline materials.</li> <li>b) Submitting the course outline and the assessment report (outline) (both as soft copy and hard copy)</li> </ul> <p><b>Registrar's office database</b></p> <ul style="list-style-type: none"> <li>a) Faculties collecting information regarding course name, course id'.</li> </ul>	<p><b>Internet</b></p> <ul style="list-style-type: none"> <li>a) Used for doing all the online citation, collecting manuals, viewing templates, and going through past OBE storage (google drive), viewing templates and using G-suite.</li> </ul>

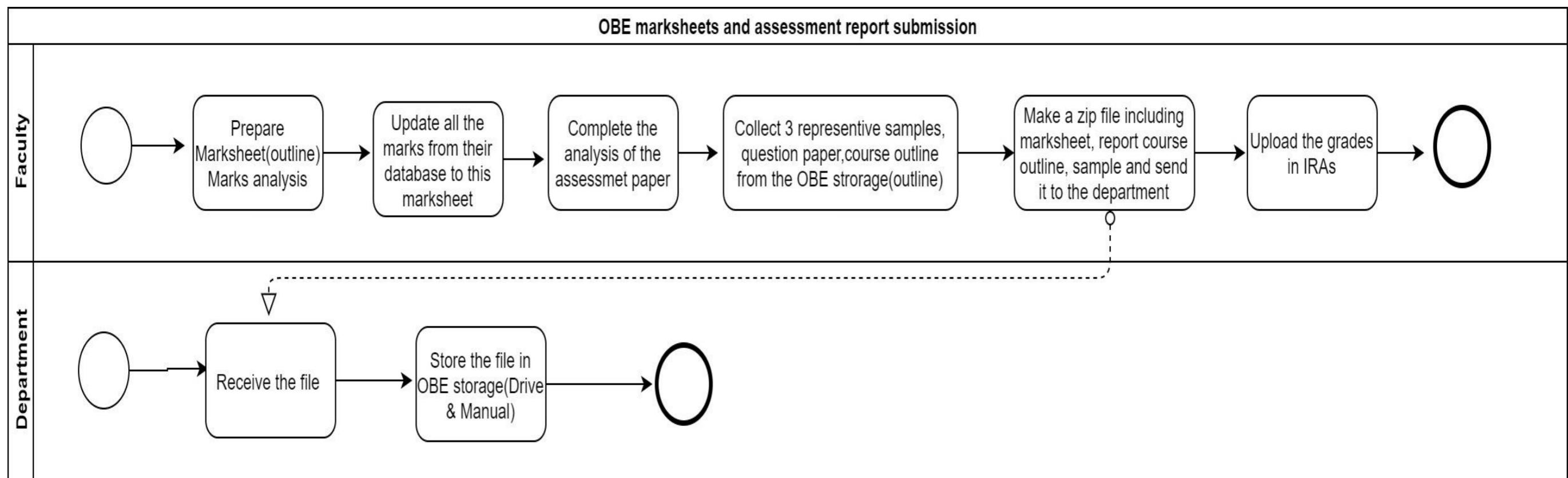
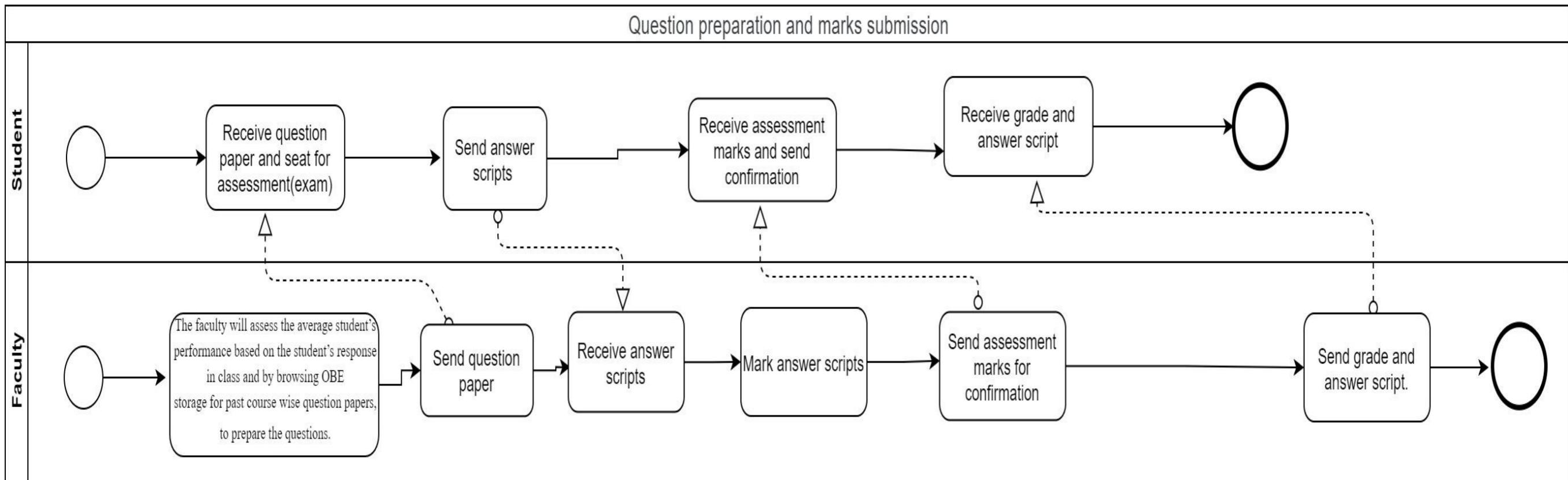
	<p>c) will submit the course outline and mappings, assessment plan to the department and will request a copy of student information to the registrar's office</p> <p>d) Faculty will give the course outline's hand out to the students.</p> <p><b><u>Registrar's office members</u></b></p> <p>a) Will provide the and student information to the faculties.</p>					
<b>Question preparation and marks submission</b>	<p><b><u>Faculty members</u></b></p> <p>a) The faculty will assess the average student's performance based on the student's response in class and by browsing OBE storage for past course wise question papers, to prepare the questions.</p> <p>b) After setting the questions, the faculties will fix classroom, time and date of examinations.</p> <p>c) Invigilate examinations and will collect answer scripts from the students.</p> <p>d) After collecting and marking the assessment tools the faculty will keep a record of the marks in their own grade sheet and will provide the copies and marks to the students.</p>	<p><b><u>Pen and Paper</u></b></p> <p>a) To note down the rough Questions and marks before going the formal way (Word, Excel etc.) and uploading.</p> <p>b) To scrutinize the answer scripts.</p> <p><b><u>Room</u></b></p> <p>a) For faculty members to carry out their works.</p> <p>b) Students attending exams.</p>	<p><b><u>Computer</u></b></p> <p>a) Used to carry out their computing and software related activities.</p> <p><b><u>Printer</u></b></p> <p>a) To print the questions.</p> <p><b><u>Networking Devices</u></b></p> <p>a) Router, Switch, Hub) to provide the internet for researching and uploading marks, question papers and answer scripts.</p> <p><b><u>Clock</u></b></p> <p>a) Setting time for the examination</p>	<p><b><u>Operating System</u></b></p> <p>a) Any OS used by the users, e.g. Windows, Mac, Linux</p> <p><b><u>Chrome/ Firefox/ Edge</u></b></p> <p>a) Used for researching to prepare questions and uploading marks and answer scripts</p> <p><b><u>Microsoft Word</u></b></p> <p>a) Used to set questions.</p> <p><b><u>Adobe Acrobat</u></b></p> <p>a) Used to view past questions, the questions which are made by them as PDF files.</p>	<p><b><u>OBE Storage (google drive/Manual storage)</u></b></p> <p>a) For going through the past question papers by other faculties found in the OBE storage.</p> <p>b) Faculty will keep the records of the answer scripts and the question papers.</p>	<p><b><u>Internet</u></b></p> <p>a) Used for online researching and going through past OBE storage (google drive), viewing templates, past questions, using G-suite, uploading marks.</p> <p>b) Used for taking online exams</p> <p>c) Emailing for confirmation of marks and other queries in between students and faculties</p>

	<p>e) The faculty will sort the answer scripts into 3 representative samples and submit a copy of the question paper and the representative samples to the OBE storage through the department.</p> <p><b><u>Student</u></b></p> <p>a) Will sit for examinations and submit attempted questions-answered script to the faculty.</p>					
<b>OBE marksheets and assessment report submission</b>	<p><b><u>Faculty members</u></b></p> <p>a) Will prepare a Marksheets outline and marksheets analysis. After the template is ready, faculty will update student's Id, Course ID, Section, current semester, from IRAS</p> <p>b) Now, a table is to be formed where, after scrutinizing the answer scripts, the marks of each question, which were initially mapped with COs, from various assessment tools are assigned</p> <p>c) After assigning marks of various assessment tools, total marks are to be calculated and grades are to be assigned (both in excel sheet and IRAS)</p> <p>d) Like above, in marksheets (analysis), faculty will assign the total marks, no. of COs and POs achieved, percentage of those, total marks obtained in specific</p>	<p><b><u>Pen and Paper</u></b></p> <p>a) To note down the rough calculated marks, grades, before going to write in the formal way (Word, Excel, pdf etc.)</p> <p>a) To print the marksheets, marksheets analysis and assessment report on a paper.</p> <p><b><u>Room</u></b></p> <p>a) For faculty members to carry out their works.</p>	<p><b><u>Computer</u></b></p> <p>a) Used to carry out their online and software related activities</p> <p><b><u>Printer</u></b></p> <p>a) To print out the marksheets, marksheets analysis and assessment report.</p> <p><b><u>Networking Devices</u></b></p> <p>a) Router, Switch, Hub</p>	<p><b><u>Operating System</u></b></p> <p>a) Any OS used by the users, e.g. Windows, Mac, Linux</p> <p><b><u>Chrome/ Firefox/ Edge</u></b></p> <p>a) Used for web Browsing IRAS, G-suite.</p> <p><b><u>Microsoft Excel</u></b></p> <p>a) Used to Marksheets and marksheets analysis report.</p> <p><b><u>Microsoft Word</u></b></p> <p>a) Used to Make OBE assessment report</p> <p><b><u>Adobe Acrobat</u></b></p> <p>a) Used to view the marksheets analysis report, OBE assessment report as PDF files.</p>	<p><b><u>OBE Storage (google drive/Manual storage)</u></b></p> <p>a) For researching from the past mark sheet outline mark sheet analysis outline by other faculties or a general format made by the department previously (in the OBE storage)</p> <p>b) The faculty will send the complete file (course outline, the question papers, the representative samples the OBE assessment reports and the marksheets (Marks and Analysis) both as a soft copy and hard copy to the OBE storage.</p> <p><b><u>Registrar's office database</u></b></p> <p>a) To get the student's Id, Course ID, Section, current semester, student's Id, Course ID,</p>	<p><b><u>Internet</u></b></p> <p>a) For using G-suite, upload the zipped file (the course outline, complete assessment report, marksheets, question papers and representative samples) to OBE storage (Drive), uploading grades to IRAS.</p>

	<p>COs, Pass/Fail.</p> <p>e) Based on the grade distribution table and the analysis marksheet, the faculty will write a detailed analysis report and will complete OBE Assessment Report (course outline, the question papers, the representative samples, the OBE assessment reports and the marksheets (Marks and Analysis)</p> <p>f) The faculty will zip all the documents and submit to the department.</p> <p><b><u>Department</u></b></p> <p>a) Department will receive and check all the documents submitted by the faculties.</p> <p>b) Then store the files in OBE storage</p>			<p>Section, current semester the faculty will get the information from IRAS.</p> <p>b) The faculty will upload the grades in IRAS.</p> <p>b) The students can view the transcripts and the grades in IRAS</p>	
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## PROCESS DIAGRAM (AS-IS)





# PROBLEM ANALYSIS

Process Name	Stakeholders	Concerns (Problems)	Analysis (Reason of the problem)	Proposed Solution	
Initial mapping, outline assessment submission	CO-PLO course and plan	1)Department officials 2)Faculty	<p>1.1) The process of CO-PLO mapping done by the department is creating unnecessary steps also wasting time and paper</p> <p>1.2) It is difficult to manually track whether all the PLO-COs were implemented properly or not. This might lead to improper mapping of CO-PLOs.</p> <p>1.3) The process of making assessment plan by the faculty might be error prone</p> <p>1.4) Submitting the assessment plan as a hard copy to multiple stakeholders is redundant. Finding and distributing the plan is also difficult.</p>	<p>1.11) Mapping CO-PLO manually then uploading them again in OBE storage wastes time and makes the process complicated unnecessarily. Modifying an existing mapping manually is a repetitive and time-consuming task.</p> <p>1.2 It is essential to map each type of CO-PLO to multiple courses. Manually tracking PLO-CO is a tedious and error prone process.</p> <p>1.3) Faculty needs to follow the mapping of CO-PLO, previous assessment resource and then come to a decision of making a new assessment plan, it a lengthy process + time consuming and error prone too</p> <p>1.4) Faculty submit the assessment plan to the department (physical copy and softcopy) and also store it for themselves as a backup. Same thing was getting stored multiple times.</p>	<p>Here are the automation features SPM will offer to solve this problem (1.1)</p> <p>Weighted CO-PLO for automatic CO-PLO mapping</p> <p>Reactive sliders for real time CO-PLO mapping</p> <p>Current and previous CO-PLO comparison graph.</p> <p>Directly share, download or print CO-PLO mappings</p> <p>The following features will address the problem (1.2)</p> <p>Auto PLO-CO tracking and balancing</p> <p>Realtime visual graph</p> <p>Alert for missing COs-PLOs</p> <p>Automatically check and warn if Bloom's Taxonomy is not followed properly.</p> <p>The following features will address the problem (1.3)</p> <p>Access previous assessment plans directly inside SPM.</p> <p>See assessment plans side by side for easy comparison</p> <p>Auto check whether the assessment plan is following CO-PLO mapping and give suggestions while making the plan.</p> <p>Faculty can edit the plan anytime without any hassle</p> <p>The following features will address the problem (1.4)</p>

		<p>1.5 Students had to face hassles for collecting the handouts they missed for being absent.</p>	<p>1.5) If any student does not attend the physical class, they will miss the hand out copy, at the same time finding it later is a hassle.</p> <p>if any student would miss the class, they would not get any sort of handouts given in the class, including the course outline and had to do visit faculties office multiple times to collect</p>	<p>Faculty can directly submit assessment plan using SPM with appropriate stakeholders</p> <p>The following features will address the problem (1.5)</p> <p>Faculty can directly share course outline and any sort of documents using SPM with the students.</p>
Question preparation and marks submission	Faculty Student	<p>2.1 Students have resources scattered in different online resources. Finding the right resources, takes up a lot of time.</p> <p>2.2 Faculties have resources scattered in different online resources. Finding the right resources and logging in different platforms takes up a lot of time.</p>	<p><u>2.1</u> Searching YouTube, going through different links, going through the books, going through the lecture slides in another website (google classroom, or zoom) is very unorganized and takes students more time.</p>	<p>Solution to problem 2.1: Students can view all the organized course materials in SPM</p> <p>1.1 Students will press the “Course Materials” button on the home page that will redirect to another page.</p> <p>The page contains the list of lecture slides and course resources.</p> <p>In this page, Students will only be able to view and download the course materials.</p> <p>Every time they view, the system will count the number of clicks and also the time spent by each student for each resource viewed.</p> <p>Solution to problem 2.2: Faculty can view and upload the course materials in SPM</p> <p>Faculty will press the “Course Materials” button on the home page that will redirect to another page.</p> <p>The page contains the list of lecture slides and course resources.</p>

	<p>2.3 Faculties assess the average students' performance through the class response, to get an idea of how complex the questions he/she should make. This process is very inaccurate.</p> <p>2.4 There is no all- in- one storage to get all the current and past course resources at a time. Searching the past question papers for faculties, to prepare the questions is an unorganized process and takes up a lot of time.</p> <p>2.5 Faculties have to access another web platform and external timer for setting question paper.</p>	<p>2.2 Faculties have to log into different online platforms to upload and create course materials. One might forget a password or forget any particular filename- that can cause trouble and momentary delay during any urgent task. Faculty has to continuously search and keep track of all information and note them down in a paper, which is time consuming and has a chance to be missed.</p> <p>2.3 This process is inaccurate because students who respond well, may not study hard, and then students who don't respond well, may study hard on their own. So, the faculty isn't getting an actual idea of the average performance of the students. Since the faculty cannot see whether they are actually studying the materials or not.</p> <p>2.4 To search the question papers from the OBE storage and storing them in different places for further modification and then saving the finalized questions in different places, is an unorganized process and this what takes up most time.</p>	<p>In the same page, Faculties will also have an upload button to upload new materials.</p> <p>Solution to problem 2.3: Faculty can view material wise; the count of students views per materials in SPM</p> <p>Faculty will press the "Course Materials" button on the home page that will redirect to another page.</p> <p>The page contains the list of lecture slides and course resources.</p> <p>Beside each material, in a small "views" button, after pressing it, the faculty will get redirected to another page</p> <p>That page will show all the students listed who viewed, how many times viewed and the average time spent per view in a chart format.</p> <p><b>Solution to problem 2.4:</b></p> <p>SPM will have a "Question Bank" feature. Q/A Bank will contain all the (course wise) past question papers for the faculty to edit real time and submit the finalized question right there.</p> <p>Faculty can access the Q/A bank to</p> <p>Faculty dashboard will have a Question Bank button</p> <p>After redirecting to question bank page, he/she will be able to view a list of course wise past question paper</p> <p>Along with viewing, there will be an edit option to modify the selected question paper and submit it as the new finalized question paper.</p> <p>There is also a "Create New" option to create a completely new question and submit it.</p> <p>Solution to problem 2.5: Faculties can upload questions and set time for assessments in SPM</p> <p>Click the "Assessment" button.</p> <p>Upload the question form or pdf question paper</p>
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			<p><b>2.6</b> Faculties have to search through all the scripts to find one particular student's script.</p> <p>An external platform is needed for uploading the scripts. All these are time consuming and disorganized.</p>	<p>On the same page, set the time to submit the answer scripts.</p> <p>Finally, press the “Assign” button for the students to view the assessment and upload the answer scripts.</p> <p>The system will stop giving access to students after the time's over.</p>
			<p><b>2.5</b> Faculties have to log into different online platforms to upload and create course materials. One might forget a password or forget any particular filename and create a timer with google timer or manually keep track of time. Students do not learn to submit on time making the whole process very tedious.</p>	<p><b>Solution to problem 2.6:</b> Students can submit the answer scripts and instantly view the MCQ based assessment marks in SPM</p> <p>Click the “Assessment” button</p> <p>Then click the uploaded assessment which will redirect to another page where the details of the assessment are given</p> <p>Upload the pdf file, form (MCQ based) or in doc format of the answer script and press the submit button.</p> <p>For MCQ based assessment, the system will check and show and store the marks instantly in the corner of the assessment page.</p> <p>For conceptual based assessment, the marks will be updated once the faculty entry the marks himself.</p>
			<p><b>2.7</b> Faculties have to manually store marks in a sheet and then calculate the marks and upload. There might be some missing values or calculation mistakes. Inaccuracy might occur.</p>	<p><b>Solution to problem 2.7</b> Faculties can entry marks for each (conceptual or diagram based) assessment in SPM</p> <p>Click the “Assessment” button.</p> <p>Then click on the uploaded Assessment for being marked</p> <p>Check the pdf or doc format copies for individual students and click the “upload marks” button</p>

		<p><b>2.8:</b> Faculties have to manually track and calculate average/highest achieved marks and answer scripts of students- which is time consuming.</p>		<p><b>Solution to problem 2.8:</b> SPM will automatically sort the answer scripts and store the three representative samples separately</p> <p>After the faculties entry all the marks, the system will arrange the copies in an ascending order.</p> <p>Then select the Highest, Average and the marginal pass copy.</p> <p>After selection, the system will transfer those answer scripts to a page named “Representative samples”</p> <p>The faculty and the department will have a “Representative Samples” button on the home page, which will redirect to another page.</p> <p>This page, based on each assessment taken, the representative sample copies will be listed.</p> <p>The users can either view by clicking the samples or download them by clicking the download option.</p>
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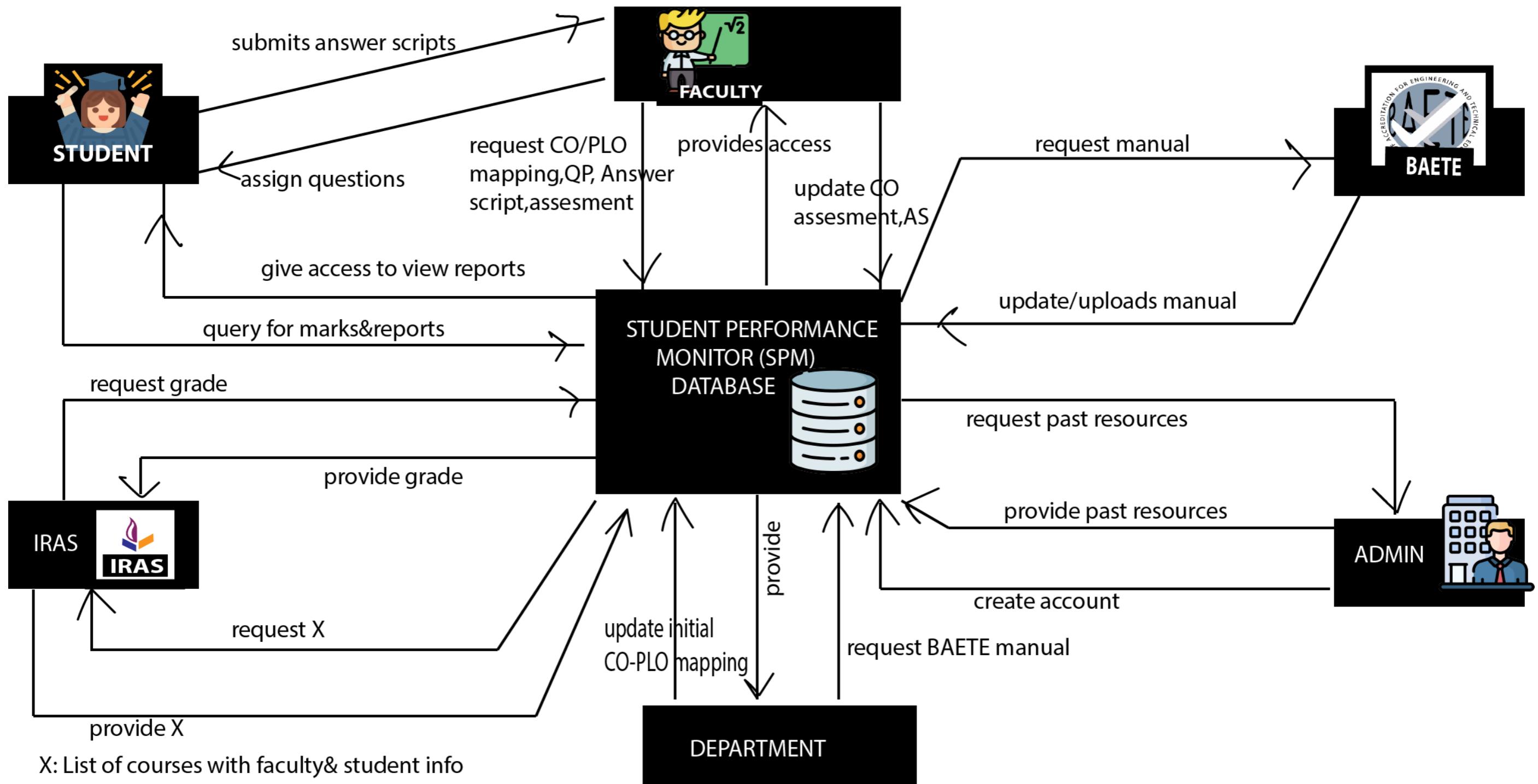
			<p><b>2.8</b>Faculties have to manually calculate all the marks and search for the highest and lowest obtained marks in a class. Grade calculation becomes tedious. External resources are needed to keep track of answer scripts.</p>	
OBE marksheets and assessment report submission	Faculty Department officials	<p>3.1 The preparation of the marksheet outlines (excel sheet) and putting the individual student names, IDs, marks and then calculating the total marks from each assessment, grades require manual typing which is a very lengthy process.</p> <p>3.2 Also the faculty also needs to visit IRAS every time to get the student information of the students enrolled in his course. This also consumes lot of extra resources</p> <p>3.3 Students cannot observe their PLO-CO achievements in a particular course.</p>	<p>3.1 The faculty needs to create an excel sheet for calculating all the assessment marks and for calculating the grades. After manually putting down the ID, the faculty will again create columns for each assessment and enter the marks in those fields. Then he has to calculate all the marks for grade submission. This is so much time consuming.</p> <p>3.2 Faculty manually write/type down the student names, IDs onto the excel sheet for assessment marks. In order to do that the faculty has to log into IRAS first which is very time consuming and raises questions about productivity.</p> <p>3.3 Students don't know what are their PLO-CO achievements at the end of the semester. How many Cos with PLOs did a student achieved remains unknown to them which is questionable.</p>	<p>SPM will have a ready marksheet outline Faculties will only have to put the specific assessment mark on the specific QUESTION-CO mapped sheet which will be available on the system. Total calculated marks will be auto generated in the system.</p> <p>3.2 SPM will have necessary student related the information Faculties can view the student information in the SPM</p> <p>3.3 Students can view their progress report, progress charts The student can view course PLO achievements with respect to course average The student can view course PLO achievements with respect to the program average The student can view PLO achievements for all the courses</p> <p>Total marks and grades will be calculated automatically for the faculty</p>

		<p>3.4 Faculty needs to gather all answer scripts, assess each of them and calculate the marks and grades of each students. It's a very lengthy process.</p> <p>3.5 Faculties cannot view any graphs or charts of the performance of each student and also the overall performance of his course.</p> <p>3.6 Head of a department cannot view any graphs regarding student performance trends prior to semester/time</p>	<p>3.4 Faculty needs to gather all answer scripts, assess each of them, note down the marks on the mapped CO excel sheet which was created before then calculate the marks and grades of each students. These is a very time-consuming process and there is always an option for making mistakes</p> <p>3.5 Faculty cannot view any graphical interface or charts regarding overall performance of the students of his course and also the PLO achieved course wise. This is a disadvantage.</p> <p>3.6 Department head has to go through all the reports submitted by the faculties of his departments and individually sort out the performance of each students programme wise</p>	<p>The faculty can click a button to calculate the total percentage of marks obtained by the students in a particular course in the marksheet.</p> <p>From the total marks, the grades will be calculated automatically as per IUB grading system (according to course)</p> <p>Faculty can view various assessment reports and performance reports in his dashboard.</p> <p>The faculty can view a chart of the overall performance of students of his/her course PLO wise</p> <p>The faculty can view a chart of the performance of students of his/her course question wise</p> <p>The faculty can view a chart of individual performance of students of his/her course PLO wise</p> <p>The faculty can view a chart of PLO achieved by a certain student course wise</p> <p>Department Head can view various charts/reports (assessment reports, student performance, enrollment) Program Wise</p> <p>The head can view a chart of comparing the overall PLO achieved by the student's program wise with respect to a given period of time/semester</p> <p>The head can view a chart of PLO achievement of students individually in with respect to a given period of time/semester</p> <p>The head can view a chart of PLO achievement of student's faculty wise with respect to a given period of time/semester</p> <p>The head can view a chart of overall course wise individual student performance report along with departmental average</p> <p>The head can view a chart of PLO progress (actual vs expected) for a given student</p>
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			<p>The head can view a chart of PLO progress (actual vs expected) of his department</p> <p>The head can view a chart of PLO achievement (most achieved Vs Least achieved) program wise</p> <p>The head can view a chart of enrollment trend of students with respect to a given period of time</p>
	<p>3.7 Dean of a school cannot view any graphs regarding department wise performance trends prior to semester/time</p> <p>3.8 The VC cannot view any graphs regarding school wise performance trends prior to semester/time</p>	<p>3.7 Dean has to go through all the reports submitted by the Heads of his departments and individually sort out the both performance of each students and faculties under whom those students took courses.</p> <p>3.8 The VC has to go through all the reports submitted by the Deans of his schools and individually sort out the both performance of each students and faculties under whom those students took courses.</p>	<p>Dean can view various charts/reports (assessment reports, student performance, enrollment) department wise</p> <p>The dean can view a chart of comparing the overall PLO achieved by the students <i>department wise</i> with respect to a given period of time/semester</p> <p>The dean can view a chart of PLO achievement of students <i>individually</i> in with respect to a given period of time/semester</p> <p>The dean can view a chart of PLO achievement of students <i>faculty wise</i> with respect to a given period of time/semester</p> <p>The dean can view a chart of overall course wise individual student performance report along with school average</p> <p>The dean can view a chart of PLO progress (actual vs expected) for a given student</p> <p>The dean can view a chart of PLO progress (actual vs expected) of his school</p> <p>The dean can view a chart of PLO achievement (most achieved Vs Least achieved) department wise</p> <p>The dean can view a chart of enrollment trend of students with respect to a given period of time</p> <p>VC can view various charts/reports(assessment reports, student performance, enrollment) school wise</p> <p>The VC can view a chart of comparing the overall PLO achieved by the students <i>school wise</i> with respect to a given period of time/semester</p>

			<p>The VC can view a chart of PLO achievement of students <i>individually</i> in with respect to a given period of time/semester</p> <p>The VC can view a chart of PLO achievement of students <i>faculty wise</i> with respect to a given period of time/semester</p> <p>The VC can view a chart of overall course wise individual student performance report along with university average</p> <p>The VC can view a chart of PLO progress (actual vs expected) for a given student</p> <p>The dean can view a chart of PLO progress (actual vs expected) of all schools</p> <p>The VC can view a chart of PLO achievement (most achieved Vs Least achieved) school wise</p> <p>The VC can view a chart of enrollment trend of students with respect to a given period of time</p>
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## RICH PICTURE (TO-BE)



## SIX ELEMENTS ANALYSIS (AS-IS & TO-BE)

Process	AS-IS						TO-BE					
	System Roles											
	Human	Non-computing hardware	Computing hardware	Software	Database	Network & communication	Human	Non-computing hardware	Computing hardware	Software	Database	Network & communication
Initial CO-PLO mapping, course outline and assessment plan submission	<u>Department officials</u>  a) Collects BAETE Manual from the website. b) Reads the directions of PEOs (found in BAETE Manual) and makes their own list of PEOs. c) Maps those PEOs with PLOs/POs (found from BAETE manual) d) Makes course contents (those courses which are offered by the department only) and depending on those contents the department makes the list of COs. e) Maps COs with PO/PLO by following domain	<u>Pen and Paper</u>  a) To note down the rough mappings, course contents, course outlines and OBE assessment report outline before going the formal way (Word,Excel,pdf etc.)  b) To print the BAETE manual, course contents, course outline and OBE assessment report outline on a paper as a booklet form.	<u>Computer</u>  a) Used to visit BAETE website, reading manuals, making all the mappings and outlines, citation of templates and standard templates or will go through the past course outline materials (found in CSE website/OBE storage).  a) To print the BAETE manual and to print out the	<u>Operating System</u>  <u>OBE Storage (google drive/Manual storage)</u>  <u>Chrome/ Firefox/ Edge</u>  <u>PDF viewer</u>  <u>Printer</u>  <u>Microsoft Word</u>	<u>Internet</u>  a) Any OS used by the users, e.g., Windows, Mac, Linux  <u>Registrar's office database</u>  <u>Microsoft Word</u>  a) Used to	<u>Internet</u>  a) Used for doing all the online citation, collecting manuals, viewing templates, and going through past OBE storage (google drive), viewing templates and using G-suite.  <u>Registrar's office database</u>  <u>Microsoft Word</u>  a) Finalize CO-PLO mapping by modifying department provided CO-PLO mapping within SPM system	<u>Department officials</u>  a) Finalize CO-PLO mapping by modifying existing initial CO-PLO map within SPM system  <u>Faculty</u>  a) Faculties collecting information regarding course name, course id's	<u>Computer</u>  a) Used by the department for modifying the existing initial CO-PLO mapping and the course content list.  <u>Faculty</u>  a) Finalize CO-PLO mapping by modifying department provided CO-PLO mapping within SPM system	<u>Operating Systems</u>  <u>SPM</u>  <u>Chrome/ Firefox/ Edge</u>  <u>PDF viewer</u>  a) Used to view the downloaded documents.	<u>Operating Systems</u>  <u>SPM</u>  <u>Chrome/ Firefox/ Edge</u>  <u>PDF viewer</u>  a) Storing all past resources of OBE.  b) For storing all kind of mappings, course content list, course outline and assessment plans	<u>Internet</u>  a) For modifying the files in SPM  <u>Communication</u>  a) Sharing the files between stakeholders	

	<p>level of bloom's taxonomy</p> <p>f) The department then stores it to the OBE storage.</p> <p>-</p> <p><b><u>Faculty members</u></b></p> <p>a) Faculty makes a new course outline following CO-PLO mapping based on online resources and initial outline from the department.</p> <p>b) Following the guidelines of the department makes PLOs/POs-COs mappings of his/her course, the course outline and assessment plan.</p> <p>c) will submit the course outline and mappings, assessment plan to the department and will request a copy of student information to the registrar's office</p> <p>d) Faculty will give the course outline's hand out to the students.</p> <p><b><u>Registrar's office members</u></b></p> <p>a) Will provide the and student</p>	<p>COs for hardcopy storage backup in case something happens to the digital version.</p>	<p>write the PEOs, COs, PLOs and their mappings, course contents, course outlines, OBE assessment report outline.</p> <p><b><u>Adobe Acrobat</u></b></p> <p>a) Used to view and make PDF files.</p>	<p>b) Then modify the existing course outline, assessment plan and share it with appropriate stakeholders</p>					
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	information to the faculties.											
<b>Question preparation and marks submission</b>	<p><b>Faculty members</b></p> <p>a) The faculty will assess the average student's performance based on the student's response in class and by browsing OBE storage for past course wise question papers, to prepare the questions.</p> <p>b) After setting the questions, the faculties will fix classroom, time and date of examinations.</p> <p>c) Invigilate examinations and will collect answer scripts from the students.</p> <p>d) After collecting and marking the assessment tools the faculty will keep a record of the marks in their own grade sheet and will provide the copies and marks to the students.</p> <p>e) The faculty will sort the answer</p>	<p><b>Pen and Paper</b></p> <p>a) To note down the rough Questions and marks before going the formal way (Word, Excel etc.) and uploading.</p> <p>b) To scrutinize the answer scripts.</p> <p><b>Room</b></p> <p>a) For faculty members to carry out their works.</p> <p>b) Students attending exams.</p>	<p><b>Computer</b></p> <p>a) Used to carry out their computing and software related activities.</p> <p><b>Printer</b></p> <p>a) To print the questions.</p> <p><b>Networking Devices</b></p> <p>a) Router, Switch, Hub) to provide the internet for researching and uploading marks, question papers and answer scripts.</p> <p><b>Clock</b></p> <p>a) Setting time for the examination</p>	<p><b>Operating System</b></p> <p>a) Any OS used by the users, e.g., Windows, Mac, Linux</p> <p><b>Chrome/ Firefox/ Edge</b></p> <p>a) Used for researching to prepare questions and uploading marks and answer scripts</p> <p><b>Microsoft Word</b></p> <p>a) Used to set questions.</p> <p><b>Adobe Acrobat</b></p> <p>a) Used to view past questions, the questions which are made by them as PDF files.</p>	<p><b>OBE Storage (google drive/Manual storage)</b></p> <p>a) For going through the past question papers by other faculties found in the OBE storage.</p>	<p><b>Internet</b></p> <p>a) Used for online researching and going through past OBE storage (google drive), viewing templates, past questions, using G-suite, uploading marks.</p> <p>b) Used for taking online exams</p> <p>c) Emailing for confirmation of marks and other queries in between students and faculties</p>	<p><b>Faculty</b></p> <p>1. Faculty can view and upload the course materials in SPM</p> <p>2. Faculty can view material wise; the count of students views per materials in SPM</p> <p>3. faculty edits real time past question papers from question Bank in SPM and submit the finalized question right there.</p> <p>4. Faculties can upload questions and set time for assessments in SPM</p> <p>5. Faculties can entry marks for each (conceptual or diagram based) assessment in SPM</p>	<p><b>Room</b></p> <p>a) For taking exams</p>	<p><b>Computer</b></p> <p>a) Used for viewing past question papers from SPM, making questions, checking answer scripts(doc/pdf), markings.</p>	<p><b>Chrome/ Firefox/ Edge</b></p> <p>a) Used for browsing SPM.</p> <p><b>PDF viewer</b></p> <p>a) To view past assessments questions, answer scripts.</p> <p><b>SPM</b></p> <p>a) Provides list of all the organized course materials and resources in one single place</p> <p>b) Provides a question Bank that contains all the past question papers, for editing, viewing and downloading the question papers</p> <p>c) Count the number of times, students view each material</p>	<p><b>SPM</b></p> <p>a) For storing the answer scripts</p> <p>b) For storing the marks for each assessment</p> <p>c) For storing the past and recent question papers in question Bank</p> <p>d) For storing the course materials</p> <p>e) for storing the total number of views by each student for each material</p>	<p><b>Internet</b></p> <p>a) Used for going through SPM to view and store.</p>

	<p>scripts into 3 representative samples and submit a copy of the question paper and the representative samples to the OBE storage through the department.</p> <p><b><u>Student</u></b></p> <p>a) Will sit for examinations and submit attempted questions-answered script to the faculty.</p>					<p>1 Students can view all the organized course materials in SPM</p> <p>2. Students can submit the answer scripts and instantly view the MCQ based assessment marks in SPM</p>			<p>and show the number of views to faculties</p> <p>d) Allows faculties to upload assessments and mark them for the students to view as well.</p> <p>e) Automatic mark the MCQ based questions.</p> <p>f) Automatically close the access for submission, when the assigned time is over for assessment.</p> <p>g) Automatically sort the answer scripts into Best, average and marginal pass.</p> <p>h) Allow the students to submit answer scripts, assessments, course materials in any format</p>	
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<b>OBE marksheets and assessment report submission</b>	<b>Faculty members</b>	<b>Pen and Paper</b>	<b>Computer</b>	<b>Operating System</b>	<b>OBE Storage (google drive/Manual storage)</b>	<b>Internet</b>	<b>Faculty</b>	<b>Paper</b>	<b>Computer</b>	<b>Operating System</b>	<b>SPM</b>

a) Will prepare a Marksheets outline and marksheets analysis. After the template is ready, faculty will update student's Id, Course ID, Section, current semester, from IRAS

b) Now, a table is to be formed where, after scrutinizing the answer scripts, the marks of each question, which were initially mapped with COs, from various assessment tools are assigned

c) After assigning marks of various assessment tools, total marks are to be calculated and grades are to be assigned (both in excel sheet and IRAS)

d) Like above, in marksheets (analysis), faculty will assign the total marks, no. of COs

a) To note down the rough calculated marks, grades, before going to write in the formal way (Word, Excel, pdf etc.)

a) Used to carry out their online and software related activities

**Printer**

a) To print out the marksheets, marksheets analysis and assessment report.

**Networking**

**Devices (Router, Switch, Bridge, Hub)**

a) For faculty members to carry out their works.

a) Used to access OBE storage, IRAS.

a) Any OS used by the users, e.g. Windows, Mac, Linux

**Chrome/ Firefox/ Edge**

a) Used for web Browsing IRAS, G-suite.

**Microsoft**

**Excel**

a) Used to Marksheets and marksheets analysis report.

**Microsoft**

**Word**

a) Used to Make OBE assessment report

**Adobe Acrobat**

a) Used to view the marksheets analysis report, OBE assessment report as PDF files.

a) For researching from the past mark sheet outline mark sheet analysis outline by other faculties or a general format made by the department previously (in the OBE storage)

b) The faculty will send the complete file (course outline, the question papers, the representative samples the OBE assessment reports and the marksheets (Marks and Analysis) both as a soft copy and hard copy to the OBE storage.

**Registrar's office database**

a) To get the student's Id, Course ID, Section, current semester, student's Id, Course ID, Section, current

a) For using G-suite, upload the zipped file (the course outline, complete assessment report, marksheets, question papers and representative samples) to OBE storage (Drive), uploading grades to IRAS.

a) Faculty will put the marks on marksheets which is available on SPM and after auto calculation, they will view total marks, grades, different stats, reports and graphs from SPM system to write the assessment report.

a) To print the requested and generated report on a paper.

a) Faculty will put the marks on marksheets which is available on SPM and after auto calculation, they will view total marks, grades, different stats, reports and graphs from SPM system to write the assessment report.

a) To print the requested and generated report on a paper.

a) To print the requested and generated report on a paper.

a) To print the requested and generated report on a paper.

a) To print the requested and generated report on a paper.

a) Used for previewing reports, marksheets, grades, submission of assessment reports.

**Room**

a) To carry out their assessment and marking works.

a) To carry out their assessment and marking works.

a) To carry out their assessment and marking works.

a) To carry out their assessment and marking works.

**Printer**

a) Used for browsing reports in SPM.

**PDF viewer**

a) To view reports.

**Networking**

**Devices (Router, Switch, Bridge, Hub)**

a) Used to access SPM.

**Student**

a) Will view stats, reports and

a) Used for viewing reports from SPM

a) Any OS used by the users, e.g. Windows, Mac, Linux

**Chrome/ Firefox/ Edge**

a) Used for browsing reports in SPM.

**PDF viewer**

a) To view reports.

**Networking**

**Devices (Router, Switch, Bridge, Hub)**

a) Used to access SPM.

**Student**

a) Will view stats, reports and

**SPM**

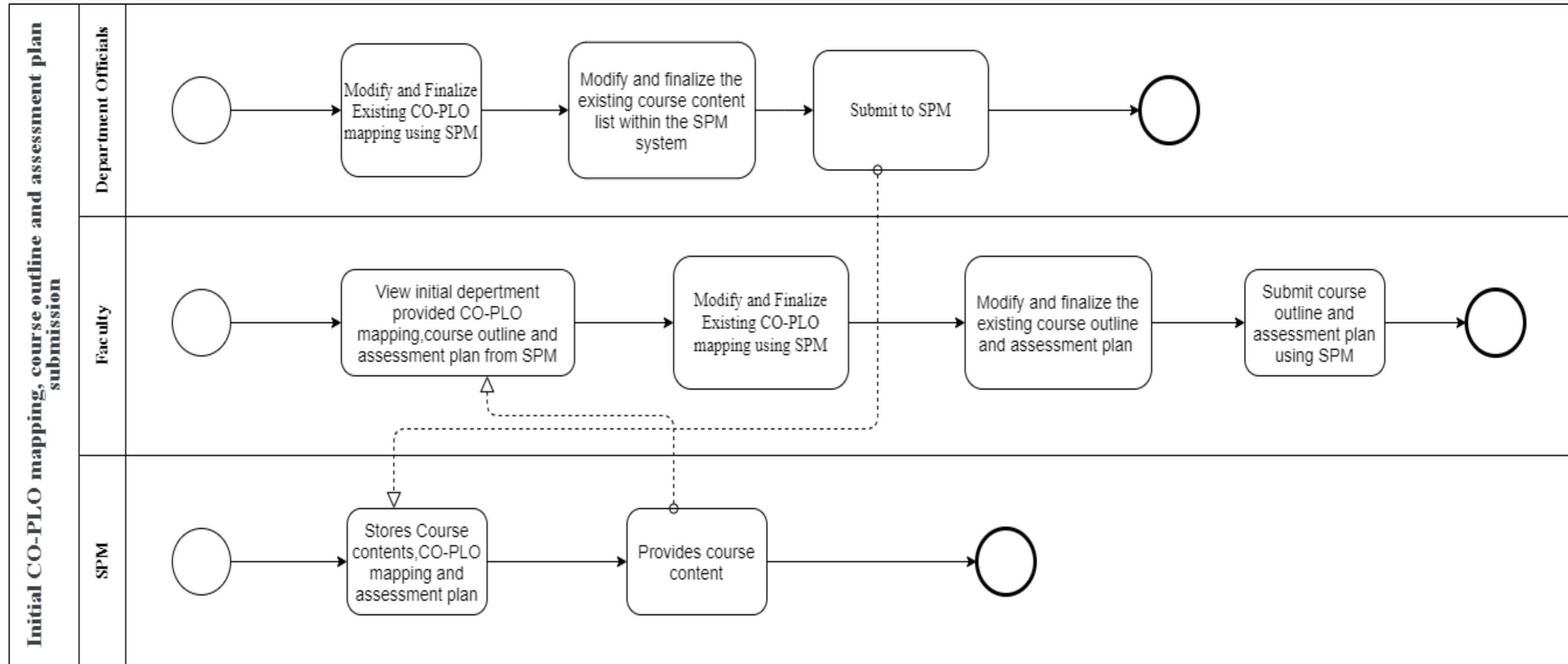
a) Viewing the marksheets outlines, stored reports, stats, submitting assessment report.

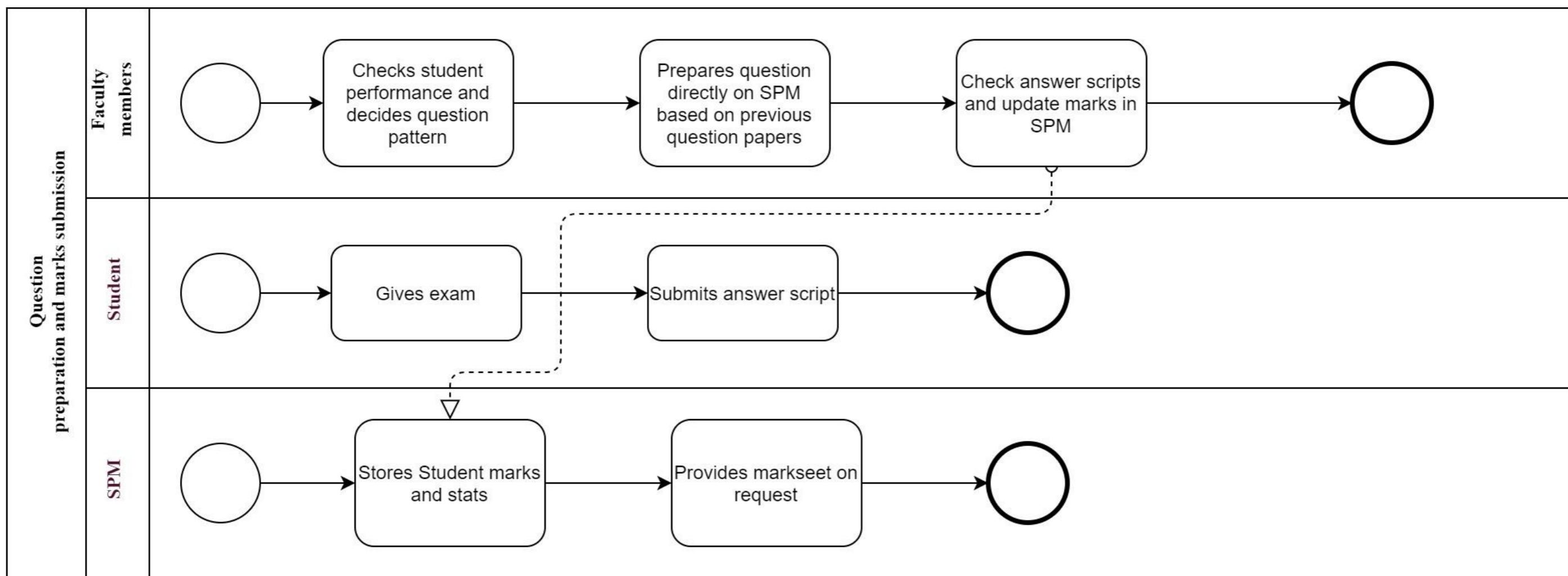
**Internet**

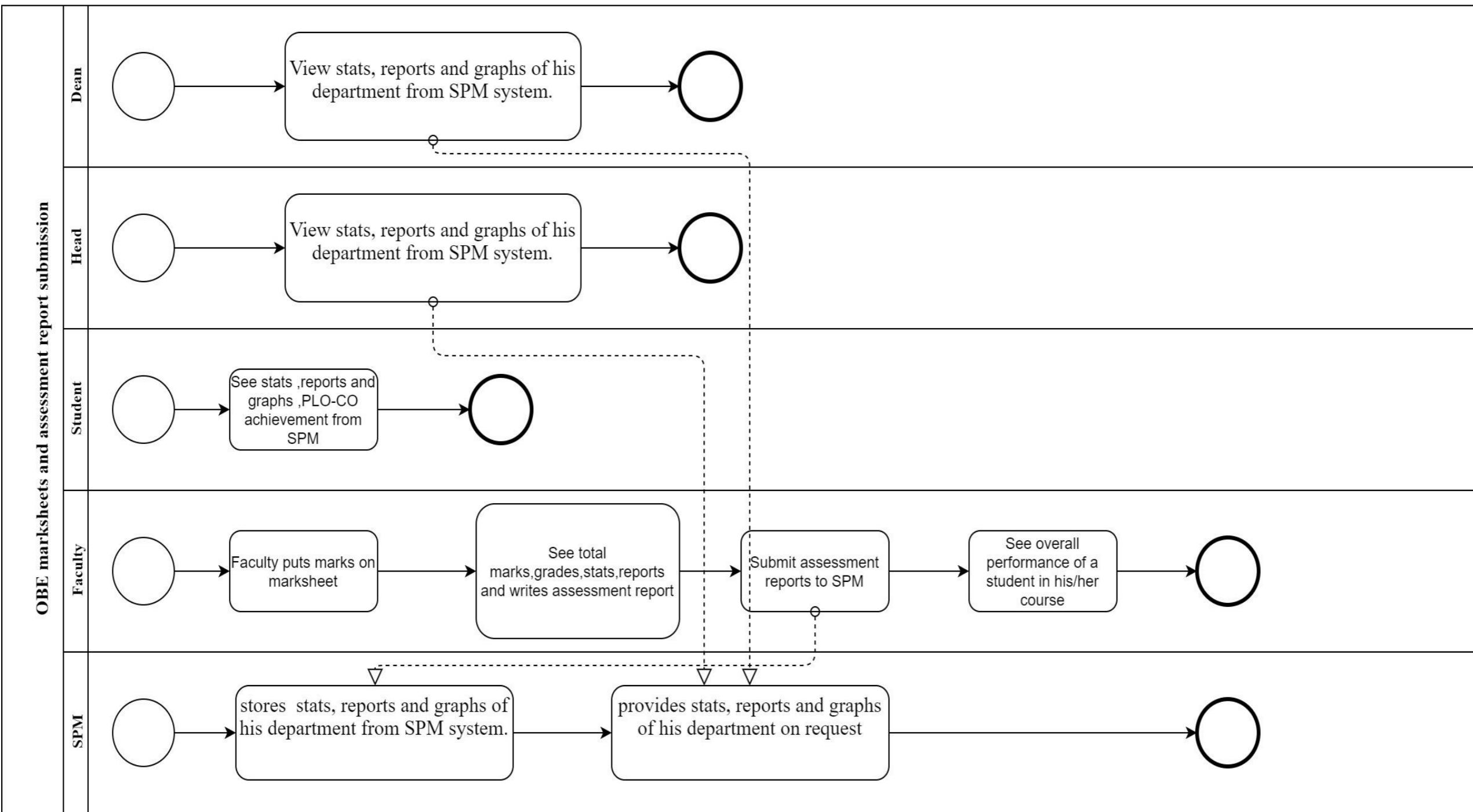
a) Used for viewing reports from SPM

	<p>and POs achieved, percentage of those, total marks obtained in specific COs, Pass/Fail.</p> <p>e) Based on the grade distribution table and the analysis marksheet, the faculty will write a detailed analysis report and will complete OBE Assessment Report (course outline, the question papers, the representative samples, the OBE assessment reports and the marksheets (Marks and Analysis)</p> <p>f) The faculty will zip all the documents and submit to the department.</p>			<p>semester the faculty will get the information from IRAS.</p> <p>b) The faculty will upload the grades in IRAS.</p> <p>b) The students can view the transcripts and the grades in IRAS</p>		<p>graphs, their performances, PLO-CO achievement in specific course from SPM system.</p> <p><b><u>Head</u></b></p> <p>View stats, reports and graphs of his department from SPM system.</p> <p><b><u>Dean</u></b></p> <p>View stats, reports and graphs of his school from SPM system.</p>				
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## PROCESS DIAGRAM (TO-BE)





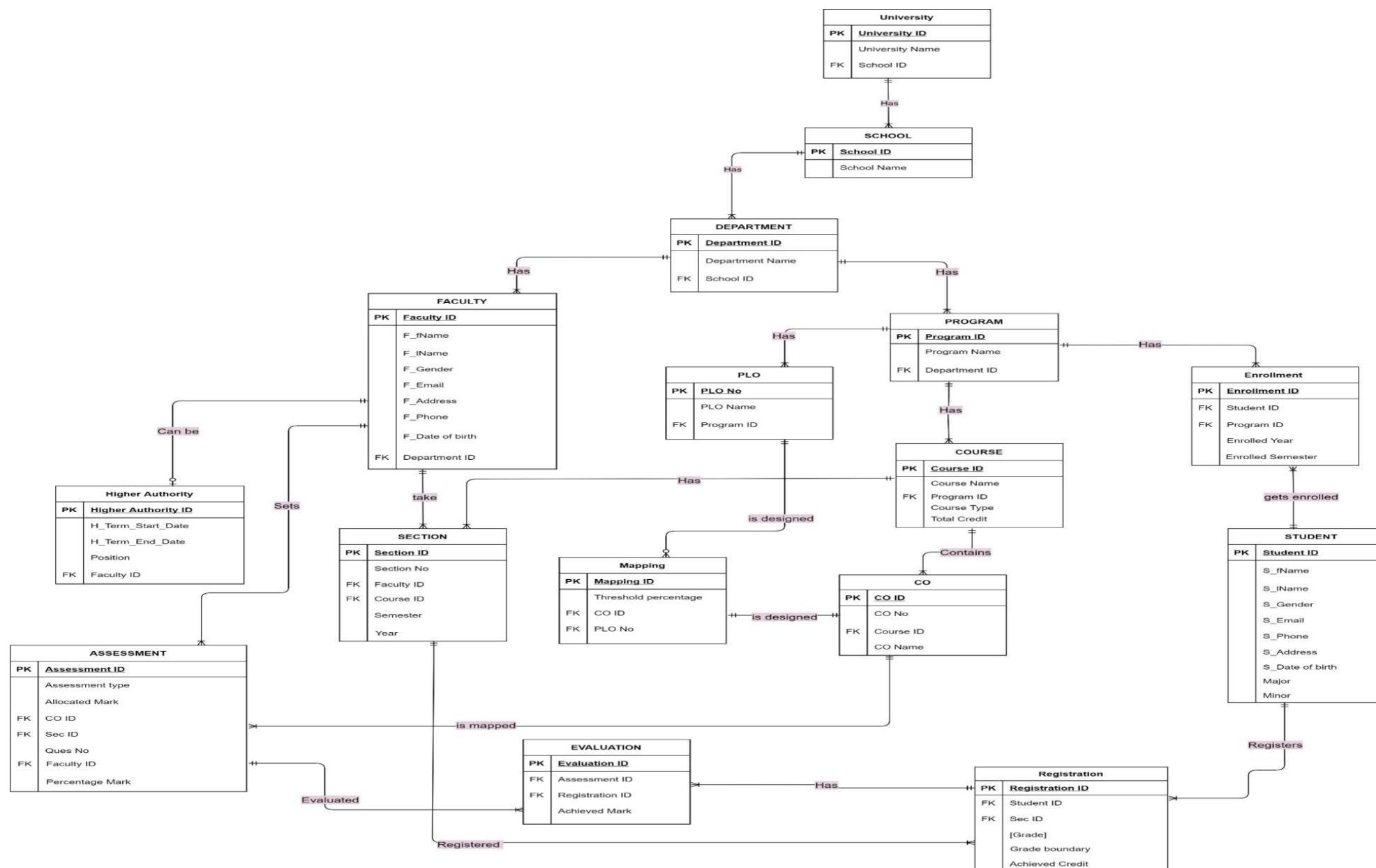


# CHAPTER 3: LOGICAL SYSTEM DESIGN

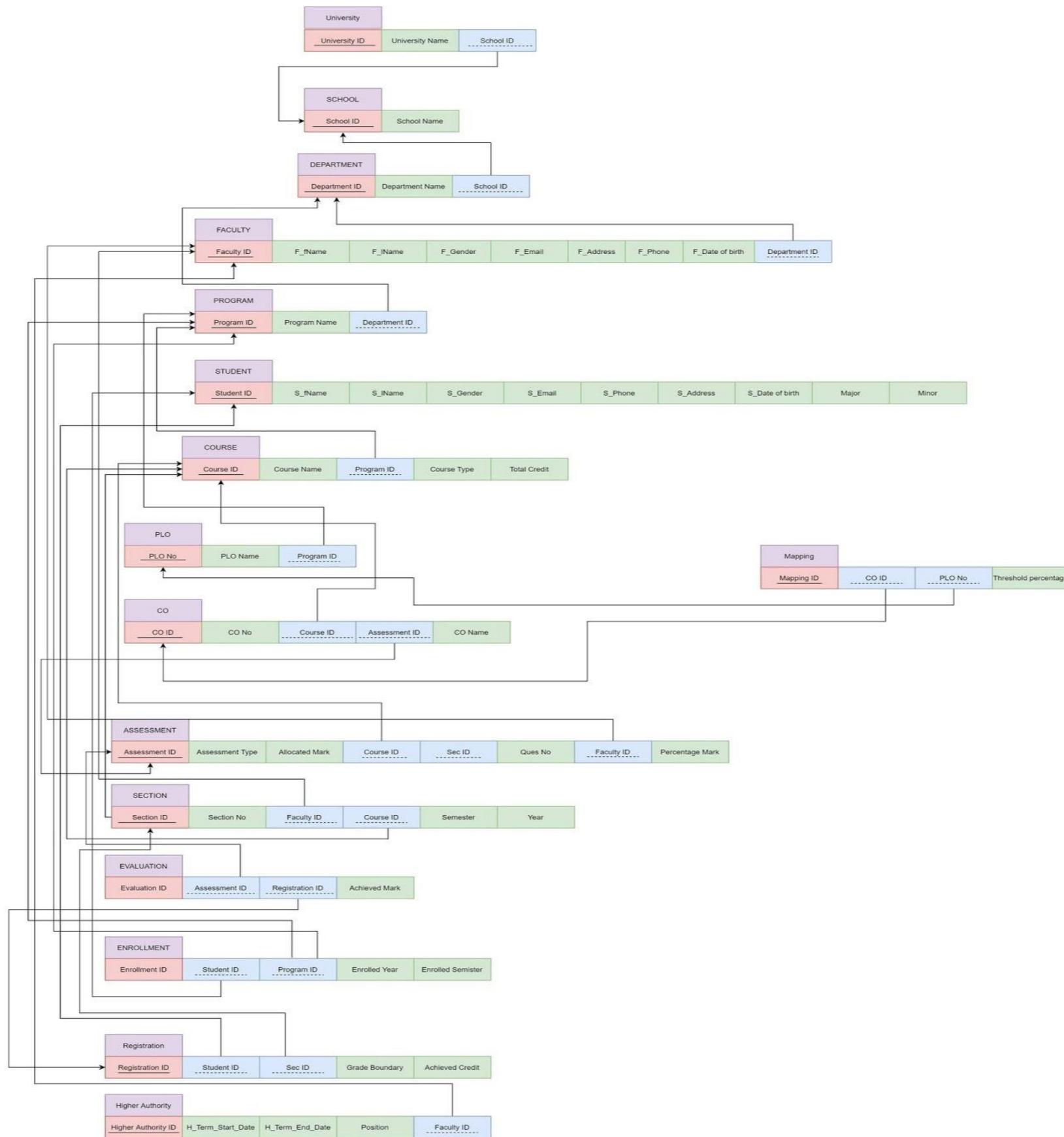
## BUSINESS RULE

In a university there are multiple schools and each school has many departments. Under each department we have faculties and programs. There are Program Learning Outcome (PLO) which are related with each of the programs. There are also many courses under each program and each of those courses has some Course Outcomes (CO) and there is a list of PLO-CO mapped with it. The faculties can take one or more than one course. All the Higher Authorities (VC, DEAN, HEAD) has to be a faculty i.e., he/she must take one or more than one course. A faculty has to set an assessment for his section and for other section of same course as well (if that course is Co-Ordinated). A student will enrol in specific program for their major and minor then each of the student will register courses under different sections and will be evaluated by a single faculty or multiple faculties (in Co-Ordinated courses)

## ERD



# ENTITY RELATIONSHIP DIAGRAM TO RELATIONSHIP SCHEMA



# NORMALIZATION

University	University ID	u1
	University Name	u2
	School ID	z1
School	School ID	z1
	School Name	z2
Department	Department ID	d1
	Department Name	d2
	School ID	z1
Faculty	Faculty ID	f1
	F_fName	f2
	F_lName	f3
	F_Gender	f4
	F_Email	f5
	F_Address	f6
	F_Phone	f7
	F_Date of birth	f8
	Department ID	d1
PLO	PLO No	y1
	PLO Name	y2
	Program ID	p1
Mapping	Mapping ID	m1
	Threshold Percentage	m2
	CO ID	x1
	PLO No	y1
Assessment	Assessment ID	a1
	Assessment Type	a2
	Allocated Mark	a3
	Percentage Mark	a4
	Question No	a5
	CO ID	x1
	Section ID	w1
	Faculty ID	f1
Evaluation	Evaluation ID	e1
	Achieved Marks	e2
	Assessment ID	a1
	Registration ID	r1
Registration	Registration ID	r1
	Grade boundary	r2
	Achieved Credit	r3
	Student ID	s1
	Section ID	w1

Program	Program ID	p1
	Program Name	p2
	Department ID	d1
Student	Student ID	s1
	Student Name	s2
	S_fName	s3
	S_lName	s4
	S_Gender	s5
	S_Email	s6
	S_Address	s7
	S_Phone	s8
	S_Date of birth	s9
	Major	s10
	Minor	s11
Course	Course ID	c1
	Course Name	c2
	Course Type	c3
	Total Credit	c4
	Program ID	p1
CO	CO ID	x1
	CO No	x2
	CO Name	x3
	Course ID	c1
Section	Section ID	w1
	Section No	w2
	Semester	w3
	Year	w4
	Faculty ID	f1
	Course ID	c1
Enrollment	Enrollment ID	v1
	Enrolled Year	v2
	Enrolled Semester	v3
	Student ID	s1
	Program ID	p1
Higher Authority	Higher Authority ID	h1
	H_Term_Start Date	h2
	H_Term_End Date	h3
	Position	h4
	Faculty ID	f1

u1 →	u2,z1
z1 →	z2
d1 →	d2,z1
f1 →	f2,f3,f4,f5,f6,f7,f8,d1
y1 →	y2,p1
m1 →	m2,x1,y1
a1 →	a2,a3,a4,a5,c1,f1,w1
e1 →	e2,a1,r1
r1 →	r2,r3,s1,w1
p1 →	p2,d1
s1 →	s2,s3,s4,s5,s6,s7,s8,s9,s10,s11
c1 →	c2,c3,c4,p1
x1 →	x2,x3,a1,c1
w1 →	w2,w3,w4,f1,c1
v1 →	v2,v3,s1,p1
h1 →	h2,h3,h4,f1

University →	UniversityID, UniversityName, SchoolID
School →	SchoolID, SchoolName
Department →	DepartmentID, DepartmentName, SchoolID
Faculty →	FacultyID, F_fName, F_IName, F_Gender, F_Email, F_Address, F_Phone, F_Dateofbirth, F_DepartmentID
PLO →	PLONo, PLOName, ProgramID
Mapping →	MappingID, ThresholdPercentage, COID, PLONo
Assessment →	AssessmentID, AssessmentType, AllocatedMark, PercentageMark, QuestionNo, COID, SectionID, FacultyID
Evaluation →	EvalutionID, AchievedMark, AssessmentID, RegistrationID
Registration →	RegistrationID, GradeBoundary, AchievedCredit, StudentID, SectionID
Program →	ProgramID, ProgramName, DepartmentID
Student →	StudentID, StudentName, S_fName, S_IName, S_Gender, S_Email, S_Address, S_Phone, S_Dateofbirth, Major, Minor
Course →	CourseID, CourseName, CourseType, TotalCredit, ProgramID
CO →	COID, CONo, COName, CourseID
Section →	SectionID, SectionNo, Semester, Year, FacultyID, CourseID
Enrollment →	EnrollmentID, EnrolledYear, EnrolledSemester, StudentID, ProgramID
HigherAuthority →	HigherAuthorityID, H_Term_Start_Date, H_Term_End_Date, Position, FacultyID

# 1NF

<u>u1</u>	<u>m1</u>	<u>e1</u>	<u>v1</u>	<u>h1</u>	u2	z1	z2	d2	f2	f3	f4	f5	f6	f7	f8	d1	y1	y2	p1	m2	x1	a1	a2	a3
a4	a5	c1	f1	w1	e2	r1	r2	r3	s1	p2	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	c2	c3	c4	x2
x3	w2	w3	w4	v2	v3	h2	h3	h4																

## 2NF

u1	u2	z1	z2
----	----	----	----

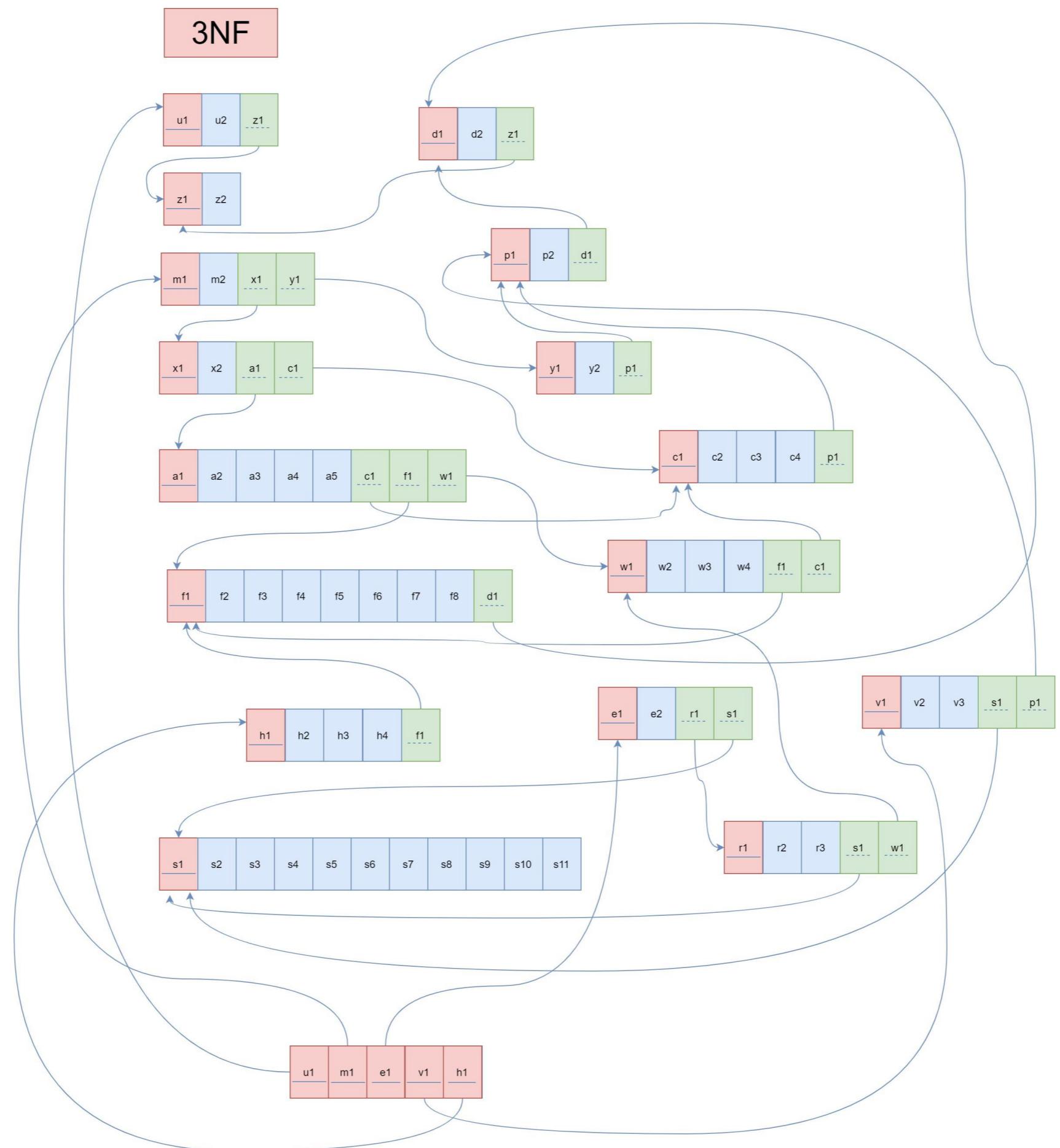
m1	m2	x1	y1	x2	x3	a1	c1	y2	p1	a2	a3	a4	a5	f1	w1	c2	c3	c4	p2	d1	d2	z1	z2	f2
f3	f4	f5	f6	f7	f8	w2	w3	w4																

e1	e2	r1	r2	r3	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11
----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----

v1	v2	v3
----	----	----

h1	h2	h3	h4
----	----	----	----

u1	m1	e1	v1	h1
----	----	----	----	----



# BCNF

No non-key can identify any primary key or part of the primary key. Therefore, all the relations are in BCNF.

## DATA DICTIONARY

University T

Name	Data Type	Size	Remark
UniversityID	VARCHAR	5	This is the Primary Key of the University. Example: "IUB, NSU"
UniversityName	VARCHAR	30	This is the name of the Department. Example: "Independent University, Bangladesh", "North South University"
schoolID	VARCHAR	5	This is the Foreign Key of the table School. Example: "SB, SETS"

#### Department\_T

Name	Data Type	Size	Remark
departmentID	VARCHAR	5	This is the Primary Key of the Department. Example: "CSC, CSE"
departmentName	VARCHAR	30	This is the name of the Department. Example: "Computer Science", "Computer Science & Engineering"
schoolID	VARCHAR	5	This is the Foreign Key of the table School. Example: "SB, SETS"

#### School\_T

Name	Data Type	Size	Remark
schoolID	VARCHAR	5	This is the Primary Key of School Example: "SB", SETS"
schoolName	VARCHAR	30	This is the name of the School. Example: "School of Business", School of Engineering, Technology and Science"

**Program\_T**

Name	Data Type	Size	Remark
programID	VARCHAR	5	This is the Primary Key for a Program Example: "B.Sc, M.Sc".
programName	VARCHAR	30	This is the name of the Degree Program. Example: "Bachelor of Science, Masters of Science"
departmentID	VARCHAR	5	This is the Foreign Key from the Department table. Example: "CSE, EEE"

**Student\_T**

Name	Data Type	Size	Remark
studentID	VARCHAR	7	This is the Primary Key for the Student. Example: "1820228, 1830256"
S_fname	VARCHAR	30	This is the first name of the Student. Example: "Tahmid"
S_lname	VARCHAR	30	This is the last name of the Student. Example: "Hossain"
S_dateOfBirth	DATE	DD-MM YYYY	This the Date of Birth of the Student. Example: "01-01-1997"
S_gender	VARCHAR	1	This is the gender of the Student. Example: "M"

S_email	VARCHAR	30	This is the email address of the Student. Example: “1820228@iub.edu.bd”
S_phone	VARCHAR	15	This is the phone number of the Student. Example: “01512345678”
S_address	VARCHAR	30	<p>Name</p> <p>Data Type</p> <p>Size</p> <p>Remark</p>
Major	VARCHAR	5	<p>Name</p> <p>Data Type</p> <p>Size</p> <p>Remark</p>
Minor	VARCHAR	5	<p>Name</p> <p>Data Type</p> <p>Size</p> <p>Remark</p>

**CO\_T**

Name	Data Type	Size	Remark
coID	INTEGER		This is the Primary Key for Course Outcome. Example:
coNo	INTEGER		This is the number of the Course Outcome. Example: "1"
courseID	VARCHAR	7	This is the Foreign Key from the Course table. Example: "CSC101"
coName	VARCHAR	5	This is the Name of the CO.
assessmentID	VARCHAR		This is the Foreign Key from Assessment Table

**PLO\_T**

Name	Data Type	Size	Remark
ploNo	VARCHAR	5	This is the primary key for Program Learning Outcome. Example: "PLO1"
ploName	VARCHAR		This is the name of PLO.

program_id	VARCHAR	5	This is the foreign key from Program table Example: "B.Sc".
------------	---------	---	---

#### Faculty\_T

Name	Data Type	Size	Remark
facultyID	VARCHAR	4	This is the Primary Key for Faculty. Example: "1801"
F_fname	VARCHAR	30	This is the first name of the Faculty. Example: "Mahady"
F_lname	VARCHAR	20	This is the last name of the Faculty Example: "Hasan"
F_dateOfBirth	DATE	DD-MM-YYYY	This the Date of Birth of the Faculty. Example: "01-01-1993"
F_gender	VARCHAR	1	This is the gender of the Faculty . Example: "M"
F_email	VARCHAR	30	This is the email address of the Faculty. Example: "mahady@iub.edu.bd"
F_phone	VARCHAR	15	This is the phone number of the Faculty. Example: "01234567890"
F_address	VARCHAR	30	This is the address of the Faculty. Example: "House 1, Road 1, Block A, Bashundhara, Dhaka, Bangladesh"

department_id	VARCHAR	5	This is the Foreign Key from the Department table. Example: "CSC"
---------------	---------	---	--

#### Course\_T

Name	Data Type	Size	Remark
courseID	VARCHAR	7	This is the Primary Key for the Course. Example: "CSC401"
courseName	VARCHAR	40	This is the name of the Course. Example: "Database Management Systems"
program_id	VARCHAR	5	This is the Foreign Key from Program table Example: "B.Sc".
courseType	VARCHAR	5	This is the course type. Example Foundation, Major
totalCredit	INTEGER		This is the total credit of the course. Example 4

#### Section\_T

Name	Data Type	Size	Remark
sectionID	INTEGER		This is the Primary Key for Section
sectionNo	INTEGER		This is the section number. Example: "1"
course_id	VARCHAR	7	This is the foreign key from the Course table. Example: "CSC401"

faculty_id	VARCHAR	4	This is the foreign key from Faculty table
semeter	VARCHAR	5	This is the semester name. Example Summer
year	date		This is the year. Example 2021

#### Enrollment\_T

Name	Data Type	Size	Remark
enrollmentID	INTEGER		This is the Primary Key for Enrollment
enrolledYear	VARCHAR	6	This is the semester of Enrollment Example: "Summer"
enrolledSemester	DATE		This is the year of Enrollment Example: "2018"
programID	VARCHAR		This is the Foreign Key from Program table
student_id	VARCHAR	7	This is the Foreign key from the Student Table. Example: "1820228"

#### Assessment\_T

Name	Data Type	Size	Remark
assessmentID	INTEGER		This is the Primary Key for Assessment

assessmentType	VARCHAR	7	This is the Assessment Type
allocatedMark	INTEGER		This is the allocated marks of assessment
courseID	VARCHAR	7	This is the Foreign Key from Course Table
section_id	INTEGER		This is the Foreign Key from Section table
questionNo	INTEGER	7	This is the question no. of Assessment
percentageMarks	VARCHAR	6	This is the percentage marks of Assessment. Example: "Summer"
facultyID	INTEGER		This is the Foreign Key from faculty table

#### Evaluation\_T

Name	Data Type	Size	Remark
evaluationID	INTEGER		This is the Primary Key for Evaluation
achievedMarks	FLOAT		This is the marks achieved by the Student Example: "50.75"
assessmentID	INTEGER		This is the Foreign Key from Assessment table
registrationID	VARCHAR	7	This is the Foreign Key from Registration table

#### Registration\_T

Name	Data Type	Size	Remark
registrationID	INTEGER		This is the Primary Key for Registration
achievedCredit	INTEGER		This is the credit achieved by the Student Example: "50"
studentID	INTEGER		This is the Foreign Key from student table
sectionID	VARCHAR	7	This is the Foreign Key from section table
gradeBoundary	VARCHAR	7	This is the range of the grade

#### Mapping\_T

Name	Data Type	Size	Remark
mappingID	INTEGER		This is the Primary Key for Mapping
coID	INTEGER		This is the Foreign Key from Co table
ploNo	INTEGER		This is the Foreign Key from Plo table
thresholdPercentage	VARCHAR	7	This is the threshold percentage of the achieved total marks of co

### **Higher Authority\_T**

Name	Data Type	Size	Remark
higherAuthorityID	INTEGER		This is the Primary Key for Higher Authority
H_Term_Start_Date	INTEGER		This is the Higher Authority TermStart Date
H_Term_End_Date	INTEGER		This is the Higher Authority Term End Date
Position	VARCHAR	7	This is the Higher Authority Position
FacultyID	INTEGER		This is the foreign key from faculty table

## INPUT FORMS

PLO to CO Mapping

CSE464	1	4					
Submit							
CO1 maps	PLO01	PLO02	PLO03	PLO01	PLO01	PLO01	40
CO2 maps	PLO04	PLO05	PLO03	PLO01	PLO01	PLO01	40
CO3 maps	PLO01	PLO01	PLO01	PLO01	PLO01	PLO01	40
CO4 maps	PLO01	PLO01	PLO01	PLO01	PLO01	PLO01	Threshold %
Submit Mapping							

### PLO-CO Mapping

```
UPDATE Mapping_T  
SET COID=?, PLOID=?, Threshold=?  
FROM Mapping_T m, Section_T s, Assessment_T a  
Evaluation_T ev, CO_T c, PLO_T p  
WHERE s.Year=?  
AND s.Semster=?  
AND s.CourseID=?  
AND s.SectionNo=?  
AND r.StudentID=?  
AND a.SectionID=s.SectionID  
AND a.AssessmentID=ev.AssessmentID  
AND m.COID=c.COID  
AND m.PLOID=p.PLOID
```

### Question to CO Mapping

CSE464	1	Spring	Mid-Term	4			
<input type="button" value="Submit"/>							
Question1	CO-01	CO-01	CO-03	CO-01	CO	CO	40
Question2	CO-01	CO-01	CO	CO	CO	CO	20
Question3	CO-02	CO	CO	CO	CO	CO	30
Question4	CO-03	CO	CO	CO	CO	CO	20
<input type="button" value="Submit"/>							

### ASSESSMENT

```
UPDATE Assessment _T
SET AssessmentType=?,
AllocatedMark=?, QuestionNo=?
FROM Mapping_T m, Section_T s, Assessment_T a,
CO_T c, PLO_T p
WHERE s.Year=?
AND s.Semster=?
AND s.CourseID=?
AND s.SectionNo=?
AND r.StudentID=?
AND a.FacultyID=?
AND a.SectionID=s.SectionID
AND a.AssessmentID=s.AssessmentID
AND m.COVID=c.COVID
AND m.PLOID=p.PLOID
```

Student ID	Name	Mid-Term	COURSE ID : CSE 303	SECTION ID : 03
102	Rohit Agarwal	12 Q1	12 Q1	Marks Obtained Question
113	Sanyal Arid	11 Q1	30 Q1	Marks Obtained Question
114	Sadman Nafi	12 Q1	18 Q1	Marks Obtained Question

[Calculate & Save](#)

### EVALUATION

```

UPDATE Evaluation_T
SET AchievedMark=?
FROM Evaluation_T ev,Section_T s,Assessment_T
a
WHERE s.Year=?
AND s.Semster=?
AND s.CourseID=?
AND s.SectionNo=?
AND r.StudentID=?
AND a.SectionID=s.SectionID
AND a.AssessmentID=ev.AssessmentID

```

Student ID	Name	Total Marks	Question Type	COURSE ID : CSE 464	SECTION ID : 01
101	Arpita Sarkar	50	C	23	Save
100	Farhan Hasan Adib	60	C+	27	Save
234	Azhar Sunny	90	A	40	Save

[Calculate & Save](#)

### GRADING

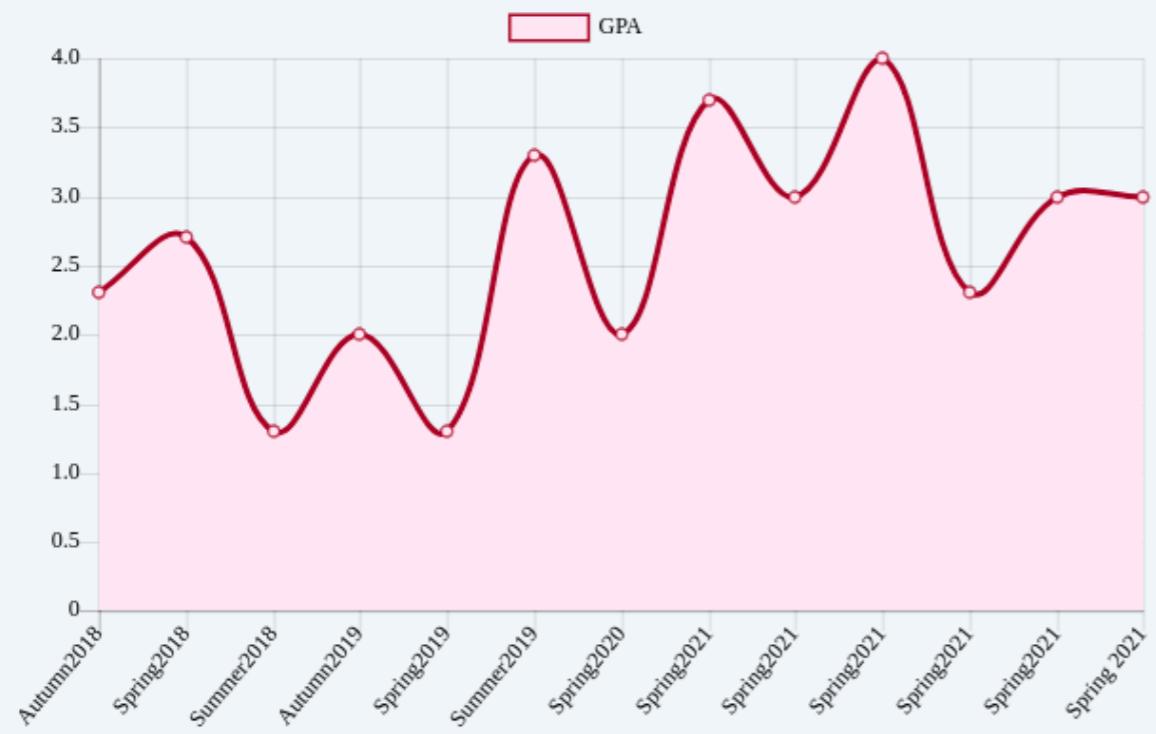
```

UPDATE Registration_T
SET TotalMark=? ,Grade=? , GradePoint=?
FROM Registration_T r,Section_T s
WHERE s.Year=?
AND s.Semster=?
AND s.CourseID=?
AND s.SectionNo=?
AND r.StudentID=?
AND r.SectionID=s.SectionID

```

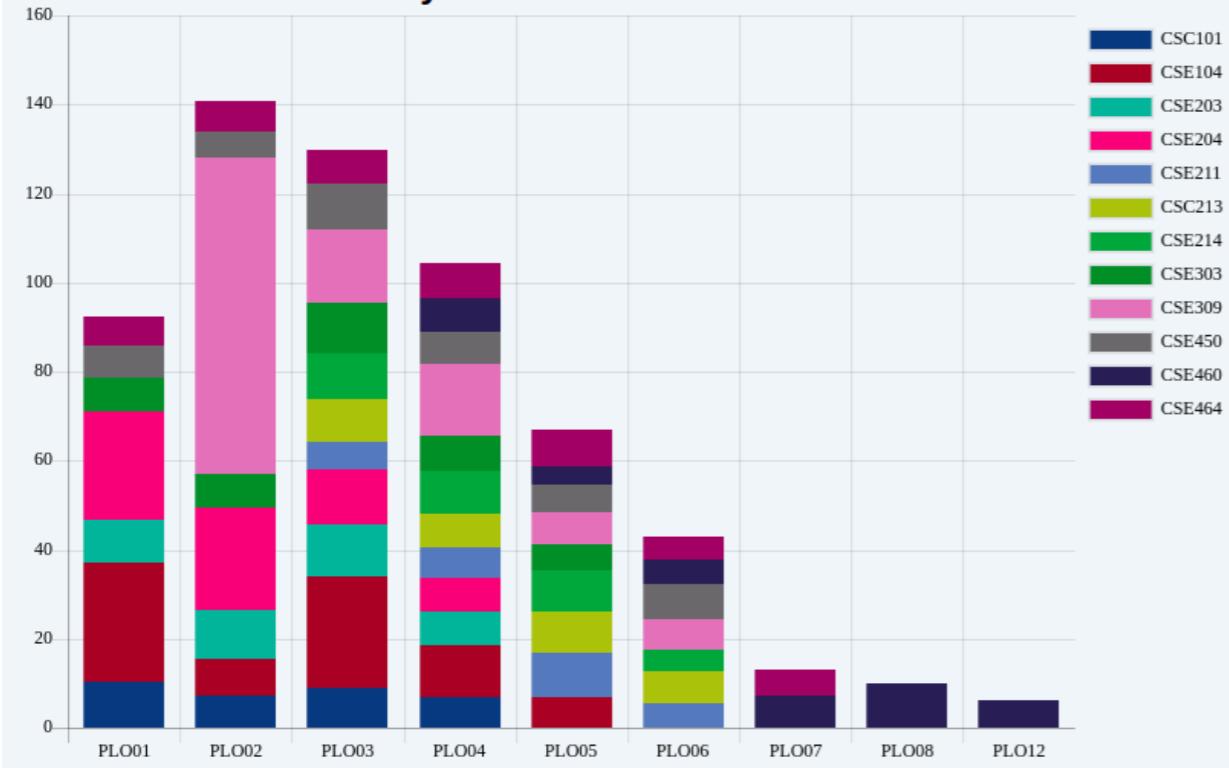
## OUTPUT FORMS

## Semester-Wise GPA



```
Year , semester , GPA
SELECT
(SUM(r.GradePoint*r.AchievedCredit)/SUM(r.AchievedCredit)) GPA
,s.Year,s.Semester
FROM Registration_T r,Enrollment_T e,Section_T s
WHERE r.SectionID =s.SectionID
AND r.StudentID=100
GROUP BY s.Year,s.Semester,s.CourseID
```

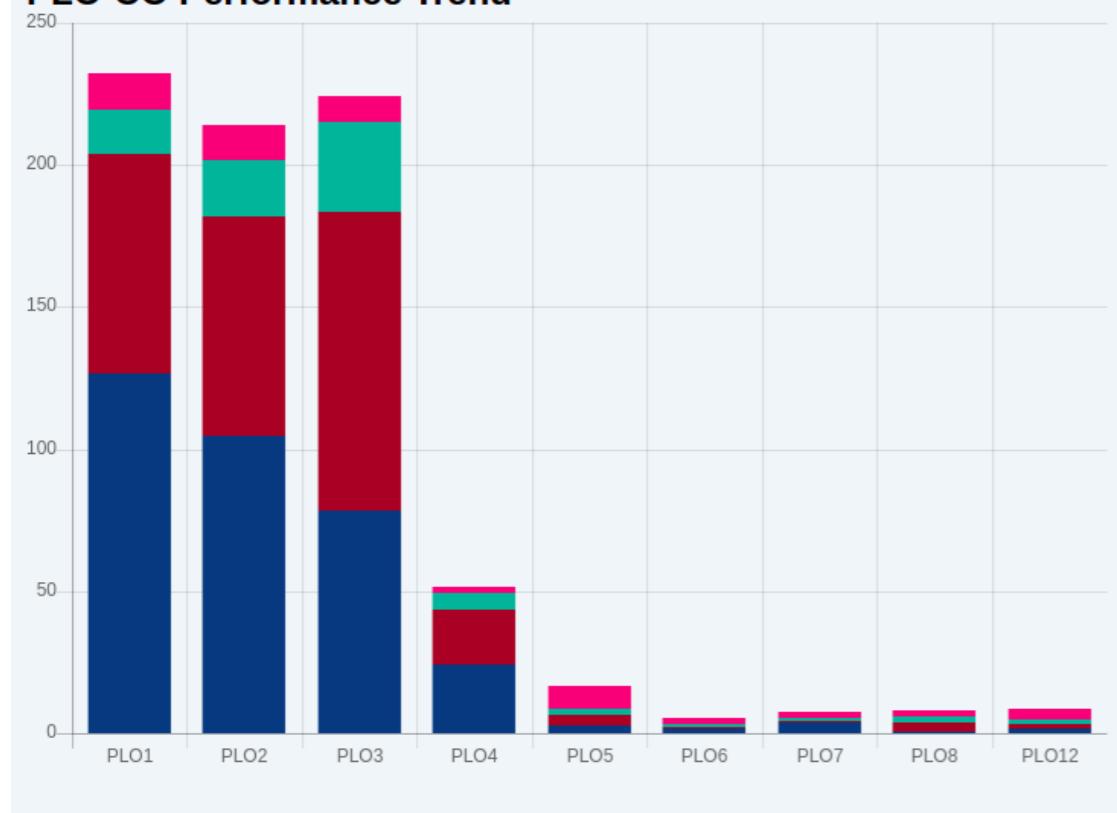
## Course-Wise PLO Analysis



```

SELECT
stepOne.CourseID,stepOne.PLONo, (SUM(stepOne.total)/SUM(stepOne.achieved
Mark) )*100 PloPercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,PLO_T p,Mapping_T m
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND p.PLONo=m.PLOID
AND c.COID=m.COID
AND r.StudentID=100
GROUP BY c.CourseID ,p.PLONo,c.CONo) stepOne
GROUP BY stepOne.CourseID,stepOne.PLONo
    
```

## PLO-CO Performance Trend



```

SELECT partTwo.PLONo, (partTwo.sumofCOPercentage/1000) percentageOfCO ,
partTwo.CONo
FROM(SELECT partOne.PLONo,SUM(partOne.CoPercentage) sumofCOPercentage,
partOne.CONo
FROM (SELECT
COResult.CourseID,COResult.StudentID,COResult.CONo,COResult.total,COResult.achievedMark,p.PLONo ,
COResult.CoPercentage FROM(SELECT
c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark) total ,
SUM(e.AchievedMark)
achievedMark, ((SUM(e.AchievedMark)/SUM(a.AllocatedMark))*100)
CoPercentage
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T r
WHERE c.AssessmentID=a.AssessmentID AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND r.StudentID=100
GROUP BY c.CourseID ,c.CONo) COResult, Mapping_T m,PLO_T p
WHERE m.PLOID=p.PLOID
GROUP BY m.PLOID,COResult.CONo,COResult.CourseID) partOne,CO_T
C,Mapping_T M,PLO_T pl WHERE M.COID=C.COID AND M.PLOID=pl.PLOID AND
C.CONo =partOne.coNo AND pl.PLONo=partOne.PLONo
GROUP BY partOne.PLONo,partOne.CONo) partTwo,CO_T C,Mapping_T M,PLO_T
pl WHERE M.COID=C.COID AND M.PLOID=pl.PLOID AND C.CONo =partTwo.coNo
AND pl.PLONo=partTwo.PLONo
GROUP BY partTwo.PLONo,partTwo.CONo

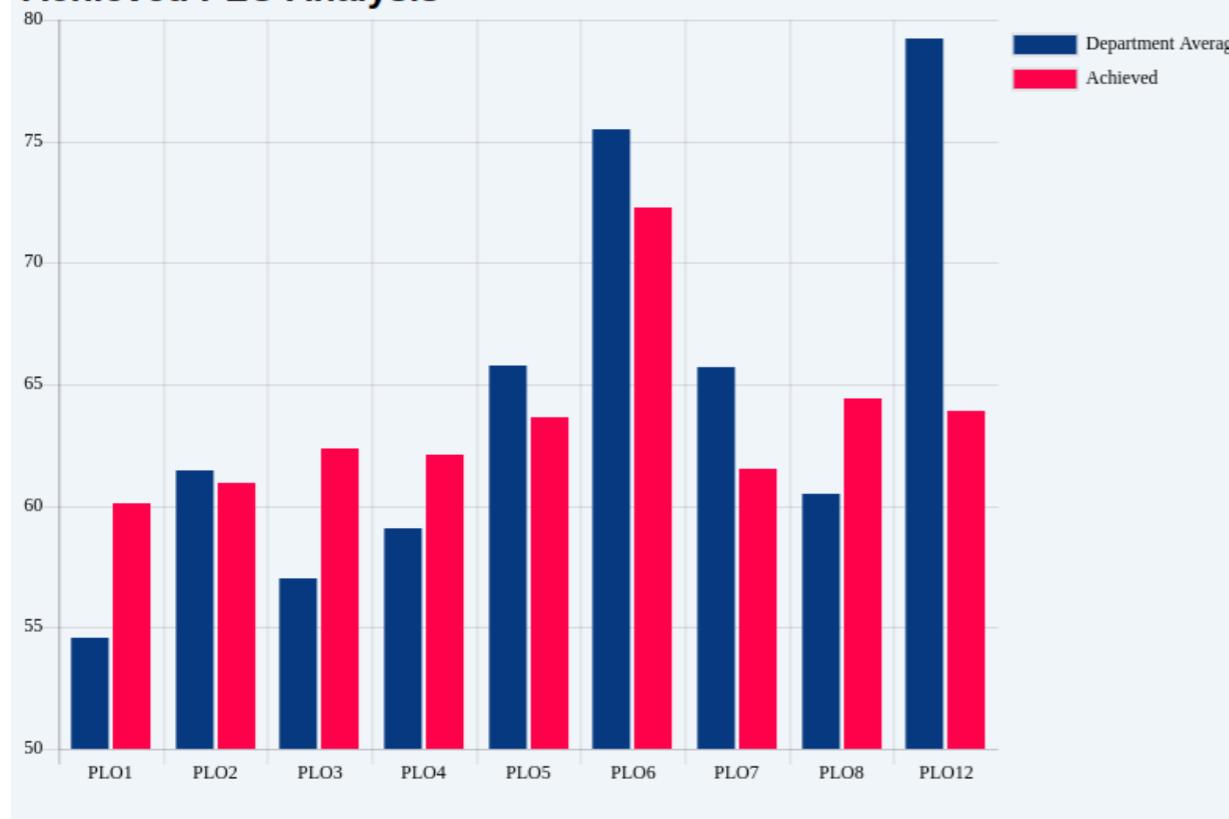
```

```

SELECT COUNT(PLOCount.PLONo)
      FROM
(SELECT PLOrawMarks.PLONo
FROM
  (SELECT COResult.CourseID
courseID,COResult.CONo coNo,p.PLONo
   FROM
    (SELECT c.CourseID,c.CONo
     FROM Evaluation_T e, CO_T
c,Assessment_T a,Registration_T r
      WHERE c.AssessmentID=a.AssessmentID
      AND c.AssessmentID= e.AssessmentID
      AND e.RegistrationID=r.RegistrationID
      AND r.StudentID=100
      GROUP BY c.CourseID ,c.CONo) COResult,
Mapping_T m,PLO_T p
      WHERE m.PLOID=p.PLOID
      GROUP BY
m.PLOID,COResult.CONo,COResult.CourseID)
PLOrawMarks,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COID=C.COID
AND M.PLOID=pl.PLOID
AND C.CONo =PLOrawMarks.coNo
AND pl.PLONo=PLOrawMarks.PLONo
GROUP BY PLOrawMarks.PLONo) PLOCount

```

## Achieved PLO Analysis



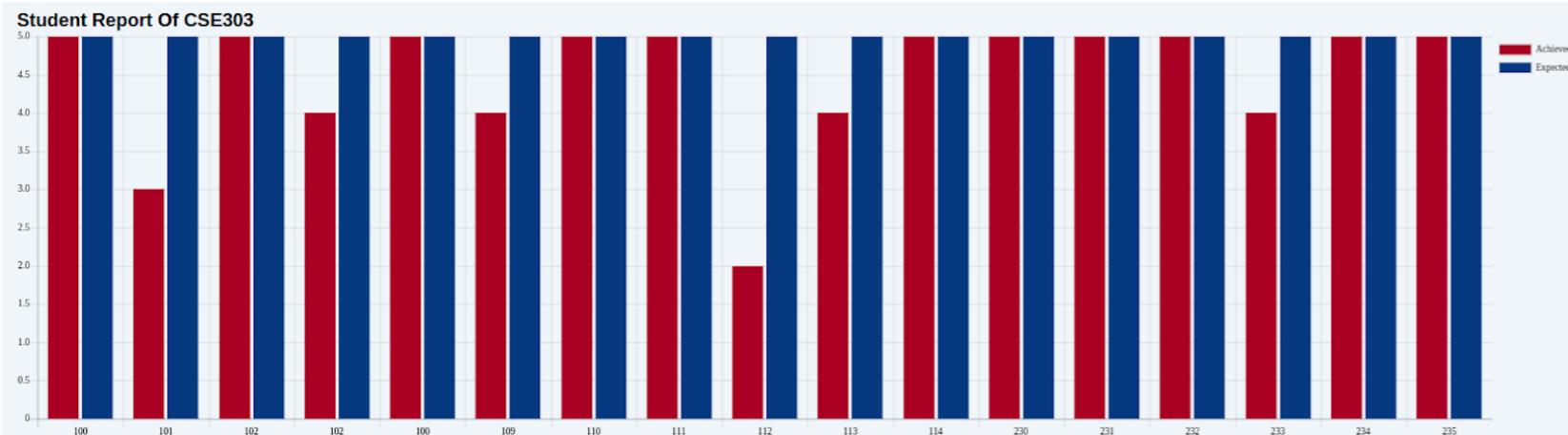
```

SELECT COUNT(PLOCOUNT.PLONO)
  FROM
  (SELECT PLORawMarks.PLONO
  FROM
    (SELECT COResult.CourseID
courseID,COResult.CONo coNo,p.PLONO
     FROM
      (SELECT c.CourseID,c.CONo
       FROM Evaluation_T e, CO_T
c,Assessment_T a,Registration_T r
      WHERE c.AssessmentID=a.AssessmentID
        AND c.AssessmentID= e.AssessmentID
        AND e.RegistrationID=r.RegistrationID
        AND r.StudentID=100
      GROUP BY c.CourseID ,c.CONo) COResult,
Mapping_T m,PLO_T p
      WHERE m.PLOID=p.PLOID
      GROUP BY
m.PLOID,COResult.CONo,COResult.CourseID)
PLORawMarks,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COID=C.COID
      AND M.PLOID=pl.PLOID
      AND C.CONo =PLORawMarks.coNo
      AND pl.PLONO=PLORawMarks.PLONO
      GROUP BY PLORawMarks.PLONO) PLOCOUNT
  
```

```

SELECT
PLOWiseRawMarks.PLONo, ((PLOWiseRawMarks.A/PLOWis
eRawMarks.T)*100) PLOpercentage
FROM
(SELECT
PLOrawMarks.PLONo, SUM(PLOrawMarks.total)
T, SUM(PLOrawMarks.achievedMark) A
FROM
(SELECT COResult.CourseID
courseID,COResult.StudentID stuID,COResult.CONO
coNo,COResult.total total ,
COResult.achievedMark
achievedMark ,p.PLONo
FROM
(SELECT
c.CourseID,r.StudentID,c.CONO,SUM(a.AllocatedMar
k) total ,SUM(e.AchievedMark) achievedMark,
((SUM(e.AchievedMark)/SUM(a.AllocatedMark))*100)
CoPercentage
FROM Evaluation_T e, CO_
c,Assessment_T a,Registration_T r
WHERE
c.AssessmentID=a.AssessmentID
AND c.AssessmentID=
e.AssessmentID
AND
e.RegistrationID=r.RegistrationID
AND r.StudentID=100
GROUP BY c.CourseID ,c.CONO)
COResult, Mapping_T m,PLO_T p
WHERE m.PLOID=p.PLOID
GROUP BY
m.PLOID,COResult.CONO,COResult.CourseID)
PLOrawMarks,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COVID=C.COVID
AND M.PLOID=pl.PLOID
AND C.CONO =PLOrawMarks.coNo
AND pl.PLONo=PLOrawMarks.PLONo
GROUP BY PLOrawMarks.PLONo) PLOWiseRawMarks
GROUP BY PLOWiseRawMarks.PLONo
HAVING (PLOpercentage>=40)

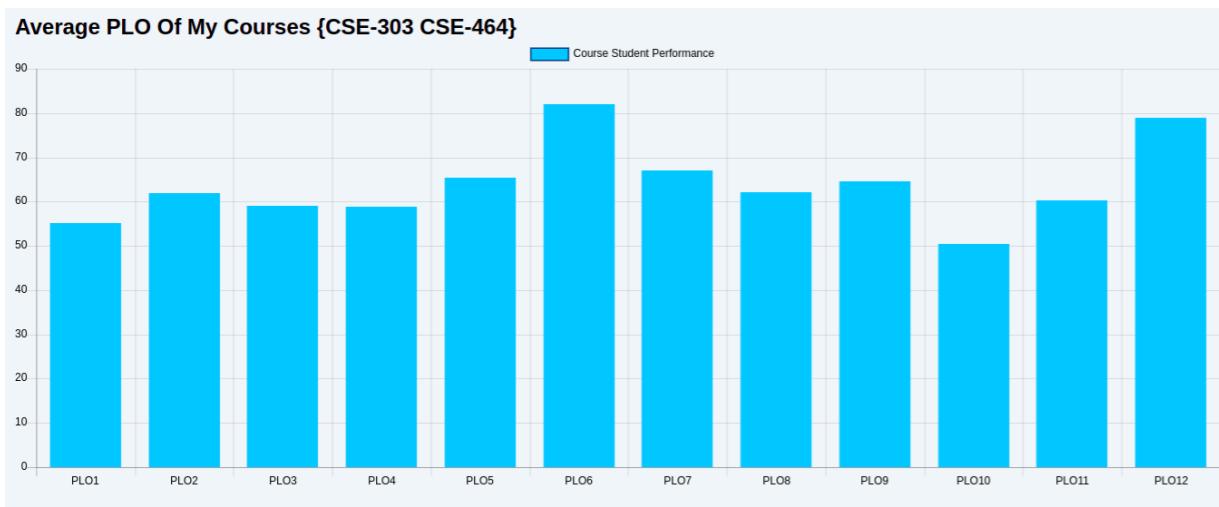
```



```

SELECT stepTwo.CourseID course,stepTwo.StudentID,COUNT(stepTwo.PLONo)
achievedNoPlo
FROM (SELECT
stepOne.CourseID,stepOne.RegistrationID,stepOne.StudentID,stepOne.PLONo
'
(SUM(stepOne.Achieved) / SUM(stepOne.Total) *100)
ploPercentage
FROM (SELECT c.CourseID,e.RegistrationID,r.StudentID
,c.CONo,SUM(a.AllocatedMark) Total,
SUM(e.AchievedMark) Achieved ,p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,PLO_T p,Mapping_T
m,Registration_T r
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND c.CourseID='CSE464'
AND m.COVID=c.COVID
AND m.PLOID=p.PLOID
GROUP BY e.RegistrationID,p.PLONo,c.CONo)
stepOne GROUP BY stepOne.RegistrationID,stepOne.PLONo
HAVING (ploPercentage>=40))
stepTwo GROUP BY stepTwo.RegistrationID

```

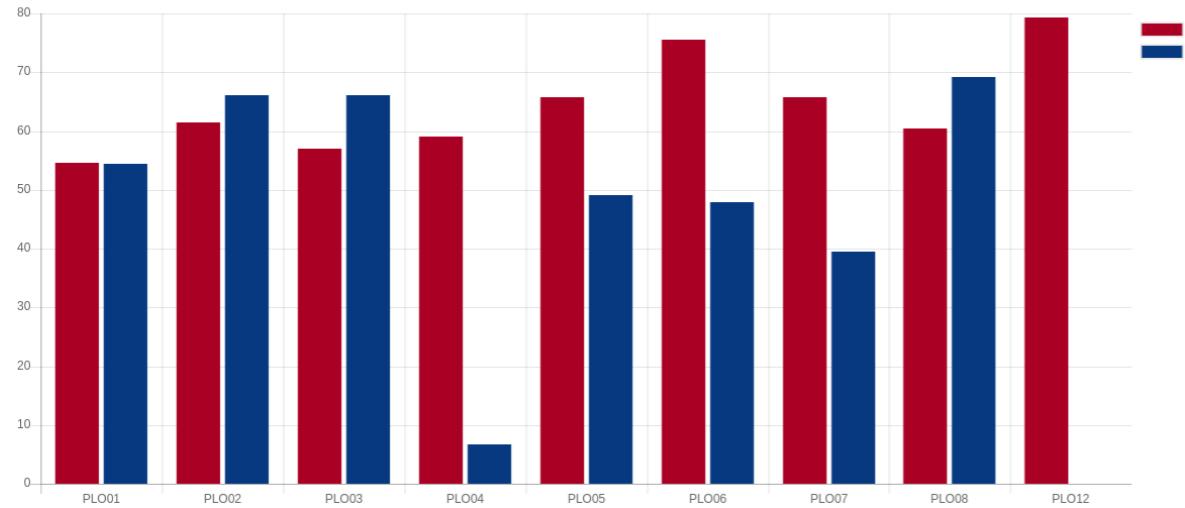


```

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark) / SUM(stepOne.total) *100)
PloPercentage
FROM
(SELECT
s.FacultyID,s.CourseID,s.Year,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,
SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Section_T s,Registration_T r,Evaluation_T e, CO_T
c,Assessment_T a,
Mapping_T m,PLO_T p,Enrollment_T en
WHERE s.FacultyID=4321
AND s.Year=2021
AND s.SectionID=r.SectionID
AND c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND m.PLOID=p.PLOID
AND c.COVID=m.COVID
AND en.StudentID=r.StudentID
GROUP BY m.PLOID,c.CONo,r.StudentID)  stepOne
GROUP BY stepOne.PLONo

```

PLO-Wise School Performance Trend

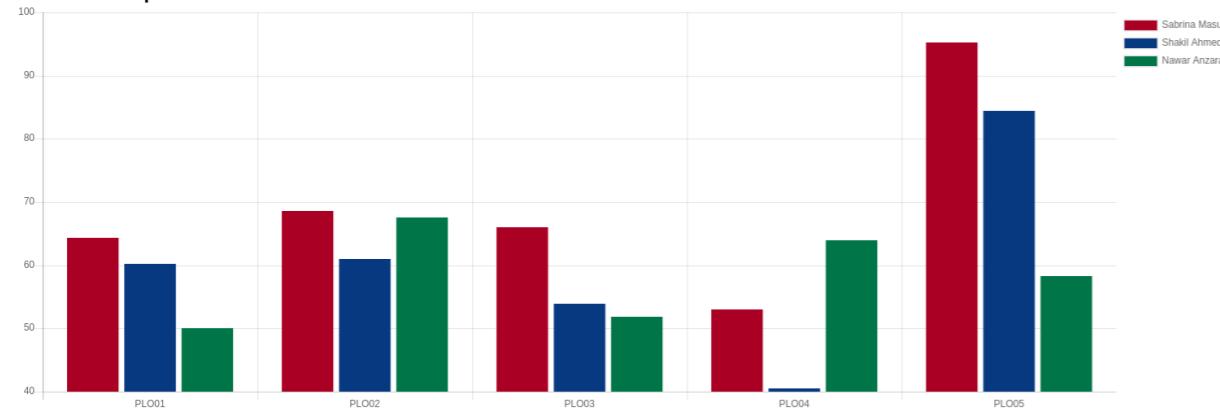


```

SELECT PLOrawMarks.PLONo, SUM(PLOrawMarks.total)
T ,SUM(PLOrawMarks.achievedMark) A,
(SUM(PLOrawMarks.achievedMark)/SUM(PLOrawMarks.total))*100 PLOpercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONO,SUM(a.AllocatedMark) total
, SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T r,Enrollment_T
en,
Program_T pr,Mapping_T m,PLO_T p,Department_T d
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND r.StudentID=en.StudentID
AND en.ProgramID=pr.ProgramID
AND m.PLOID=p.PLOID
AND m.COID=c.COID
AND pr.DepartmentID=d.DepartmentID
AND d.SchoolID='SB'
GROUP BY p.PLONo,c.CONO,r.StudentID,c.CourseID) PLOrawMarks,CO_T C,PLO_T
pl
WHERE C.CONO =PLOrawMarks.coNo
AND pl.PLONo=PLOrawMarks.PLONo
GROUP BY PLOrawMarks.PLONo

```

### Instructor Report of CSC460

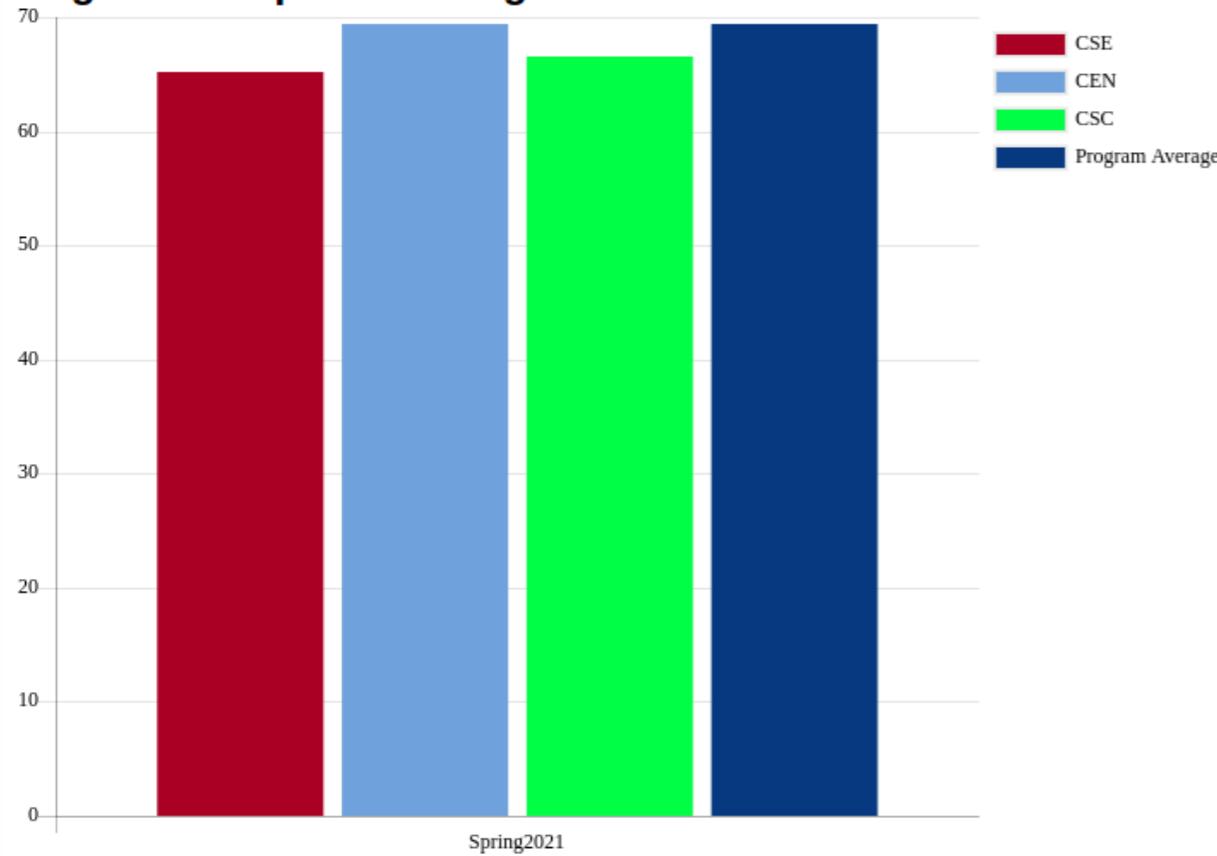


```

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark) / SUM(stepOne.total) *100)
PloPercentage
FROM
(SELECT
s.FacultyID,s.CourseID,s.Year,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,
SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Section_T s,Registration_T r,Evaluation_T e, CO_T
c,Assessment_T a,
Mapping_T m,PLO_T p,Enrollment_T en
WHERE s.FacultyID=5678
-- AND s.Year=2021
AND s.CourseID='CSE303'
AND s.SectionID=r.SectionID
AND s.SectionID=a.SectionID
AND c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND m.PLOID=p.PLOID
AND c.COID=m.COID
AND en.StudentID=r.StudentID
GROUP BY m.PLOID,c.CONo,r.StudentID) stepOne
GROUP BY stepOne.PLONo

```

## Program Comparison Progress View



```

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark) / SUM(stepOne.total)*100)
PloPercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Mapping_T m,PLO_T p,Enrollment_T en,Section_T s
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND m.PLOID=p.PLOID
AND r.StudentID=en.StudentID
AND s.SectionID=a.SectionID
AND en.ProgramID='B.SC. in CEN'
AND s.Year =2021
GROUP BY m.PLOID,c.CONo,c.CourseID,r.StudentID)
stepOne,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COVID=C.COVID
AND M.PLOID=pl.PLOID
AND C.CONo =stepOne.coNo
AND pl.PLONo=stepOne.PLONo
GROUP BY stepOne.PLONo

```

```

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark) / SUM(stepOne.total)*100)
PloPercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Mapping_T m,PLO_T p,Enrollment_T en,Section_T s
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND m.PLOID=p.PLOID
AND r.StudentID=en.StudentID
AND s.SectionID=a.SectionID
AND en.ProgramID='B.SC. in CSC'
AND s.Year =2021
GROUP BY m.PLOID,c.CONo,c.CourseID,r.StudentID)
stepOne,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COVID=C.COVID
AND M.PLOID=pl.PLOID
AND C.CONo =stepOne.coNo
AND pl.PLONo=stepOne.PLONo
GROUP BY stepOne.PLONo

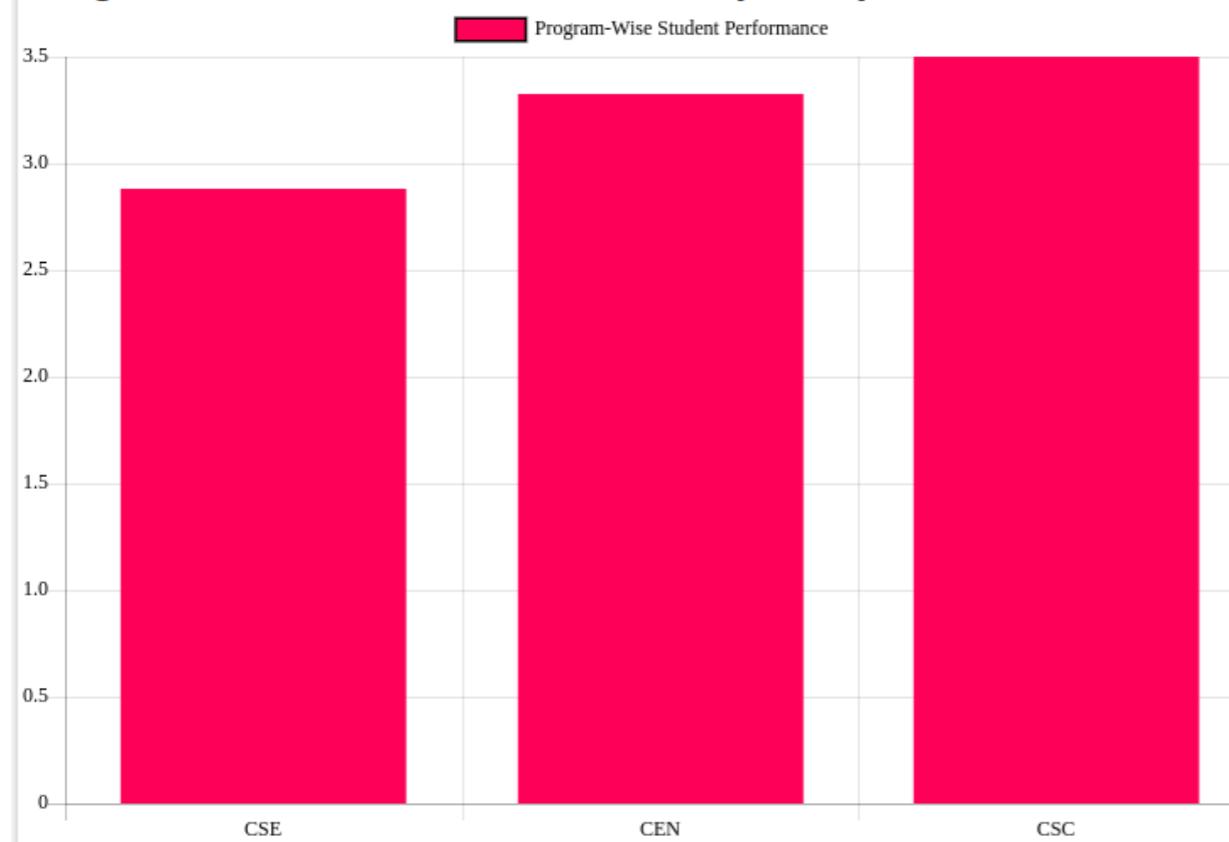
```

```

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark)/SUM(stepOne.total)*100)
PloPercentage
    FROM
        (SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
        p.PLONo
        FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Mapping_T m,PLO_T p,Enrollment_T en,Section_T s
        WHERE c.AssessmentID=a.AssessmentID
        AND c.AssessmentID= e.AssessmentID
        AND e.RegistrationID=r.RegistrationID
        AND m.PLOID=p.PLOID
        AND r.StudentID=en.StudentID
        AND s.SectionID=a.SectionID
        AND en.ProgramID='B.SC. in CSE'
        AND s.Year =2021
        GROUP BY m.PLOID,c.CONo,c.CourseID,r.StudentID)
stepOne,CO_T C,Mapping_T M,PLO_T pl
    WHERE M.COID=C.COID
        AND M.PLOID=pl.PLOID
        AND C.CONo =stepOne.coNo
        AND pl.PLONo=stepOne.PLONo
    GROUP BY stepOne.PLONo

```

## Program-Wise Student Performance (CGPA)



```
SELECT SUM(stepTwo.CGPAofCSE) sumofCGPA, COUNT(stepTwo.StudentID)
noofStudent,
          (SUM(stepTwo.CGPAofCSE)/COUNT(stepTwo.StudentID)*4)/4
CGPA
FROM
          (SELECT SUM(stepOne.calOne)/SUM(stepOne.AchievedCredit)
CGPAC, stepOne.StudentID ,stepOne.ProgramID
FROM(
          SELECT (r.GradePoint*r.AchievedCredit) calOne
,r.StudentID,e.ProgramID,r.AchievedCredit
          FROM Registration_T r,Enrollment_T e
WHERE r.StudentID=e.StudentID
AND e.ProgramID='B.SC. in CSC'
) stepOne
GROUP BY stepOne.StudentID) stepTwo
```

```

SELECT SUM(stepTwo.CGPAofCSE) sumofCGPA, COUNT(stepTwo.StudentID)
noofStudent,
          (SUM(stepTwo.CGPAofCSE) / COUNT(stepTwo.StudentID) *4) /4
CGPA
FROM
          (SELECT SUM(stepOne.calOne)/SUM(stepOne.AchievedCredit)
CGPAC, stepOne.StudentID ,stepOne.ProgramID
          FROM (
              SELECT (r.GradePoint*r.AchievedCredit) calOne
,r.StudentID,e.ProgramID,r.AchievedCredit
              FROM Registration_T r,Enrollment_T e
              WHERE r.StudentID=e.StudentID
              AND e.ProgramID='B.SC. in CSE'
          ) stepOne
          GROUP BY stepOne.StudentID) stepTwo

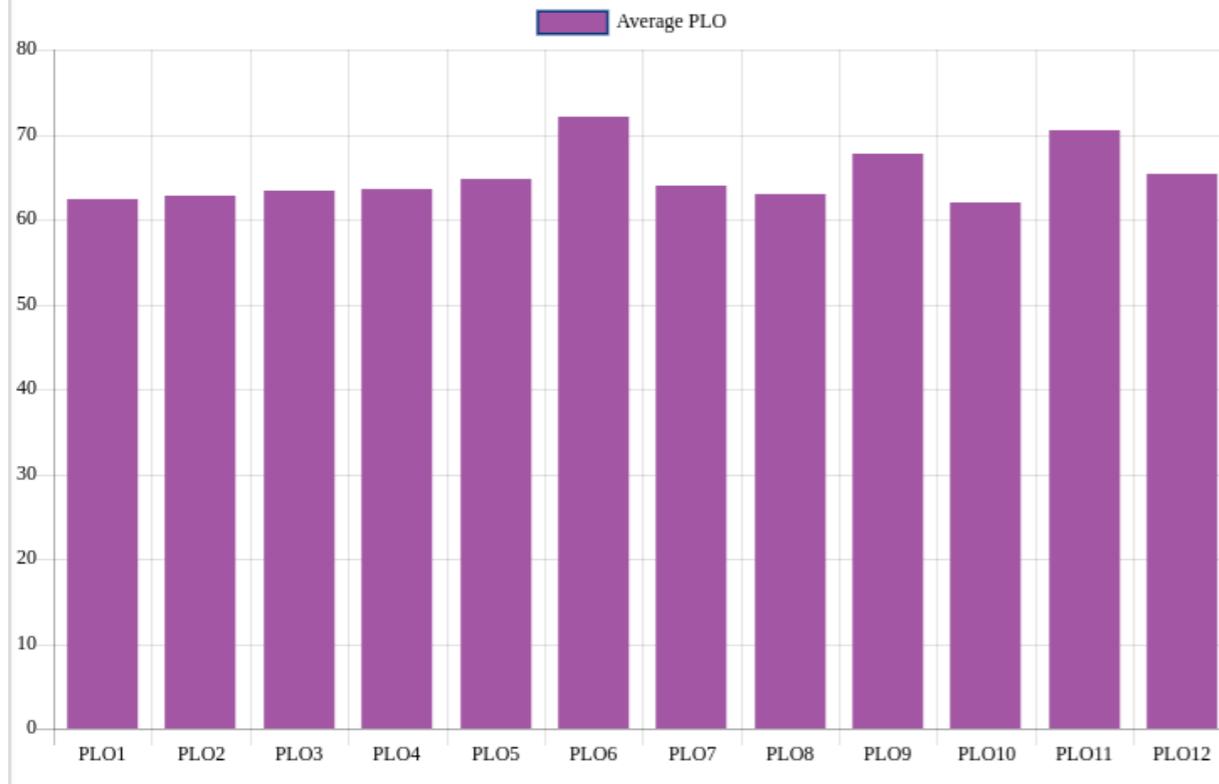
```

```

SELECT SUM(stepTwo.CGPAofCSE) sumofCGPA, COUNT(stepTwo.StudentID)
noofStudent,
          (SUM(stepTwo.CGPAofCSE) / COUNT(stepTwo.StudentID) *4) /4
CGPA
FROM
          (SELECT SUM(stepOne.calOne)/SUM(stepOne.AchievedCredit)
CGPAC, stepOne.StudentID ,stepOne.ProgramID
          FROM (
              SELECT (r.GradePoint*r.AchievedCredit) calOne
,r.StudentID,e.ProgramID,r.AchievedCredit
              FROM Registration_T r,Enrollment_T e
              WHERE r.StudentID=e.StudentID
              AND e.ProgramID='B.SC. in CEN'
          ) stepOne
          GROUP BY stepOne.StudentID) stepTwo

```

## CSE Program Student Performance

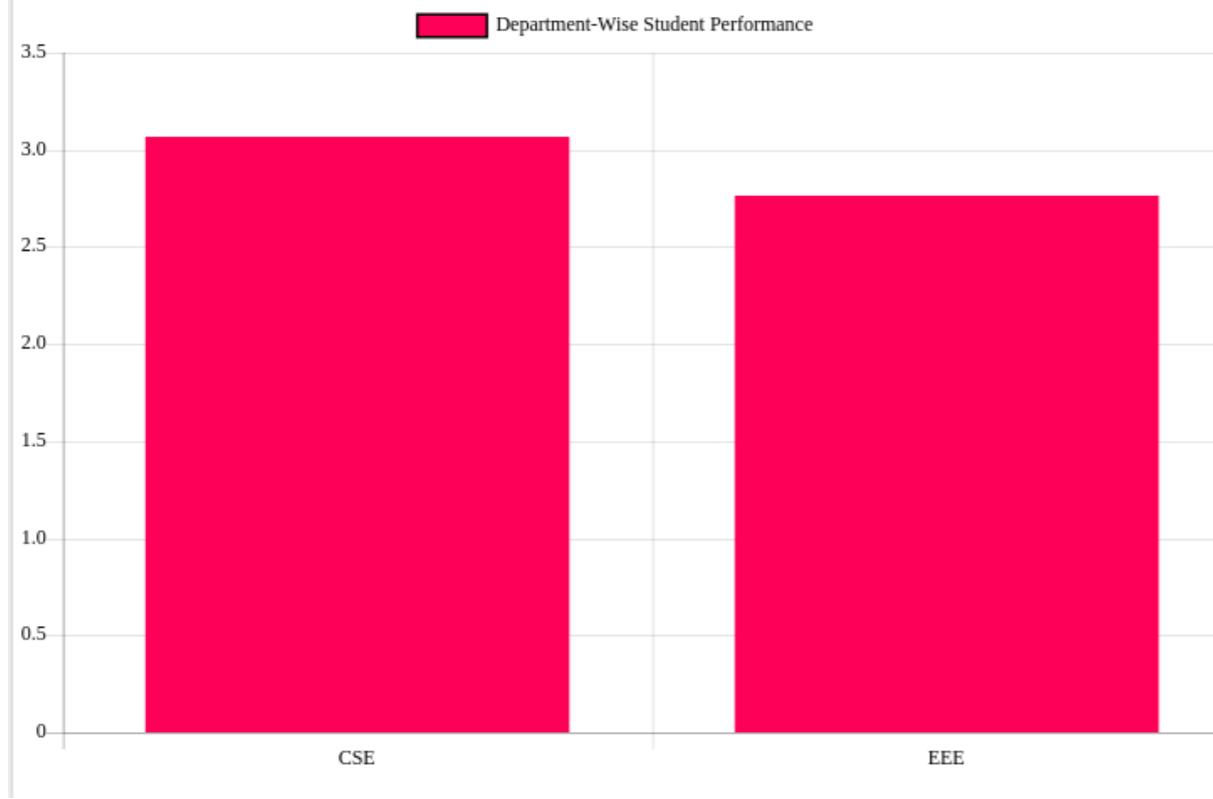


```

SELECT
PLOWiseRawMarks.PLONo, ((PLOWiseRawMarks.A/PLOWiseRawMarks.T)*100)
PLOpercentage
FROM (SELECT PLOrawMarks.PLONo,SUM(PLOrawMarks.total)
T,SUM(PLOrawMarks.achievedMark) A
FROM (SELECT COResult.CourseID,COResult.StudentID
stuID,COResult.CONO,COResult.total total , COResult.achievedMark
achievedMark ,p.PLONo
FROM (SELECT c.CourseID,r.StudentID,c.CONO,SUM(a.AllocatedMark) total
,a.SUM(e.AchievedMark) achievedMark,
((SUM(e.AchievedMark)/SUM(a.AllocatedMark))*100) CoPercentage
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T r WHERE
c.AssessmentID=a.AssessmentID AND c.AssessmentID= e.AssessmentID AND
e.RegistrationID=r.RegistrationID AND r.StudentID=100
GROUP BY c.CourseID ,c.CONO, Mapping_T m,PLO_T p WHERE
m.PLOID=p.PLOID GROUP BY m.PLOID,COResult.CONO,COResult.CourseID)
PLOrawMarks,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COID=C.COID
AND pl.PLONo=PLOrawMarks.PLONo
GROUP BY PLOrawMarks.PLONo)
PLOWiseRawMarks GROUP BY PLOWiseRawMarks.PLONo

```

## Department-Wise Student Performance (CGPA)



```
SELECT P.DepartmentID, AVG(CGPAofAllStudent.CGPA)
FROM
    (SELECT SUM(r.GradePoint*r.AchievedCredit)
x,SUM(r.AchievedCredit) CreditEarned,
(SUM(r.GradePoint*r.AchievedCredit)/SUM(r.AchievedCredit)) CGPA
, r.StudentID,e.ProgramID

FROM Registration_T r,Enrollment_T e,Program_T p
WHERE r.StudentID=e.StudentID
AND e.ProgramID=p.ProgramID
AND p.DepartmentID='CSE'
GROUP BY r.StudentID

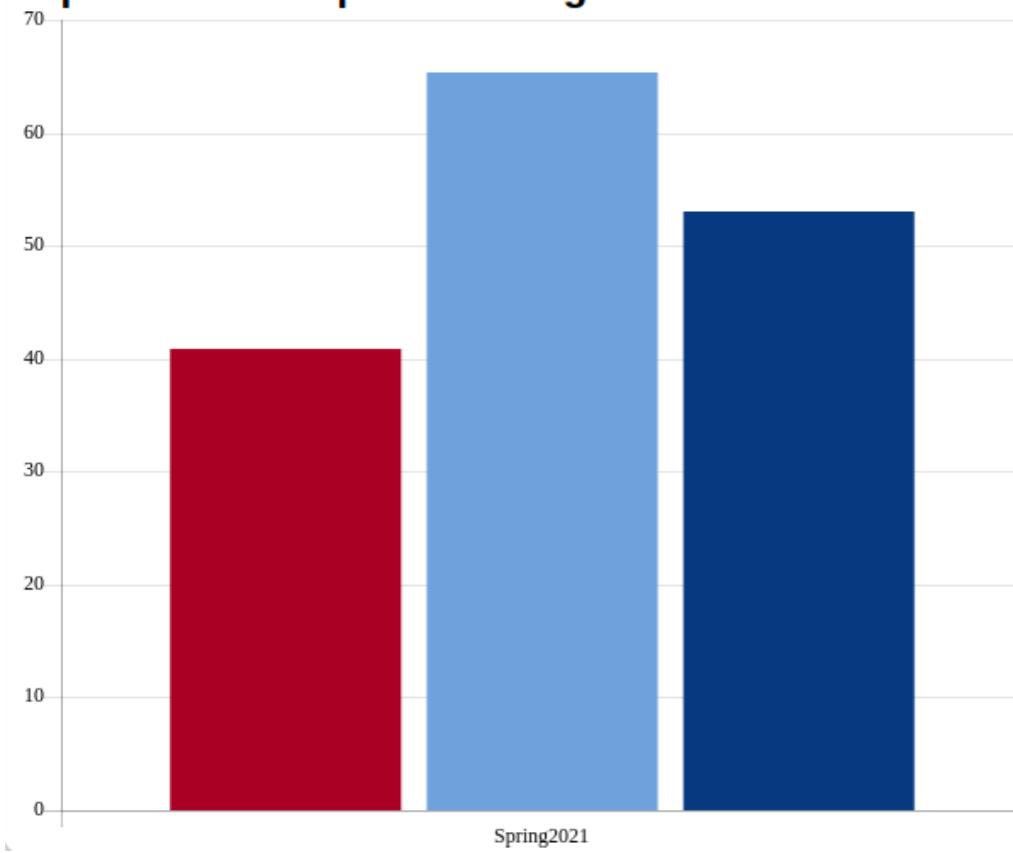
) CGPAofAllStudent,Registration_T R,Enrollment_T E,Program_T
P
WHERE r.StudentID=e.StudentID
AND e.ProgramID='B.SC. in CSE'
AND P.DepartmentID='CSE'
```

```
SELECT P.DepartmentID, AVG(CGPAofAllStudent.CGPA)
FROM
    (SELECT SUM(r.GradePoint*r.AchievedCredit)
x,SUM(r.AchievedCredit) CreditEarned,
(SUM(r.GradePoint*r.AchievedCredit)/SUM(r.AchievedCredit)) CGPA
, r.StudentID,e.ProgramID

FROM Registration_T r,Enrollment_T e,Program_T p
WHERE r.StudentID=e.StudentID
AND e.ProgramID=p.ProgramID
AND p.DepartmentID='CSE'
GROUP BY r.StudentID

) CGPAofAllStudent,Registration_T R,Enrollment_T E,Program_T
P
WHERE r.StudentID=e.StudentID
AND e.ProgramID='B.SC. in EEE'
AND P.DepartmentID='EEE'
```

## Department Comparison Progress View



■ EEE  
■ CSE  
■ Dept Average

```

SELECT d.SchoolID,COUNT(e.StudentID) AS c
FROM Enrollment_T e,Program_T p, Department_T d,School_T s
WHERE e.ProgramID=p.ProgramID
AND d.DepartmentID=p.DepartmentID
AND d.SchoolID=s.SchoolID
GROUP BY d.SchoolID

SELECT stepOne.PLONo, (SUM(stepOne.achievedMark)/SUM(stepOne.total)*100)
PloPercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Mapping_T m,PLO_T p,Enrollment_T en,Section_T s,
Program_T pr
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND m.PLOID=p.PLOID
AND r.StudentID=en.StudentID
AND s.SectionID=a.SectionID
AND en.ProgramID=pr.ProgramID
AND pr.DepartmentID='EEE'
AND s.Year =2021
GROUP BY m.PLOID,c.CONo,c.CourseID,r.StudentID)
stepOne,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COID=C.COID
AND M.PLOID=pl.PLOID
AND C.CONo =stepOne.coNo
AND pl.PLONo=stepOne.PLONo
GROUP BY stepOne.PLONo
    
```

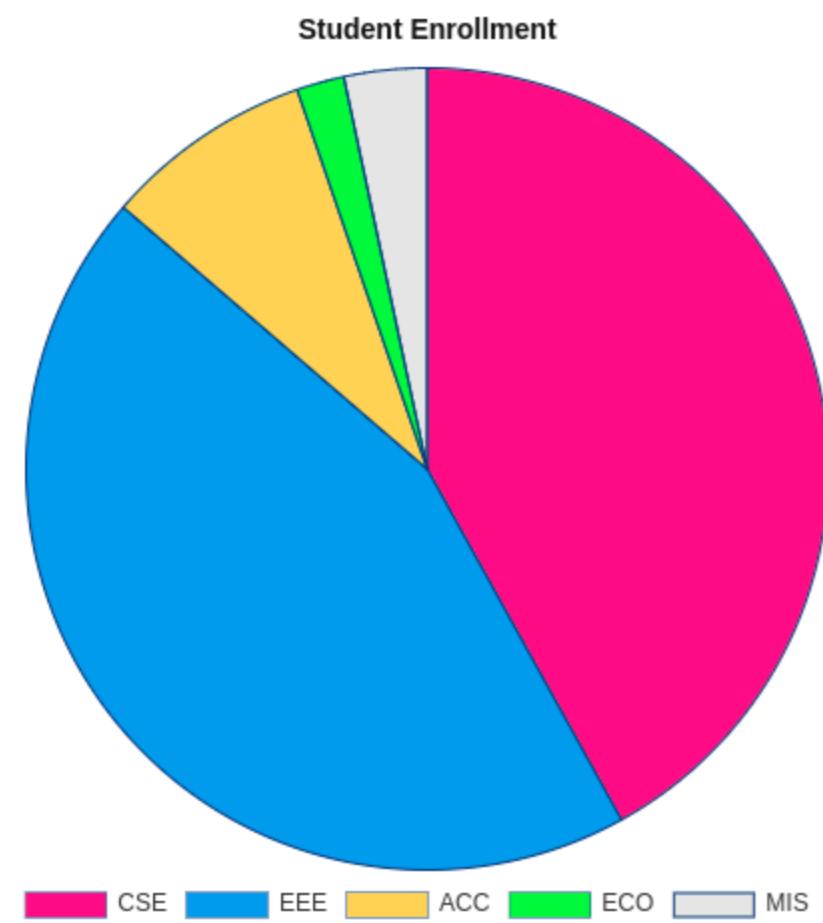
```

SELECT d.SchoolID,COUNT(e.StudentID) AS c
FROM Enrollment_T e,Program_T p, Department_T d,School_T s
WHERE e.ProgramID=p.ProgramID
AND d.DepartmentID=p.DepartmentID
AND d.SchoolID=s.SchoolID
GROUP BY d.SchoolID

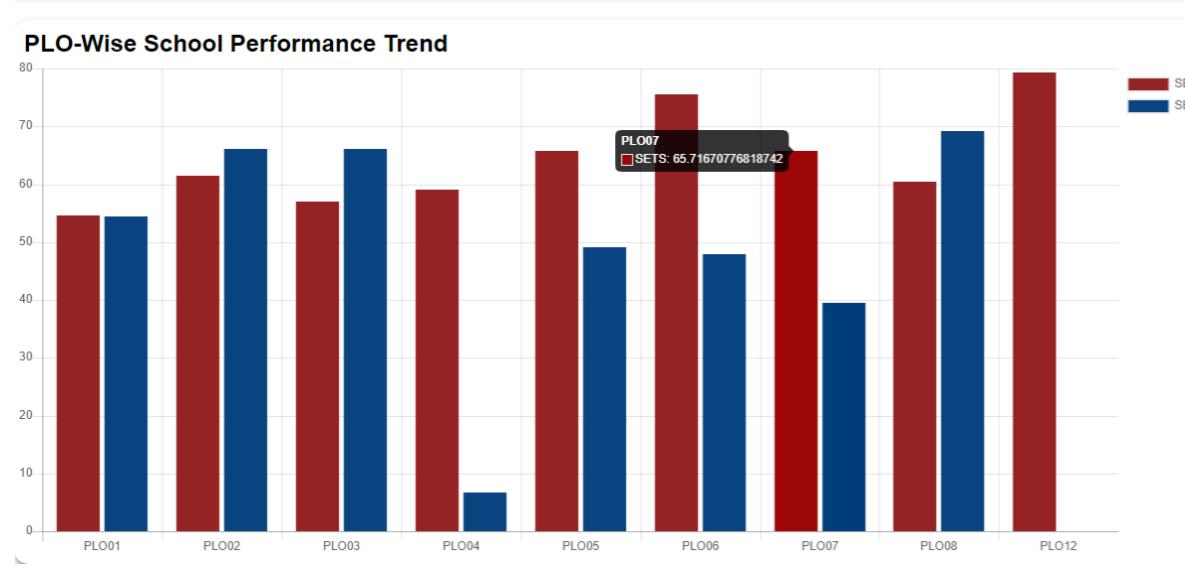
SELECT stepOne.PLONo, (SUM(stepOne.achievedMark)/SUM(stepOne.total)*100)
PloPercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Mapping_T m,PLO_T p,Enrollment_T en,Section_T s,
Program_T pr
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND m.PLOID=p.PLOID
AND r.StudentID=en.StudentID
AND s.SectionID=a.SectionID
AND en.ProgramID=pr.ProgramID
AND pr.DepartmentID='CSE'
AND s.Year =2021
GROUP BY m.PLOID,c.CONo,c.CourseID,r.StudentID)
stepOne,CO_T C,Mapping_T M,PLO_T pl
WHERE M.COID=C.COID
AND M.PLOID=pl.PLOID
AND C.CONo =stepOne.coNo
AND pl.PLONo=stepOne.PLONo
GROUP BY stepOne.PLONo

```

### Department-Wise Enrollment Trend



```
SELECT p.DepartmentID,COUNT(e.StudentID) c
FROM Enrollment_T e,Program_T p,Department_T d
WHERE e.ProgramID=p.ProgramID
AND e.EnrolledYear=2021
AND e.EnrolledSem='Spring'
AND d.SchoolID='SETS'
GROUP BY p.DepartmentID
```



```

SELECT PLOrawMarks.PLONo, SUM(PLOrawMarks.total)
T, SUM(PLOrawMarks.achievedMark) A,
(SUM(PLOrawMarks.achievedMark)/SUM(PLOrawMarks.total))*100
PLOpercentage
FROM
(SELECT c.CourseID,r.StudentID,c.CONo,SUM(a.AllocatedMark)
total ,SUM(e.AchievedMark) achievedMark,
p.PLONo
FROM Evaluation_T e, CO_T c,Assessment_T a,Registration_T
r,Enrollment_T en,
Program_T pr,Mapping_T m,PLO_T p,Department_T d
WHERE c.AssessmentID=a.AssessmentID
AND c.AssessmentID= e.AssessmentID
AND e.RegistrationID=r.RegistrationID
AND r.StudentID=en.StudentID
AND en.ProgramID=pr.ProgramID
AND m.PLOID=p.PLOID
AND m.COVID=c.COVID
AND pr.DepartmentID=d.DepartmentID
AND d.SchoolID='SETS'
GROUP BY p.PLONo,c.CONo,r.StudentID,c.CourseID)
PLOrawMarks,CO_T C,PLO_T pl
WHERE C.CONo =PLOrawMarks.coNo
AND pl.PLONo=PLOrawMarks.PLONo
GROUP BY PLOrawMarks.PLONo

```

## CHAPTER 5: CONCLUSION

### PROBLEM AND SOLUTION

1. We faced inefficiency and lagging during implementing the software codes. So, we need more resources and tools to build up this type of powerful web application.
2. We could not connect to IRAS as there should have been a gateway to sync all the information from IRAS to SPM. As a result, we used dummy data.

3. We couldn't implement regular deployment of data in Microsoft Azure Cloud Service.
4. Due to time limitation, we could not add some features.

## ADDITIONAL FEATURES AND FUTURE DEVELOPMENT

1. Since we are building this web application for all the public and private universities of Bangladesh, we will bring all the information of the students in the cloud.
2. Automated PLO-CO mapping
3. Count the views

## CONTRIBUTION OF EACH MEMBER

<u>Subject/Content</u>	<u>Tahmid Hossain</u>	<u>Nawar Anzara</u>	<u>Sabrina Masum</u>	<u>Nusrat Jahan</u>	<u>Shakil Ahmed</u>	<u>Farhan Ahsan</u>
<u>Cover Page</u>		-	-	-	-	<input checked="" type="checkbox"/>
<u>Table of Contents</u>	-	-	-	-	-	<input checked="" type="checkbox"/>

<u>Background of the Organization</u>	-	-	-	-	-	✓
<u>Background of the Project</u>	-	-	-	-	-	✓
<u>Objectives of the Project</u>	-	-	-	-	-	✓
<u>Scope of the Project</u>	-	-	-	-	-	✓
<u>Existing Rich Picture</u>	-	-	✓	-	-	-
<u>Existing Six Element System Analysis</u>	✓	✓	✓	✓	✓	✓
<u>Existing BPMN</u>	✓	✓	✓	✓	✓	✓
<u>Existing Problems and Analysis of the Problems</u>	✓	✓	✓	✓	✓	✓
<u>Proposed Rich Picture</u>	-	-	✓	-	-	-

<u>Proposed Six Element System Analysis</u>	✓	✓	✓	✓	✓	✓
<u>Proposed BPMN</u>	✓	✓	✓	✓	✓	✓
<u>Business Rules</u>	-	-	-	✓	-	✓
<u>ERD</u>	-	✓	-	✓	-	-
<u>Relational Schema</u>	-	-	✓	-	✓	-
<u>Normalization</u>		✓	-	✓	-	
<u>Data Dictionary</u>	✓		-		-	✓
<u>Input Forms - Purpose</u>	✓	✓	✓	✓	✓	✓
<u>Output Query and Reports - Purpose and Use</u>	-	-	-	✓	-	-
<u>Input Forms - Related SQL Used</u>	-	-	-	✓	-	-

<u>Output Query and Reports – Description along with SQL</u>	–	–	–	✓	–	–
<u>System Design Architecture</u>	–	–	✓	–	✓	✓
<u>Problem &amp; Solution</u>	✓	✓	–	–	–	✓
<u>Additional Features and Future Development</u>	–	–	–	–	–	✓
<u>Reference and Appendix</u>	–	–	–	–	–	✓

## REFERENCE

[1] “IUB at a glance,” [Online].

## APPENDIX

As we are working on a huge set of data, we were facing many difficulties to run those on local machine. So, to prevent this, we used MS Azure Cloud Service as a result we can access data very smoothly and fastly from anywhere of the world.