



Database Management Project

Final Report

Group 01

Name:	ID:
William Jefferson Mondol	2020600
Fardin Ahsan Shafi	2020975
Mehedi Hasan Surem	2030069
Fahim Shahriar Eram	2022523
Anannya Preeta	2020977
Shanjidul Hasan Shajid	2022049

TABLE OF CONTENT

CHAPTER 1: INTRODUCTION.....	3
1.1 Background of the Organization.....	3
1.2 Background of the Organization.....	4
1.3 Objectives of the Project.....	5
1.4 Scope of the Project.....	5
CHAPTER 2: REQUIREMENT ANALYSIS.....	6
2.1 Existing Business System (With Rich Picture).....	6
2.2 Processes along with Six System Element Analysis.....	7
2.2.1 Process Diagram (As Is).....	7
2.3 Existing Problems & Analysis of the Problem.....	21
2.4 Proposed Business System (with rich picture).....	22
2.4.1 Proposed Processes along with Six System Element Analysis.....	23
CHAPTER 3: LOGICAL SYSTEM DESIGN.....	40
3.1 Business Rules.....	40
3.2 Entity Relationship Diagram (ERD).....	43
3.3 ERD To Relations.....	45
3.4 Normalization.....	46
3.5 Data Dictionary.....	51
CHAPTER 4: PHYSICAL SYSTEM DESIGN.....	71
CHAPTER 5: CONCLUSION.....	74
5.1 Problems & Solution.....	74
5.2 Additional Feature & Future Development.....	74
5.3 Conclusion & Recommendation.....	74

CHAPTER 1: INTRODUCTION

1.1 Background of the Organization

The top private university in Bangladesh, Independent University, Bangladesh (IUB), was founded in 1993 and has a clear emphasis on research and international collaborations.

The Independent University, Bangladesh (IUB) has numerous, strong schools, including the following:

- Business & Entrepreneurship
- Engineering, Technology & Sciences
- Environment and Life Sciences
- Liberal Arts & Social Sciences
- Pharmacy and Public Health.

The institution has made a significant contribution to the growth of Bangladesh's educational sector and has turned out knowledgeable and skillful researchers who have made contributions on both a national and international scale. The University Grants Commission (UGC), the Ministry of Education, and other crucial organizations for each of the schools, along with routine curriculum updates, the implementation of a system to track student performance based on a quantified approach between course curriculum and standards set by UGC and the Bangladesh government, and ongoing student performance monitoring, have all assisted IUB in accomplishing this.

The goals of IUB are to produce local graduates who meet international standards and have the knowledge and skills to lead in business, government, and welfare. They also include encouraging and supporting useful research, creating knowledge, and providing opportunities for adults to continue their education.



Figure 1: Independent University, Bangladesh

1.2 Background of the Organization

The purpose of our project is to design, develop, and disseminate software that, in our opinion, will help universities all over the world encourage a more effective and fruitful method of student evaluation. The idea of course outcomes (COs) and program learning outcomes (PLOs), where each CO is mapped to a PLO, and each PLO represents a specific valuable skill that students are expected to acquire or improve at the conclusion of that course, such as problem analysis, design, implementation of a skill, and spider chart, has been introduced as the central concept of our project.

The information will all be included in the course outline so that students can easily access it and learn everything they need to know about a course. In order to evaluate students effectively using tools like spider charts, the project will determine whether each student has successfully completed the PLOs that are linked to the COs requirements. The system accepts IEB input when establishing PLO standards. The faculties then enter the COs for each of their students so that the system can map the COs to PLO appropriately. Through the execution of this project, it was discovered that efficiency not only cut down on time but also improved quality. The PLOs are thoughtfully chosen to ensure that students gain the most skills from a course.

We also have a feature that allows professors to enter questions into a question bank that students can access. This feature will help students learn about the topics they want to learn about and will give them a huge practice area.

Students can keep track of their development in each area and pinpoint their areas for development. Our program also aims to assist institutional bodies, such as faculty, administrative, and departmental bodies, in better distributing and allocating resources while keeping track of student development and departmental performance.

1.3 Objectives of the Project

Our project aims to develop an interactive, user-friendly program that will serve as a platform for university staff, faculty, and other participants to assist in enhancing the standard of instruction and revolutionizing how we incorporate technology into our education. We are confident that the information we have gathered, assessed, and organized will open doors for significant improvements in the educational sector as well as the field of computer science. In this situation, SMPS will broaden the project's scope in order to benefit all the departments.

1.4 Scope of the Project

Our strategy involves developing a Web application called SPMS 2 that uses a Relational Database Management System (RDMS) to store, edit, add, and update the data necessary for monitoring student performance as well as for producing and archiving related OBE data, reports, and documents. For the web-based SPMS system, we created fictitious users and made assumptions about their usage habits and the data and information they would need. We will design special user interfaces and login options for various stakeholders who will also be using this system because problems can happen at many different points throughout all business processes. Our data is stored using a (RDBMS), making it possible to obtain pertinent files, tabular data, and page layouts. Reports also become incredibly simple, allowing for in-the-moment interaction with the necessary data.

Additionally, we create user interfaces that make it simple for all users to access these data and use them to download reports, among other things. We develop a platform that enables faculties to collaborate on the creation of course outlines, course reports, marksheets, assessments, mapping assessments to COs and PLOs for PLO success, and keeping track of student evaluations for all of their courses throughout the semester. We also allow faculties to upload questions into the question bank for the students. The IUB leadership team, governmental organizations, and students can all access the systems for arriving at conclusions.

Each stakeholder will only see the data that is specifically relevant to them, and data will also be protected.

CHAPTER 2: REQUIREMENT ANALYSIS

2.1 Existing Business System (With Rich Picture)

We develop a platform that enables faculties to collaborate on the creation of course descriptions, course reports, marksheets, assessments, mapping assessments to COs and PLOs for PLO success, and maintaining student evaluations for all of their courses throughout the semester. We also allow faculties to upload questions into the question bank for the students. The IUB leadership team, governmental organizations, and students can all access the systems for arriving at conclusions. Data will be protected and each stakeholder will only see the information that pertains to them specifically. The faculty is then provided with student responses to their inquiries. After the assessment is finished, the system receives and stores the records. Every report is recorded by the system.

All users have access to the system's illuminating bar graphs, pie charts, and tables that show PLO achievement for all students, PLO achievement for a particular student, and PLO achievement with regard to particular courses. The faculty is then provided with student responses to their inquiries. After the assessment is finished, the system receives and stores the records. Every report is recorded by the system.

All users have access to the system's illuminating bar graphs, pie charts, and tables that show PLO achievement for all students, PLO achievement for a particular student, and PLO achievement related to particular courses.

The Faculty User will be able to add questions to that exam using the system. To assign a CO, the questions will be necessary. The user will have the option of adding numerous questions to a single exam. Additionally, CO must be assigned with each question separately. A text box will be provided for the user to type the question. The applications will add a view option for the question after the Faculty User adds it. The user will be able to see the learning domain and level in the question view interface.

The percentage of COs and POs achieved can be calculated from the marks the faculty user can individually assign to each of the questions. A spider diagram of the students' COs and POs will be available to all users.

The faculty user will add an OBE-based course outline for a single course and make it accessible to all users. The user will be able to download the course outline for one course in a program separately, as well as the course outline for every course in the program as one PDF file.

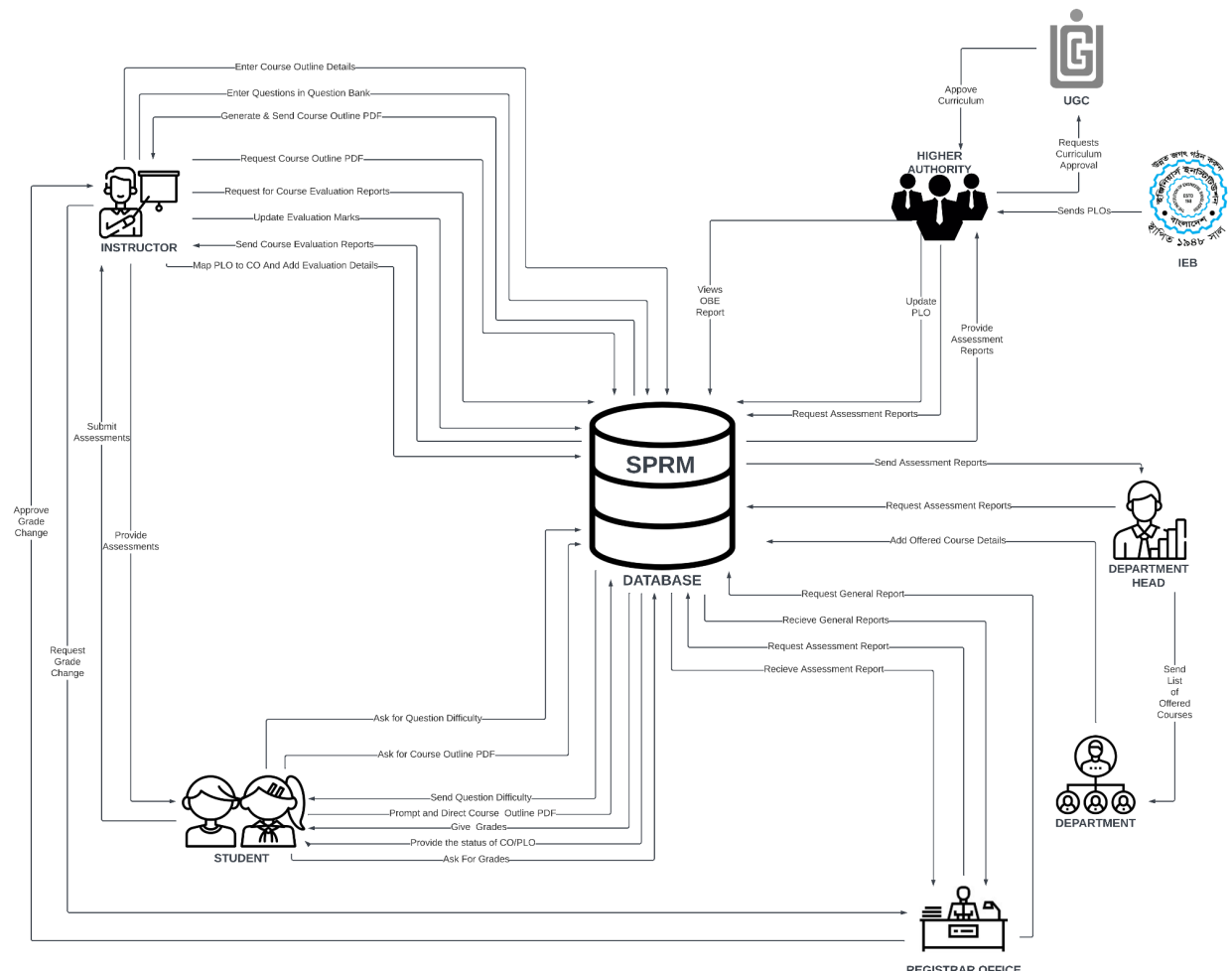


Figure 2: Rich Picture of Existing System

2.2 Processes along with Six System Element Analysis

2.2.1 Process Diagram (As Is)

The existing system's six elements analysis is a process of analysis where each analysis is built upon the one that came before it. The table below provides

additional insight into each component's function in the current system based on the detailed picture.

Process	System Roles					
	Human	Non-computing hardware	Computing Hardware	Software	Database	Network and Communication
Student Enrollment	Student: a) Search for the website. b) Enter the website. c) Click on the form option within the website. d) Fill out the form with the required information. Registrar's Office: a) Checks and verifies student enrollment information from the website or hard copy forms. b) The registrar office admin logs into the system.	Paper and Stationery: Used to collect information about students through enrollment forms.	Computer / Laptop: a) Data can be accessed and updated by SPMS Admin using computer. b) Students can input data using computer. c) Data can be viewed by Users using computer. Database Server: a) Used by SPMS Admin to collect data and maintain software. Networking Devices (Router, Switch, Bridge, Hub):	Operating System: a) Used by SPMS and Registrar Office. b) Students use to fill up form from website. SPMS: a) Used by Admin to setup user accounts.	Register Office Database: a) Used by Registrar's office to input student data into an excel file that is saved in SPMS. SPMS: a) All Updated information is kept in the database. Excel: a) Student data is entered in excel file for SPMS to access.	Internet: a) Used to access and store data to SPMS. b) Collects student form from students and gives it to the Registrar's office. c) Student information are sent to SPMS Admin by the Registrar's office.

	<p>c) Sends verified student information as attachment to Admin.</p> <p>Admin:</p> <p>a) Logs into the system using SPMS ID and password.</p> <p>b) Receives the student enrollment information via attached files.</p> <p>c) Updates the student enrollment information in the database.</p> <p>d) Enters the semester/year to view the number of students enrolled.</p> <p>e) Notifies respected stakeholders.</p>		<p>a) Uses to access SPMS</p>			
Student Performance Based on CGPA	<p>Student:</p> <p>a) Logs into the system using</p>		<p>Computer / Laptop:</p> <p>a) Uses computer</p>	<p>Operating System:</p> <p>a) Used by the user to</p>	<p>SPMS Database:</p> <p>a) Get the performan</p>	<p>Internet:</p> <p>a) Used to login to access SPMS and</p>

	<p>Student ID and Password. b) Enter the semester/year to inspect own CGPA progress.</p> <p>Admin: a) Logs into the system using SPMS ID and Password. b) Enters semester/year, school, department, program to view statistical analysis on CGPA.</p> <p>Instructor : a) Logs into the system using Instructor ID and Password. b) Enters semester/year, school, department, program to view statistical analysis on CGPA of either whole</p>		<p>to access SPMS.</p> <p>Printer: b) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub): a) Used to access SPMS through internet</p>	<p>execute SPMS.</p> <p>SPMS: a) Software will generate a performance trend.</p>	<p>ce record from SPMS Database.</p>	<p>use it.</p>
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	section or any individual student.					
Course-wise student performance based on CGPA	<p>Student:</p> <p>a) Logs in system with Student ID and Password</p> <p>b) Input course ID to view GPA for that course.</p> <p>Admin:</p> <p>a) Logs into the system using SPMS ID and Password</p> <p>b) Inputs semester and Course ID</p> <p>c) View statistically analyzed GPA trend of Students.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password.</p> <p>b)</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Software will generate performance trend based on GPA</p>	<p>SPMS Database:</p> <p>a) Performance is stored and updated</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	Inputs semester and Course ID under Instructor. c) View student GPA trend for that class.					
Selective Number of Instructor-wise student performance based on the GPA	Admin: a) Logs into system using SPMS ID and Password b) Inputs semester and Course ID c) View statistically analyzed GPA trend of Students for a multiple instructor. Faculty: a) Log into the system using Instructor ID and Password b) Inputs semester and Course ID under Instructor. c) View statistically analyzed GPA trend of		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce student performance trend for a specified instructor.	SPMS Database: a) Storing and updating the performance data.	Internet: a) Used to login and access the SPMS.

	Students for a multiple instructor					
VC/Dean wise student performance	Admin: a) Logs into the system using SPMS ID and Password. b) Select option VC/Dean wise student performance. c) View the student performance trend as per choice.		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce a student performance trend.	SPMS Database: a) Storing and updating the performance data.	Internet: a) Used to login and access the SPMS.
Instructor-wise student performance based on the GPA of the students	Admin: a) Logs into the system using SPMS ID and Password. b) Select Instructor Name & Instructor ID. c) View the student GPA performance trend		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge,	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce a student performance trend.	SPMS Database: a) Storing and updating the performance data.	Internet: a) Used to login and access the SPMS.

	<p>as per selection.</p> <p>Instructor :</p> <p>a) Logs into the system using Instructor ID and password.</p> <p>b) Select semester, course ID, section.</p> <p>c) View the student performance GPA trend as per selection.</p>		<p>Hub):</p> <p>a) Used to access the internet for SPMS.</p>			
<p>Total PLO percentage achieved and attempted by the student along with the departmental average</p>	<p>Student</p> <p>a) Logs into system using Student ID and Password.</p> <p>b) Input Semester period</p> <p>c) Views comparison of Attempted vs Achieved PLO percentage and department average.</p> <p>Admin:</p> <p>a)</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a comparison of attempted vs. achieved PLO as well as the departmental average.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the PLO percentage comparison data.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>Log into the system using SPMS ID and Password</p> <p>b) Input semester period.</p> <p>c) Views comparison of students Attempted vs Achieved PLO percentage and department average.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password</p> <p>b) Input semester period</p> <p>c) Views comparison of students Attempted vs Achieved PLO percentage and department average</p>					
PLO achievem	<p>Student:</p> <p>a) Log</p>		<p>Computer /</p>	<p>Operating System:</p>	<p>SPMS Database:</p>	<p>Internet:</p> <p>a) Used</p>

ent	<p>into the system using Student ID and Password.</p> <p>b) Selects PLO achievement.</p> <p>c) View PLO achievement.</p> <p>Admin:</p> <p>a) Log into the system using SPMS ID and Password.</p> <p>b) Selects PLO achievement and program.</p> <p>c) View PLO achievement.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password</p> <p>b) Selects PLO achievement and program.</p> <p>c) View PLO achievement.</p>		<p>Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a PLO achievement.</p>	<p>a) Storing and updating the PLO achievement.</p>	<p>to login and access the SPMS.</p>
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Expected PLO-achievement versus actual score (for Course's, Student's, Department's, Program's, or School's)	<p>Student:</p> <ul style="list-style-type: none"> a) Logs into the system using Student ID and Password. b) Select PLO Achievements and Comparisons. c) View PLO achievement and comparisons. <p>Admin:</p> <ul style="list-style-type: none"> a) Logs into the system using SPMS ID and Password. b) Selects Program from PLO Achievements and Comparison. c) View PLO Achievements and Comparison. <p>Instructor :</p> <ul style="list-style-type: none"> a) Logs in to the system using 		<p>Computer / Laptop:</p> <ul style="list-style-type: none"> a) Uses computer to access SPMS. <p>Printer:</p> <ul style="list-style-type: none"> a) Prints out reports if necessary. <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <ul style="list-style-type: none"> a) Used to access the internet for SPMS. 	<p>Operating System:</p> <ul style="list-style-type: none"> a) Used by the user to execute SPMS. <p>SPMS:</p> <ul style="list-style-type: none"> a) Produce a comparison of expected vs. achieved PLO by calculation. 	<p>SPMS Database:</p> <ul style="list-style-type: none"> a) Storing and updating the comparison data. 	<p>Internet:</p> <ul style="list-style-type: none"> a) Used to login and access the SPMS.

	<p>Instructor ID and Password.</p> <p>b) Selects Program from PLO Achievement and Comparisons.</p> <p>c) View PLO Achievement and Comparison.</p>					
CO-PLO achievement summary	<p>Student:</p> <p>a) Student ID and Password will be required to log in to the system.</p> <p>b) Select Program from CO-PLO achievement summary.</p> <p>c) View CO-PLO achievement summary.</p> <p>Admin:</p> <p>a) Logs into the system using SPMS ID and Password</p> <p>b) Select Program from CO-PLO</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a CO-PLO achievement summary.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the CO-PLO achievement summary.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>achievement summary. c) View CO-PLO achievement summary.</p> <p>Instructor : a) Logs into the system using Instructor ID and Password. b) Selects CO-PLO achievement summary. c) View CO-PLO achievements summary.</p>					
Question Bank	<p>Student: a) Logs into the system using Student ID and Password. b) Selects course ID, section, semester, assessment type from Question Bank form. c) Downloads Question.</p>		<p>Computer / Laptop: a) Uses computer to access SPMS.</p> <p>Printer: a) Prints out Question Papers if necessary.</p> <p>Networking Devices(Router, Switch, Bridge,</p>	<p>Operating System: a) Used by the user to execute SPMS.</p> <p>SPMS: a) Produce a Question Bank.</p>	<p>SPMS Database: a) Storing and updating the Question Bank in the database.</p>	<p>Internet: a) Used to login and access the SPMS.</p>

	Instructor : a) Logs into the system using Instructor ID and Password. b) Selects course ID, section, semester, assessment type from Question Bank form. c) Uploads Question.		Hub): a) Used to access the internet for SPMS.			
Course Outline	Student: a) Logs into the system using Student ID and Password. b) Selects course ID, section, semester from Course Outline. c) Downloads Course Outline. Instructor : a) Logs into the system using Instructor ID and		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out Course Outlines if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Generates a Course Outline.	SPMS Database: a) Storing and updating the Course Outline in the database.	Internet: a) Used to login and access the SPMS.

	Password. b) Selects course ID, section, semester from Course Outline form. c) Uploads Course Outline.					
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2.3 Existing Problems & Analysis of the Problem

Process Name	Stakeholders	Concerns(Problems)	Analysis(Reason of the Problem)	Proposed Solution
Backlog	a) Vice Chancellor b) Dean c) Department Head d) Instructor	a) There is no interface to store the backlog data of previous students in the existing system. b) There may not be any data of the previous students in the system.	a) Stakeholders will need an option to add all the backlog data to the system. b) The system currently has no unified storage for backlog and present data.	a) An interface is added to the proposed system to add backlog data. b) If any previous data is not found, necessary data to show the grades, CO and PLO will be automatically generated. c) As the data is being generated, the main tables in

				the system are being filled with the backlog entries. This provides storage for both backlog and present data.
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2.4 Proposed Business System (with rich picture)

This new system fixes the issues present with the existing system and improves it further by adding the feature of entering backlog data of previous students and alumni. A lot of the previous features of the system had observable flaws both logically and figuratively. It tweaks with the previous concepts and improves the features vastly in a relaxing and simple manner. The new feature enables certain stakeholders to add data and in turn view all the statistics of the information collected from the data with the help of an interface.

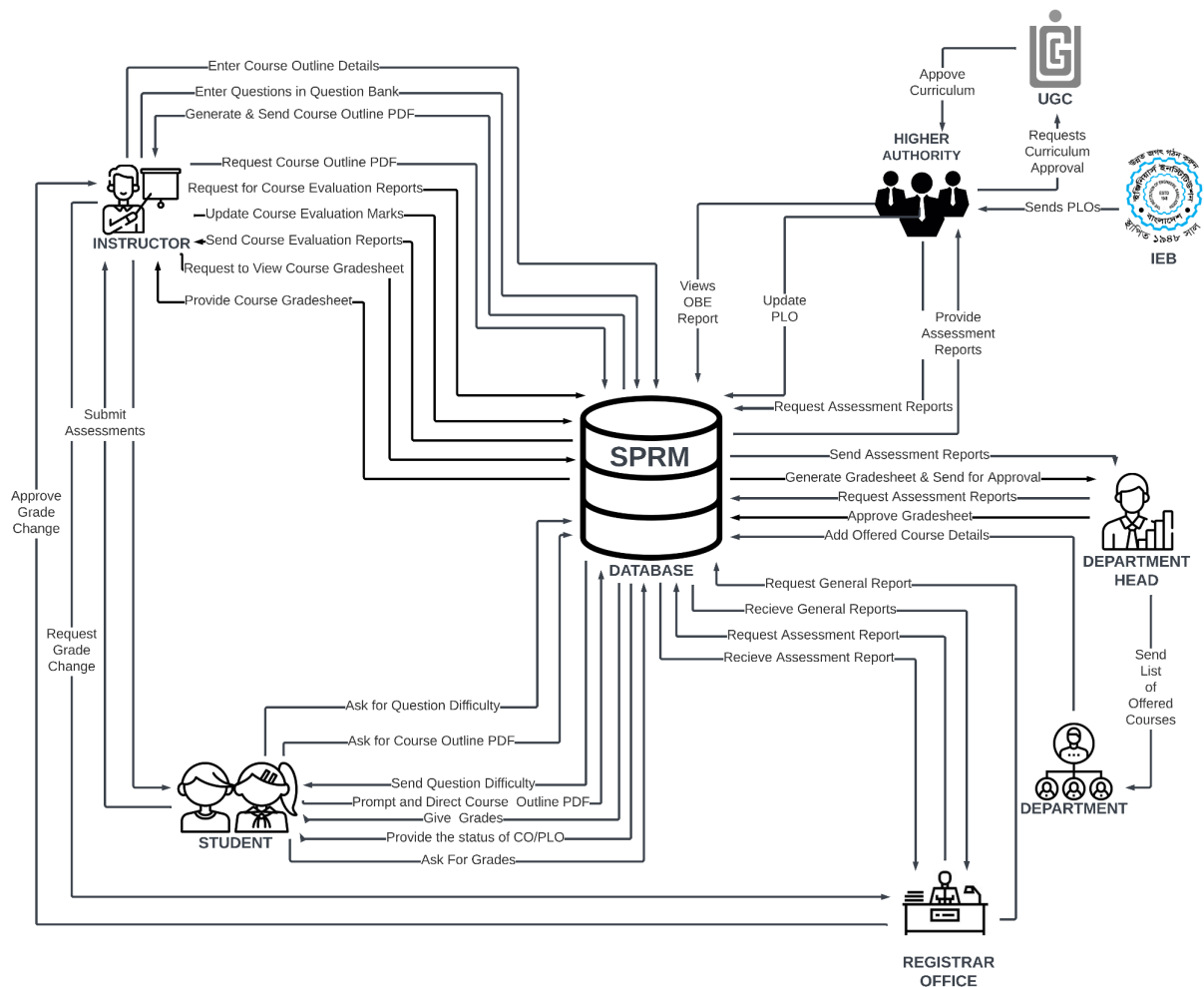


Figure 3: Rich Picture of Proposed System

2.4.1 Proposed Processes along with Six System Element Analysis

Process	System Roles					
	Human	Non-comp uting hardware	Computing Hardware	Software	Database	Network and Communic ation
Student Enrollment	Student: a)	Paper and Stationer	Computer /	Operating System:	Register Office	Internet: a)

nt	<p>Search for the website. b) Enter the website. c) Click on the form option within the website. d) Fill out the form with the required information.</p> <p>Registrar's Office: a) Checks and verifies student enrollment information from the website or hard copy forms. b) The registrar office admin logs into the system. c) Sends verified student information as attachment to Admin.</p> <p>Admin: a) Logs into the system using</p>	<p>y: Used to collect information about students through enrollment forms.</p>	<p>Laptop: a) Data can be accessed and updated by SPMS Admin using computer. b) Students can input data using computer. c) Data can be viewed by Users using computer.</p> <p>Database Server: a) Used by SPMS Admin to collect data and maintain software.</p> <p>Networkin g Devices (Router, Switch, Bridge, Hub): a) Uses to access SPMS</p>	<p>a) Used by SPMS and Registrar Office. b) Students use to fill up form from website.</p> <p>SPMS: a) Used by Admin to setup user accounts.</p>	<p>Database: a) Used by Registrar's office to input student data into an excel file that is saved in SPMS.</p> <p>SPMS: a) All Updated information is kept in the database.</p> <p>Excel: a) Student data is entered in excel file for SPSM to access.</p>	<p>Used to access and store data to SPMS. b) Collects student form from students and gives it to the Registrar's office. c) Student information are sent to SPMS Admin by the Registrar's office.</p>
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	<p>SPMS ID and password.</p> <p>b) Receives the student enrollment information via attached files.</p> <p>c) Updates the student enrollment information in the database.</p> <p>d) Enters the semester/year to view the number of students enrolled.</p> <p>e) Notifies respected stakeholders.</p>					
Student Performance Based on CGPA	<p>Student:</p> <p>a) Logs into the system using Student ID and Password.</p> <p>b) Enter the semester/year to inspect own CGPA progress.</p> <p>Admin:</p> <p>a) Logs</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>b) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge,</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Software will generate a performance trend.</p>	<p>SPMS Database:</p> <p>a) Get the performance record from SPMS Database.</p>	<p>Internet:</p> <p>a) Used to login to access SPMS and use it.</p>

	<p>into the system using SPMS ID and Password.</p> <p>b) Enters semester/year, school, department, program to view statistical analysis on CGPA.</p> <p>Instructor :</p> <p>a) Logs into the system using Instructor ID and Password.</p> <p>b) Enters semester/year, school, department, program to view statistical analysis on CGPA of either whole section or any individual student.</p>		<p>Hub):</p> <p>a) Used to access SPMS through internet</p>			
<p>Course-wise student performance based on CGPA</p>	<p>Student:</p> <p>a) Logs in system with Student ID and</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p>	<p>SPMS Database:</p> <p>a) Performance is stored and updated</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>Password</p> <p>b) Input course ID to view GPA for that course.</p> <p>Admin:</p> <p>a) Logs into the system using SPMS ID and Password</p> <p>b) Inputs semester and Course ID</p> <p>c) View statistically analyzed GPA trend of Students.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password.</p> <p>b) Inputs semester and Course ID under Instructor.</p> <p>c) View student GPA trend for that class.</p>		<p>SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>SPMS:</p> <p>a) Software will generate performance trend based on GPA</p>		
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Selective Number of Instructor-wise student performance based on the GPA	Admin: a) Logs into system using SPMS ID and Password b) Inputs semester and Course ID c) View statistically analyzed GPA trend of Students for a multiple instructor. Faculty: a) Log into the system using Instructor ID and Password b) Inputs semester and Course ID under Instructor. c) View statistically analyzed GPA trend of Students for a multiple instructor		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce student performance trend for a specified instructor.	SPMS Database: a) Storing and updating the performance data.	Internet: a) Used to login and access the SPMS.
VC/Dean wise student performance	Admin: a) Logs into the system using SPMS ID and		Computer / Laptop: a) Uses computer to access	Operating System: a) Used by the user to execute SPMS.	SPMS Database: a) Storing and updating the	Internet: a) Used to login and access the SPMS.

	Password. b) Select option VC/Dean wise student performance. c) View the student performance trend as per choice.		SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	SPMS: a) Produce a student performance trend.	performance data.	
Instructor-wise student performance based on the GPA of the students	Admin: a) Logs into the system using SPMS ID and Password. b) Select Instructor Name & Instructor ID. c) View the student GPA performance trend as per selection. Instructor : a) Logs into the system using Instructor ID and password. b) Select semester,		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out reports if necessary. Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce a student performance trend.	SPMS Database: a) Storing and updating the performance data.	Internet: a) Used to login and access the SPMS.

	<p>course ID, section.</p> <p>c) View the student performance GPA trend as per selection.</p>					
<p>Total PLO percentage achieved and attempted by the student along with the departmental average</p>	<p>Student</p> <p>a) Logs into system using Student ID and Password.</p> <p>b) Input Semester period</p> <p>c) Views comparison of Attempted vs Achieved PLO percentage and department average.</p> <p>Admin:</p> <p>a) Log into the system using SPMS ID and Password</p> <p>b) Input semester period.</p> <p>c) Views comparison of</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a comparison of attempted vs. achieved PLO as well as the departmental average.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the PLO percentage comparison data.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>students Attempted vs Achieved PLO percentage and department average.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password</p> <p>b) Input semester period</p> <p>c) Views comparison of students Attempted vs Achieved PLO percentage and department average</p>					
PLO achievement	<p>Student:</p> <p>a) Log into the system using Student ID and Password.</p> <p>b) Selects PLO achievement.</p> <p>c) View PLO achievement</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a PLO achievement.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the PLO achievement.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>nt.</p> <p>Admin:</p> <p>a) Log into the system using SPMS ID and Password.</p> <p>b) Selects PLO achievement and program.</p> <p>c) View PLO achievement.</p> <p>Instructor :</p> <p>a) Log into the system using Instructor ID and Password</p> <p>b) Selects PLO achievement and program.</p> <p>c) View PLO achievement.</p>		<p>(Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>			
<p>Expected PLO-achievement versus actual score (for Course's, Student's, Department's, Program'</p>	<p>Student:</p> <p>a) Logs into the system using Student ID and Password.</p> <p>b) Select PLO</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a)</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a</p>	<p>SPMS Database:</p> <p>a) Storing and updating the comparison data.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

<p>s, or School's)</p>	<p>Achievements and Comparisons. c) View PLO achievement and comparisons.</p> <p>Admin: a) Logs into the system using SPMS ID and Password. b) Selects Program from PLO Achievements and Comparison. c) View PLO Achievements and Comparison.</p> <p>Instructor : a) Logs in to the system using Instructor ID and Password. b) Selects Program from PLO Achievement and Comparisons. c) View PLO Achievem</p>		<p>Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.</p>	<p>comparison of expected vs. achieved PLO by calculation .</p>		
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	ent and Compariso n.					
CO-PLO achievem ent summary	<p>Student:</p> <p>a) Student ID and Password will be required to log in to the system.</p> <p>b) Select Program from CO-PLO achievement summary.</p> <p>c) View CO-PLO achievement summary.</p> <p>Admin:</p> <p>a) Logs into the system using SPMS ID and Password</p> <p>b) Select Program from CO-PLO achievement summary.</p> <p>c) View CO-PLO achievement summary.</p> <p>Instructor :</p> <p>a) Logs into the system</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out reports if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Produce a CO-PLO achievement summary.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the CO-PLO achievement summary.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	using Instructor ID and Password. b) Selects CO-PLO achievement summary. c) View CO-PLO achievements summary.					
Question Bank	Student: a) Logs into the system using Student ID and Password. b) Selects course ID, section, semester, assessment type from Question Bank form. c) Downloads Question. Instructor : a) Logs into the system using Instructor ID and Password. b) Selects course ID, section,		Computer / Laptop: a) Uses computer to access SPMS. Printer: a) Prints out Question Papers if necessary. Networking Devices(Router, Switch, Bridge, Hub): a) Used to access the internet for SPMS.	Operating System: a) Used by the user to execute SPMS. SPMS: a) Produce a Question Bank.	SPMS Database: a) Storing and updating the Question Bank in the database.	Internet: a) Used to login and access the SPMS.

	semester, assessment type from Question Bank form. c) Uploads Question.					
Course Outline	<p>Student:</p> <p>a) Logs into the system using Student ID and Password.</p> <p>b) Selects course ID, section, semester from Course Outline.</p> <p>c) Downloads Course Outline.</p> <p>Instructor :</p> <p>a) Logs into the system using Instructor ID and Password.</p> <p>b) Selects course ID, section, semester from Course Outline form.</p> <p>c) Uploads Course Outline.</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out Course Outlines if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Generates a Course Outline.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the Course Outline in the database.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

Backlog	<p>VC:</p> <p>a) Logs into the system using employee ID and Password.</p> <p>b) Inputs studentID, semester, year, course, section, obtain marks and timestamp into the backlog form.</p> <p>c) VC submits the backlog form, and view the backlog entry table and check backlog data and timestamp of other employees.</p> <p>Dean:</p> <p>d) Logs into the system using employee ID and Password.</p> <p>e) Inputs studentID, semester, year, course, section, obtain marks and timestamp into the backlog</p>		<p>Computer / Laptop:</p> <p>a) Uses computer to access SPMS.</p> <p>Printer:</p> <p>a) Prints out Course Outlines if necessary.</p> <p>Networking Devices (Router, Switch, Bridge, Hub):</p> <p>a) Used to access the internet for SPMS.</p>	<p>Operating System:</p> <p>a) Used by the user to execute SPMS.</p> <p>SPMS:</p> <p>a) Generates a Course Outline.</p>	<p>SPMS Database:</p> <p>a) Storing and updating the Course Outline in the database.</p>	<p>Internet:</p> <p>a) Used to login and access the SPMS.</p>

	<p>form.</p> <p>f) Dean submits the backlog form, and view the backlog entry table and check backlog data and timestamp of other employees .</p> <p>Department Head:</p> <p>g) Logs into the system using employee ID and Password.</p> <p>h) Inputs studentID, semester, year, course ,section, obtain marks and timestamp into the backlog form.</p> <p>i) Department Head submits the backlog form, and view the backlog entry table and check backlog data and timestamp of other employees .</p> <p>Instructor</p>					
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	<p>:</p> <p>j) Logs into the system using employee ID and Password.</p> <p>k) Inputs studentID, semester, year, course, section, obtain marks and timestamp into the backlog form.</p> <p>l) Instructor submits the backlog form, and view the backlog entry table and check backlog data and timestamp of other employees.</p>					
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CHAPTER 3: LOGICAL SYSTEM DESIGN

3.1 Business Rules

Business Rules are a set of guidelines and constraints that guide how a business operates both internally and externally. Business Rules are written in natural language statements, which state the rule in plain language which makes it easy for anyone to read and understand the data model without having any prior knowledge about data notations.

The business rules that govern our data model are as follows:

1. A STUDENT may do multiple REGISTRATIONS. A STUDENT has StudentID, FirstName, LastName, Password, Address, Email, Phone, Gender, DateOfBirth, AdmissionYear, and AdmissionSemester.
2. REGISTRATION must be done by a single STUDENT. A REGISTRATION has RegistrationID, Date, Semester, and Year.
3. A STUDENT must enroll in a PROGRAM. A PROGRAM has ProgramID, ProgramName. A PROGRAM may have multiple STUDENTS.
4. A REGISTRATION contains at least one enrollment. An ENROLLMENT has SecRegID, trademarks. An ENROLLMENT must belong to a REGISTRATION.
5. After Student enrolls, he or she must be assigned to a SECTION. A SECTION has SectionID, SectionNumber, Semester, and Year. A SECTION must have at least one ENROLLMENT.
6. A PROGRAM must belong to a DEPARTMENT. A DEPARTMENT has DepartmentID, DepartmentName. A DEPARTMENT must have at least one PROGRAM.
7. A SCHOOL manages one or more DEPARTMENT. A SCHOOL has SchoolID, SchoolName. A DEPARTMENT must be a part of the SCHOOL.

8. A DEPARTMENT may offer multiple COURSE. A COURSE has CourseID, CourseName, and NumberOfCredits. A COURSE must be offered by a DEPARTMENT.

9. PLO is the Program Learning Outcome of a student. A PROGRAM contains at least one PLO and a PLO has PLOID, Description. A PLO must be a part of a PROGRAM.

10. CO is the Course Outcome of a student. A CO contains COID, Bloom's Level, and Description. COURSE, CO, and PLO create an associative table COURSE_CO_PLO which has CO_Distribution, CO_PLO_Relationship, Year, and Semester, which must belong to COURSE, CO, and PLO. COURSE, CO, and PLO contain at least one COURSE_CO_PLO. Using the Year and Semester attribute from the associative table, we map the CO and PLO of each course.

11. A COURSE has one or more QUESTION. A QUESTION has QuestionID, QuestionDescription, Year, and Semester. A QUESTION must belong to a COURSE.

12. A SECTION has at least one EXAM. An EXAM has ExamID, ExamType, and Description. An EXAM must be taken by a SECTION.

13. EXAM, CO, and QUESTION create an associative table CO_QUESTION_EXAM which has CQEID and TotalMarks, which must belong to EXAM, CO, and QUESTION. EXAM, CO, and QUESTION may have CO_QUESTION_EXAM. Using the TotalMarks attribute from the associative table, we map the CO and Question of each exam.

14. A CO_QUESTION_EXAM has at least one EVALUATION. An EVALUATION has ObtainedMarks, where EVALUATION must belong to a CO_QUESTION_EXAM.

15. A SECTION must have a COURSE_OUTLINE. A COURSE_OUTLINE has OutlineID, LessonPlan, RoomNo, MarkDistribution, Grading, Syllabus, and Book. A COURSE_OUTLINE must belong to a SECTION.

16. An Instructor may wish to evaluate the students enrolled in his/her section based on ObtainedMarks. An ENROLLMENT must have at least one EVALUATION, and EVALUATION must be a part of the ENROLLMENT.

17. A SECTION must belong to a single COURSE and a COURSE must have at least one SECTION.

18. EMPLOYEE is a super-type class that has EmployeeID, Password, FirstName, LastName, Address, Email, Phone, Gender, DateOfBirth, JoiningDate, and an

EmployeeType: VC, DEAN, DEPARTMENT_HEAD and INSTRUCTOR. EMPLOYEE needs to be one of the EmployeeTypes, but they can also be more than one type.

19. A VC must be supervising at least one DEAN. A VC has VCID, and a DEAN is supervised by only one VC.

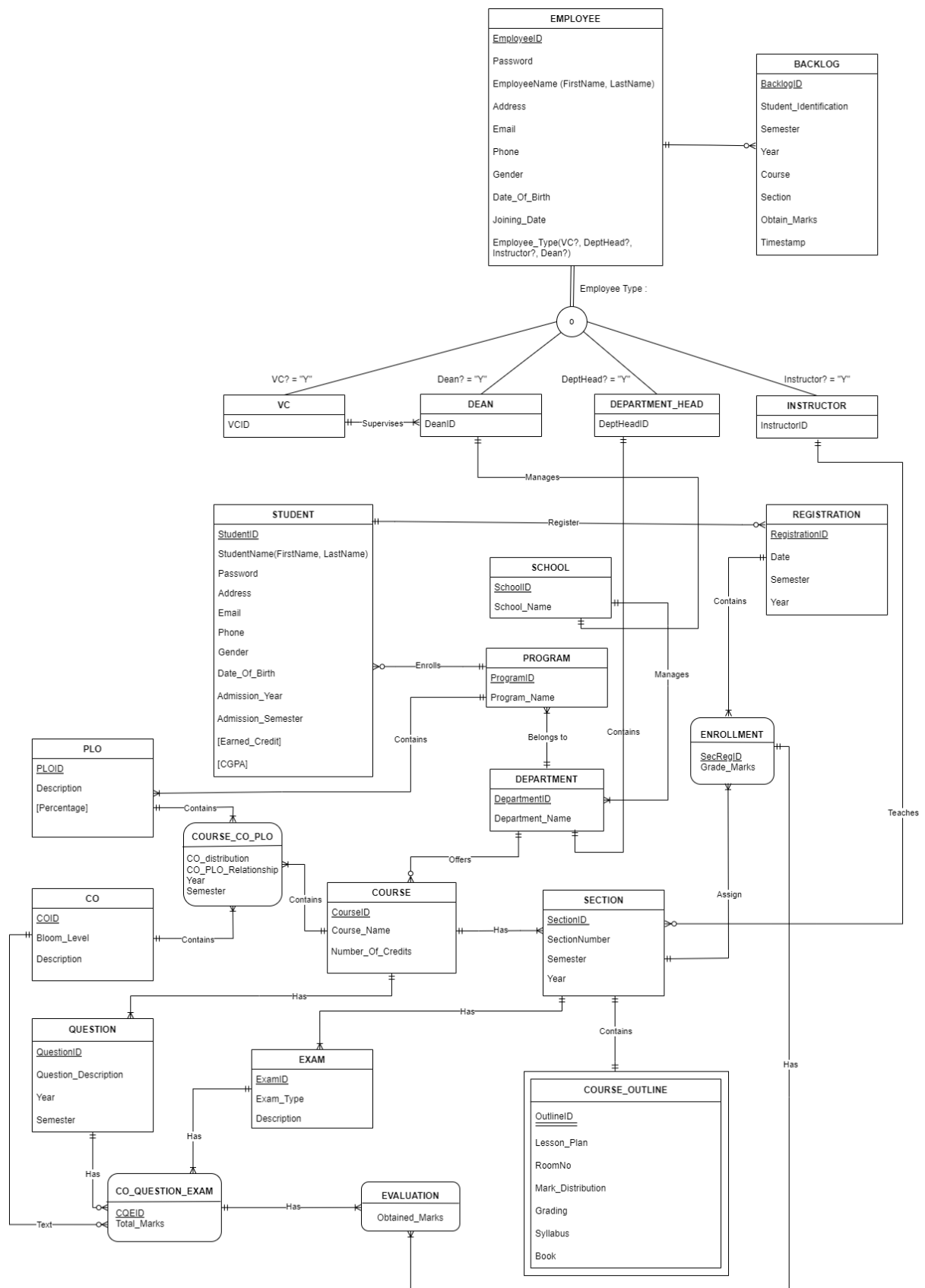
20. A DEAN must manage a SCHOOL. A DEAN has DeanID and a SCHOOL must be managed by a DEAN.

21. A DEPARTMENT must have a DEPARTMENT_HEAD. A DEPARTMENT_HEAD has a DeptHeadID, where DEPARTMENT_HEAD must be a part of a DEPARTMENT.

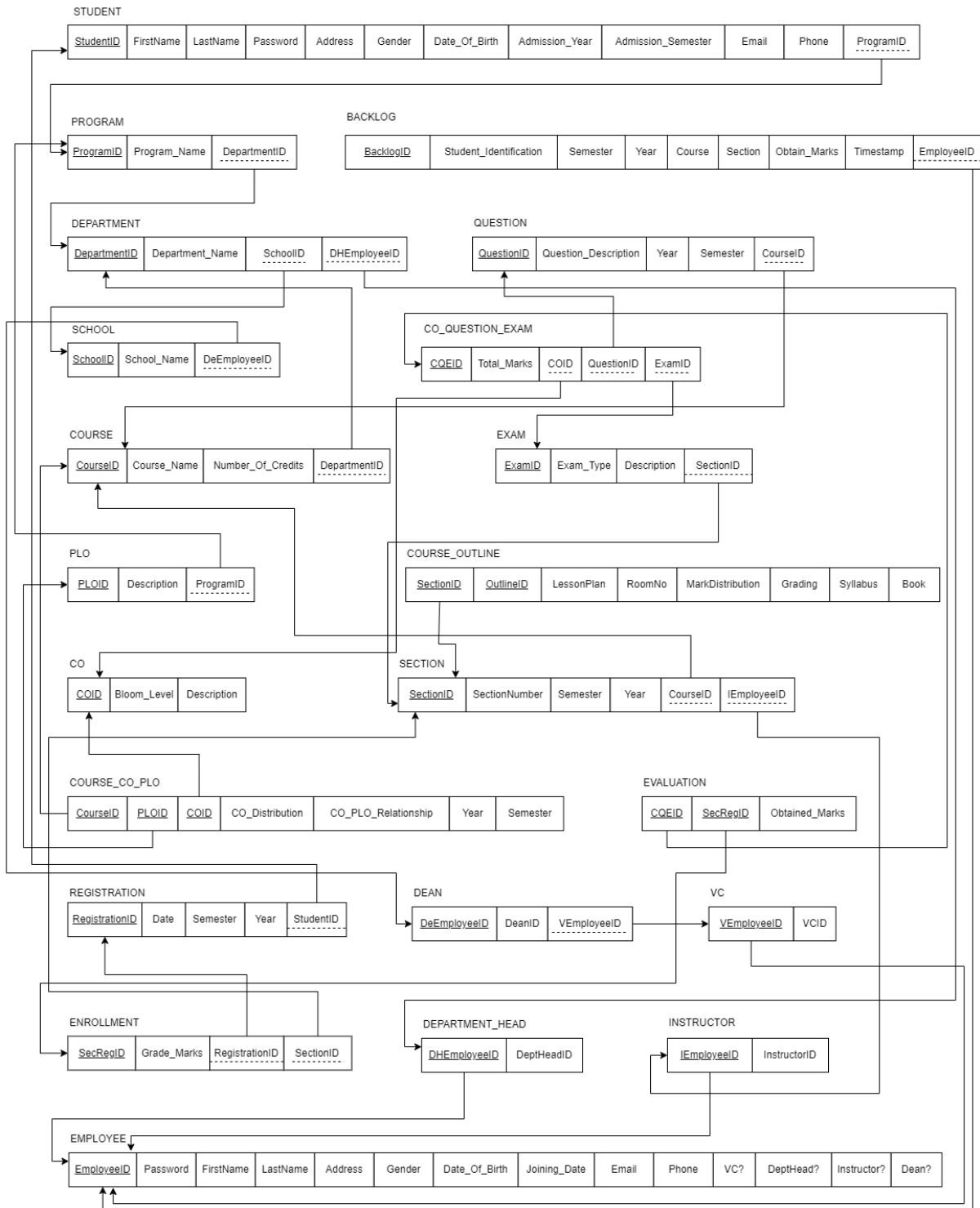
22. An INSTRUCTOR may teach multiple SECTION. An INSTRUCTOR has InstructorID, where a SECTION must be taught by an INSTRUCTOR.

23. EMPLOYEE may input multiple backlog data into the BACKLOG table. A BACKLOG has BacklogID, StudentIdentification, Semester, Year, Course, Section, ObtainMarks AND Timestamp. A BACKLOG must be viewed by an EMPLOYEE.

3.2 Entity Relationship Diagram (ERD)



3.3 ERD To Relations



3.4 Normalization

STUDENT(a)	StudentID	a1
	FirstName	a2
	LastName	a3
	Password	a4
	Address	a5
	Email	a6
	Gender	a7
	Date_Of_Birth	a8
	Admission_Year	a9
	Admission_Semester	a10
	Phone	a11
	ProgramID	l1
REGISTRATION(b)	RegistrationID	b1
	Date	b2
	Semester	b3
	Year	b4
	StudentID	a1
SECTION(c)	SectionID	c1
	SectionNumber	c2
	Semeter	c3
	Year	c4
	CourseID	n1
	IEmployeeID	e1
ENROLLMENT(d)	SecRegID	d1
	Grade_Marks	d2
	RegistrationID	b1
	SectionID	c1
EMPLOYEE(e)	EmployeeID	e1
	Password	e2
	FirstName	e3

	LastName	e4
	Address	e5
	Email	e6
	Phone	e7
	Gender	e8
	Date_Of_Birth	e9
	Joining_Date	e10
	VC?	e11
	DeptHead?	e12
	Instructor?	e13
	Dean?	e14
VC(f)	VCID	f1
	VEmployeeID	e1
DEAN(g)	DeanID	g1
	DeEmployeeID	e1
	VEmployeeID	e1
DEPARTMENT_HEAD(h)	DeptHeadID	h1
	DHEmployeeID	e1
INSTRUCTOR(i)	InstructorID	i1
	IEmployeeID	e1
BACKLOG(j)	Backlog_ID	j1
	Student_Identification	j2
	Semester	j3
	Year	j4
	Course	j5
	Section	j6
	Obtained_Mark	j7
	Timestamp	j8
	EmployeeID	e1
SCHOOL(k)	SchoolID	k1
	School_Name	k2
	DeEmployeeID	e1
PROGRAM(l)	ProgramID	l1
	Program_Name	l2

	DepartmentID	m1
DEPARTMENT(m)	DepartmentID	m1
	Department_Name	m2
	SchoolID	k1
	DHEmployeeID	e1
COURSE(n)	CourseID	n1
	Course_Name	n2
	Number_Of_Credits	n3
	DepartmentID	m1
QUESTION(o)	QuestionID	o1
	Question_Description	o2
	Year	o3
	Semeter	o4
	CourseID	n1
CO(p)	COID	p1
	Bloom_Level	p2
	Description	p3
PLO(q)	PLOID	q1
	Description	q2
	ProgramID	l1
COURSE_CO_PLO(r)	CO_Distribution	r1
	CO_PLO_Relationship	r2
	Year	r3
	Semester	r4
	CourseID	n1
	PLOID	q1
	COID	p1
EXAM(s)	ExamID	s1
	Exam_Type	s2
	Description	s3
	SectionID	c1
CO_QUESTION_EXAM(t)	CQEID	t1
	Total_Marks	t2
	COID	p1

	QuestionID	o1
	ExamID	s1
EVALUATION(u)	Obtained_Marks	u1
	CQEID	t1
	SecRegID	d1
COURSE_OUTLINE(v)	OutlineID	v1
	LessonPlan	v2
	RoomNo	v3
	Mark_Distribution	v4
	Grading	v5
	Syllabus	v6
	Book	v7
	SectionID	c1

Given,

a1 \longrightarrow a2, a3, a4, a5, a6, a7, a8, a9, a10, a11, l1

b1 \longrightarrow b2, b3, b4, a1

c1 \longrightarrow c2, c3, c4, n1, e1

d1 \longrightarrow d2, b1, c1

e1 \longrightarrow e2, e3, e4, e5, e6, e7, e8, e9, e10, e11, e12, e13, e14

e1 \longrightarrow f1

e1 \longrightarrow g1

e1 \longrightarrow h1

e1 \longrightarrow i1

j1 \longrightarrow j2, j3, j4, j5, j6, j7, j8, e1

k1 \longrightarrow k2, e1

m1 \longrightarrow m2, k1, e1

n1 \longrightarrow n2, n3, m1

o1 \longrightarrow o2, o3, o4, n1

p1 \longrightarrow p2, p3

q1 \longrightarrow q2, l1

n1, q1, p1 \longrightarrow r1, r2, r3, r4

s1 \longrightarrow s2, s3, c1

t1 \longrightarrow t2, p1, o1, s1

d1, t1 \longrightarrow u1

c1, v1 \longrightarrow v2, v3, v4, v5, v6, v7

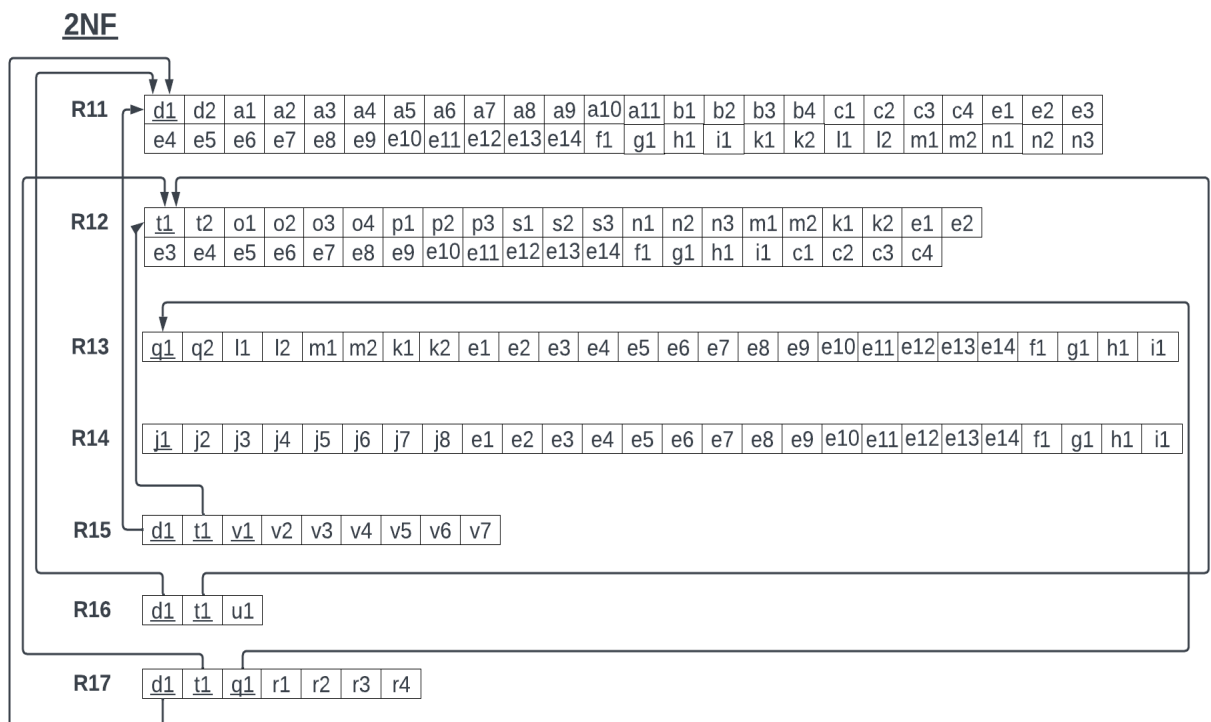
l1 \longrightarrow l2, m1

1NF: A relation that has a primary key and in which there are no repeating groups.

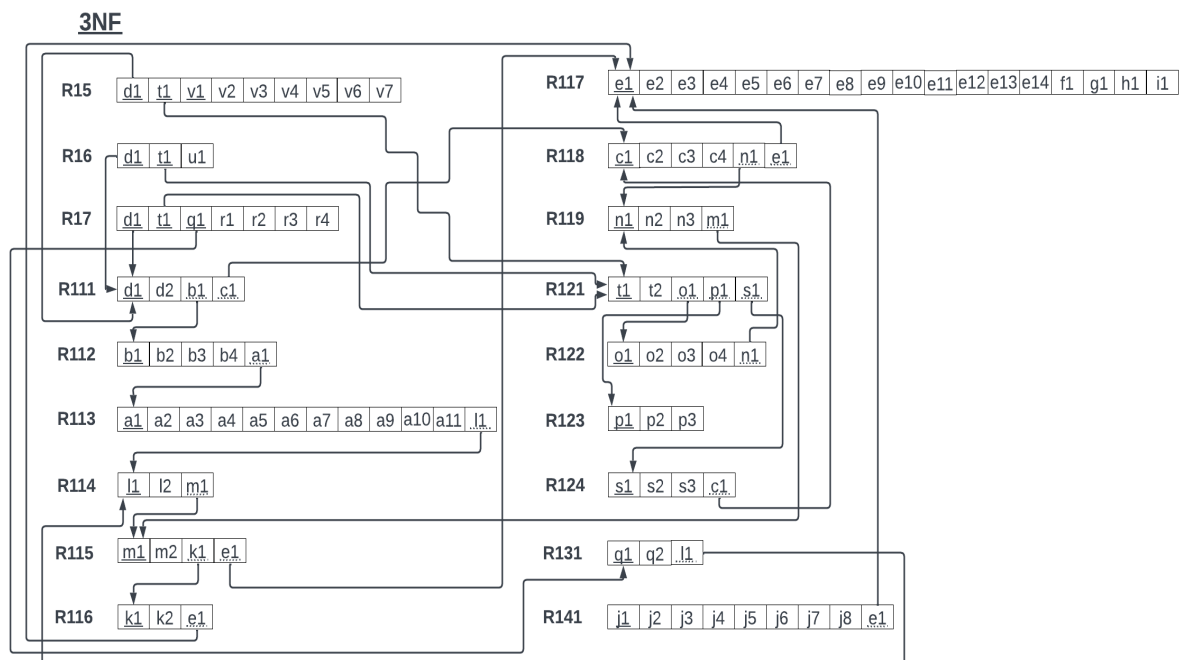
1NF

R1	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	c1	c2	c3	c4	<u>d1</u>	
	d2	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10	e11	e12	e13	e14	f1	g1	h1	i1	<u>j1</u>	j2
	j3	j4	j5	j6	j7	j8	k1	k2	l1	l2	m1	m2	n1	n2	n3	o1	o2	o3	o4	p1	p2
	p3	<u>q1</u>	q2	r1	r2	r3	r4	s1	s2	s3	<u>t1</u>	t2	u1	<u>v1</u>	v2	v3	v4	v5	v6	v7	

2NF: A relation in the first normal form in which every non-key attribute is fully functionally dependent on the primary key.



3NF: A relation that is in second normal form and has no transitive dependencies.



BCNF

There are no relations where a non-key identifies a primary key or part of primary key.

Thus all relations are in BCNF.

3.5 Data Dictionary

TblStudent:

Name	Data Type	Size	Remark
cStudentID	VARCHAR	7	This is the primary key of this table. This contains the ID of the Student. i.e.: “2022523”

cFirst_Name	VARCHAR	30	This contains the first name of the Student. i.e.: “Fahim”
cLast_Name	VARCHAR	30	This contains the last name of the Student. i.e.: “Shahriar”
cPassword	VARCHAR	8	This contains the password of the Student. i.e.: “fse77esf”
cAddress	VARCHAR	100	This contains the address of the Student. i.e.: “Suvastu Nazar Valley, T#05, Flat#8G1, Pragati Sarani, Shahjadpur, Dhaka-1212”
cGender	VARCHAR	6	This contains the gender of the Student. i.e.: “Male”
cDate_Of_Birth	VARCHAR	10	This contains the date of birth of the Student. i.e.: “18/02/2000”
cAdmissionYear	VARCHAR	4	This contains the admission year of the Student. i.e.: “2020”
cAdmissionSemester	VARCHAR	6	This contains the admission semester of the Student. i.e.: “Spring”
cEmail	VARCHAR	20	This contains the email of the Student. i.e.: “2022523@iub.edu.bd”

nPhone	INTEGER		This contains the phone number of the Student. i.e.: 1671827339
cProgramID	VARCHAR	4	This is the foreign key of this table. This contains the ID of the Program. i.e.: "BCSE"

TblProgram

Name	Data Type	Size	Remark
cProgramID	VARCHAR	4	This is the primary key of this table. This contains the ID of the Program. i.e.: "BCSE"
cProgramName	VARCHAR	40	This contains the name of the Program. i.e.: "B.Sc. In Computer Science & Engineering"
cDepartmentID	VARCHAR	4	This is the foreign key of this table. This contains the ID of the Department. i.e.: "CSE"

TblDepartment

Name	Data Type	Size	Remark
cDepartmentID	VARCHAR	4	This is the primary key of this table. This contains the ID of the Department. i.e.: "CSE"
cDepartment_Name	VARCHAR	40	This contains the name of the Department. i.e.: "Computer Science & Engineering"
cSchoolID	VARCHAR	10	This is one of the foreign keys of this table. This contains the ID of the School. i.e.: "SETS"
cDHEmployeeID	VARCHAR	7	This is one of the foreign keys of this table. This contains the Employee ID of the Department Head responsible for a particular Department. i.e.: "4007"

TblSchool

Name	Data Type	Size	Remark
cSchoolID	VARCHAR	10	This is the primary key of this table. This contains the ID of the School. i.e.: "SETS"

cSchool_Name	VARCHAR	40	This contains the name of the School. i.e.: “School of Engineering, Technology & Sciences”
cDeEmploueeID	VARCHAR	7	This is the foreign key of this table. This contains the Employee ID of the Dean responsible for a particular School. i.e.: “4077”

TblCourse

Name	Data Type	Size	Remark
cCourseID	VARCHAR	10	This is the primary key of this table. This contains the ID of the Course. i.e.: “CSE303”
cCourse_Name	VARCHAR	30	This contains the name of the Course. i.e.: “Database Management System”
nNumber_Of_Credits	INTEGER		This contains the credit hours of each Course. i.e.: 3
cDepartmentID	VARCHAR	4	This is the foreign key of this table. This contains the ID of the Department. i.e.: “CSE”

TblEmployee

Name	Data Type	Size	Remark
cEmployeeID	VARCHAR	7	This is the primary key of this table. This contains the ID of the Employee. i.e.: "4007"
cFirst_Name	VARCHAR	30	This contains the first name of the Employee. i.e.: "Mahady"
cLast_Name	VARCHAR	30	This contains the last name of the Employee. i.e.: "Hasan"
cPassword	VARCHAR	8	This contains the password of the Employee. i.e.: "emp10077"
cAddress	VARCHAR	100	This contains the address of the Employee. i.e.: "House No. 9, Jail Road, Sadar Bazar, Tangail"
cGender	VARCHAR	6	This contains the gender of the Employee. i.e.: "Male"
cDate_Of_Birth	VARCHAR	10	This contains the date of birth of the Employee. i.e.: "07/01/1980"

cJoining_Date	VARCHAR	10	This contains the joining date of the Employee. i.e.: “16/10/2000”
cEmail	VARCHAR	30	This contains the email of the Employee. i.e.: “mahady@iub.edu.bd”
nPhone	INTEGER		This contains the phone number of the Student. i.e.: 1800000007
bVC	BOOL		This contains if the Employee is a VC or not. i.e.: Yes/No
bDeptHead	BOOL		This contains if the Employee is a Department Head or not. i.e.: Yes/No
bDean	BOOL		This contains if the Employee is a Dean or not. i.e.: Yes/No
bInstructor	BOOL		This contains if the Employee is an Instructor or not. i.e.: Yes/No
nVCID	INTEGER		This contains the VC ID of the Employee. i.e.: 107

nDeptHeadID	INTEGER		This contains the Department Head ID of the Employee. i.e.: 2007
nDeanID	INTEGER		This contains the Dean ID of the Employee. i.e.: 3007
cInstructorID	VARCHAR	4	This contains the Instructor ID of the Employee. i.e.: "1007"

TblCO

Name	Data Type	Size	Remark
cCOID	VARCHAR	6	This is the primary key of this table. This contains the ID of the CO. i.e.: "CO001"
nBloom_Level	INTEGER		This contains the bloom level of the CO. i.e.: 1
cDescription	VARCHAR	40	This contains the description of the CO. i.e.: "Analyze linear circuit"

TblPLO

Name	Data Type	Size	Remark
cPLOID	VARCHAR	6	This is the primary key of this table. This contains the ID of the PLO. i.e.: "PLO001"
cDescription	VARCHAR	40	This contains the description of the PLO. i.e.: "Knowledge"
cProgramID	VARCHAR	4	This is the foreign key of this table. This contains the ID of the Program. i.e.: "BCSE"

TblRegistration

Name	Data Type	Size	Remark
nRegistrationID	INTEGER		This is the primary key of this table. This contains the ID of the Registration. i.e.: 20200001
cYear	VARCHAR	4	This contains the registration year. i.e.: "2020"

cSemester	VARCHAR	6	This contains the semester in which the registration took place. i.e.: “Spring”
cDate	VARCHAR	10	This contains the registration date. i.e.: “07/01/2020”
cStudentID	VARCHAR	7	This is the foreign key of this table. This contains the ID of the Student. i.e.: “2022523”

TblSection

Name	Data Type	Size	Remark
nSectionID	INTEGER		This is the primary key of this table. This contains the ID of the Section. i.e.: 11001
nSection_Number	INTEGER		This contains the number of the Section. i.e.: 3
cSemester	VARCHAR	6	This contains the semester of the Section. i.e.: “Spring”
cYear	VARCHAR	4	This contains the year of the Section. i.e.: “2023”

cCourseID	VARCHAR	10	<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the Course that is being conducted for a particular Section.</p> <p>i.e.: “CSE104”</p>
cEmployeeID	VARCHAR	7	<p>This is one of the foreign keys of this table.</p> <p>This contains the Employee ID of the Instructor responsible for a particular Section.</p> <p>i.e.: “1001”</p>

TblCourseOutline

Name	Data Type	Size	Remark
nSectionID	INTEGER		<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the Section.</p> <p>i.e.: 11001</p>
nOutlineID	INTEGER		<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the Outline.</p> <p>i.e.: 66661</p>

cLesson_Plan	VARCHAR	5000	<p>This contains the lesson plan of the Outline.</p> <p>i.e.: “CSE104 is an introductory course that focuses on the fundamentals of electrical circuits. The course aims to provide students with a strong foundation in circuit analysis techniques, including Kirchhoff's laws, node, and mesh analysis, Thevenin's and Norton's theorems, and transient analysis. The course is designed to help students develop critical thinking and problem-solving skills in electrical circuit analysis, with an emphasis on practical applications. The course will consist of lectures, tutorials, and laboratory sessions, where students will have the opportunity to apply the concepts learned in the classroom to real-world scenarios. By the end of the course, students will have a thorough understanding of electrical circuit analysis techniques and will be able to apply them to solve complex problems.”</p>
nRoom_Number	INTEGER		<p>This contains the room number of a particular course outline.</p> <p>i.e.: 5013</p>
cMark_Distribution	VARCHAR	100	<p>This contains the mark distribution of a particular course outline.</p> <p>i.e.:</p> <p>“Quizzes 3 = 10%</p> <p>Midterm = 25%</p> <p>Final = 30%</p> <p>Assignments = 5%</p> <p>Attendance = 10%</p> <p>Final Project and Presentation = 20”</p>

cGrading	VARCHAR	1000	<p>This contains the grade boundary of a particular course outline.</p> <p>i.e.:</p> <p>“90-100 = A</p> <p>85-89 = A-</p> <p>80-84 = B+</p> <p>75-79 = B</p> <p>70-74 = B-</p> <p>65-69 = C+</p> <p>60-64 = C</p> <p>55-59 = C-</p> <p>50-54 = D+</p> <p>45-49 = D</p> <p>0-44 = F”</p>
cSyllabus	VARCHAR	5000	<p>This contains the syllabus of a particular course outline.</p> <p>i.e.: “Syllabus1”</p>
cBook	VARCHAR	1000	<p>This contains the Book of a particular course outline.</p> <p>i.e.: “TextBook1”</p>

TblExam

Name	Data Type	Size	Remark
nExamID	INTEGER		This is the primary key of this table. This contains the ID of the Exam. i.e.: 690001
cExam_Type	VARCHAR	10	This contains the type of Exam. i.e.: "Quiz"
cDescription	VARCHAR	2000	This contains the description of the Exam. i.e.: "There are 4 questions in this examination, where each question carries 25 marks."
nSectionID	INTEGER		This is the foreign key of this table. This contains the ID of the Section. i.e.: 11001

TblQuestion

Name	Data Type	Size	Remark
nQuestionID	INTEGER		This is the primary key of this table. This contains the ID of the Question. i.e.: 9900001

cQuestion_Description	VARCHAR	10000	This contains the description of the Question. i.e.: “What is the difference between a series and a parallel circuit? Provide an example of each.”
cSemester	VARCHAR	6	This contains the semester at which a particular Question was given. i.e.: “Autumn”
cYear	VARCHAR	4	This contains the year at which a particular Question was given. i.e.: “2021”
cCourseID	VARCHAR	10	This is the foreign key of this table. This contains the ID of the Course. i.e.: “CSE303”

TblCourseCOPLO

Name	Data Type	Size	Remark
cCourseID	VARCHAR	10	This is one of the primary keys of this table. This contains the ID of the Course. i.e.: “CSE303”

cCOID	VARCHAR	6	<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the CO.</p> <p>i.e.: “CO001”</p>
cPLOID	VARCHAR	6	<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the PLO.</p> <p>i.e.: “PLO001”</p>
fCODistribution	FLOAT		<p>This contains the distribution of CO of a course.</p> <p>i.e.: 33.33</p>
fCOPLORelationship	FLOAT		<p>This contains the relationship of CO of a PLO.</p> <p>i.e.: 25</p>
cSemester	VARCHAR	6	<p>This contains the academic semester of a particular course and its CO and PLO.</p> <p>i.e.: “Summer”</p>
cYear	VARCHAR	4	<p>This contains the academic year of a particular course and its CO and PLO.</p> <p>i.e.: “2022”</p>

TblCOQuestionExam

nCQEID	INTEGER		<p>This is the primary key of this table.</p> <p>This contains the ID of the relationship of a particular exam containing questions and their CO.</p> <p>i.e.: 11100001</p>
nTotalMarks	INTEGER		<p>This contains the total marks of a question in an exam.</p> <p>i.e.: 15</p>
cCOID	VARCHAR	6	<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the CO.</p> <p>i.e.: "CO001"</p>
nQuestionID	INTEGER		<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the Question.</p> <p>i.e.: 9900001</p>
nExamID	INTEGER		<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the Exam.</p> <p>i.e.: 690001</p>

TblBacklog

Name	Data Type	Size	Remark
nBacklogID	INTEGER		This is the primary key of this table. This contains the ID of the Backlog. i.e.: 99900001
cStudentIdentification	VARCHAR	7	This contains the student ID of a particular student. i.e.: "1122523"
cSemester	VARCHAR	6	This contains the academic semester of the backlog entry marks. i.e.: "Spring"
cYear	VARCHAR	4	This contains the academic year of the backlog entry marks. i.e.: "2007"
cCourse	VARCHAR	10	This contains the course of the backlog entry marks. i.e.: "CSE203"
nSectionNumber	INTEGER		This contains the section number of the backlog entry marks. i.e.: 4
nObtainedMarks	INTEGER		This contains the backlog entry marks. i.e.: 77

dTimestamp	DATETIME		<p>This contains the date and time of when the backlog entry was made.</p> <p>i.e.: 2023-06-12 17:30:00</p>
cEmployeeID	VARCHAR	7	<p>This is the foreign key of this table.</p> <p>This contains the ID of the Employee who did the backlog entry.</p> <p>i.e.: “4007”</p>

TblEnrollment

nSecRegID	INTEGER		<p>This is the primary key of this table.</p> <p>This contains the ID of the enrollment of a registration with section.</p> <p>i.e.: 12300001</p>
nGradeMarks	INTEGER		<p>This contains the total marks of a course of a student.</p> <p>i.e.: 83</p>
nRegistrationID	INTEGER		<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the Registration.</p> <p>i.e.: 20200001</p>
nSectionID	INTEGER		<p>This is one of the foreign keys of this table.</p> <p>This contains the ID of the Section.</p> <p>i.e.: 11001</p>

TblEvalutaion

nSecRegID	INTEGER		<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the enrollment of a registration with section.</p> <p>i.e.: 12300001</p>
nCQEID	INTEGER		<p>This is one of the primary keys of this table.</p> <p>This contains the ID of the relationship of a particular exam containing questions and their CO.</p> <p>i.e.: 11100001</p>
nObtainedMarks	INTEGER		<p>This contains the obtained marks a student got in a question of an exam.</p> <p>i.e.: 13</p>

CHAPTER 4: PHYSICAL SYSTEM DESIGN

```
$sql2 = "SELECT d.DepartmentID , COUNT(*) AS studentNo FROM student st
JOIN program p ON st.ProgramID = p.ProgramID
JOIN department d ON p.DepartmentID = d.DepartmentID
Where AdmissionYear = '$year' AND AdmissionSemester = '$semester'
GROUP BY d.DepartmentID ";
```

```
$deptResult = mysqli_query($conn, $sql2);
$department = array();
$deptStd = array();
while ($row2 = mysqli_fetch_assoc($deptResult)) {
    if (!empty($row2['DepartmentID']) && !empty($row2['studentNo'])) {
        array_push($department, $row2['DepartmentID']);
        array_push($deptStd, $row2['studentNo']);
    }
}
```

```
// SQL query to get the number of students enrolled in each school
$sql = "SELECT s.schoolID, COUNT(*) AS num_students FROM student st
JOIN program p ON st.ProgramID = p.ProgramID
JOIN department d ON p.DepartmentID = d.DepartmentID
JOIN school s ON d.SchoolID = s.SchoolID
Where AdmissionYear = '$year' AND AdmissionSemester = '$semester'
GROUP BY s.SchoolID";
```

```
$result = mysqli_query($conn, $sql);
$schools = array();
```

```
// SQL query to get the number of students enrolled in each Program
$sql3 = "SELECT p.ProgramID , COUNT(*) AS totalStudent FROM student st
JOIN program p ON st.ProgramID = p.ProgramID
Where AdmissionYear = '$year' AND AdmissionSemester = '$semester'
GROUP BY p.ProgramID ";
```

```
$programResult = mysqli_query($conn, $sql3);
```

```
$program = array();
$totalstd = array();
```

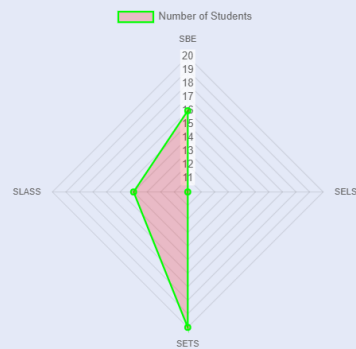
```
while ($row3 = mysqli_fetch_assoc($programResult)) {
    if (!empty($row3['ProgramID']) && !empty($row3['totalStudent'])) {
        array_push($program, $row3['ProgramID']);
        array_push($totalstd, $row3['totalStudent']);
    }
}
```

```
echo "<script>console.log(" . json_encode($program) . ");</script>";
echo "<script>console.log(" . json_encode($totalstd) . ");</script>";
mysqli_close($conn);
```

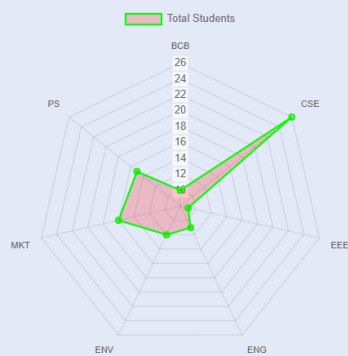
```
$sql2 = "INSERT INTO `backlog`(`BacklogID`, `StudentIdentification`, `Semester`, `Year`, `Course`, `SectionNumber`, `ObtainedMarks`, `Timestamp`, `EmployeeID`)
VALUES (`$backlogID`, `$studentID`, `$semester`, `$year`, `$course`, `$section`, `$grade`, `$timestamp`, `$emp`);"
```

```
$abc = "INSERT INTO backlog (`BacklogID`,`StudentIdentification`, `Semester`, `Year`, `Course`, `SectionNumber`, `ObtainedMarks`, `Timestamp`, `EmployeeID`)VALUES (`$backlogID`, `$stdID`, `$semester`, `$year`, `$course`, `$secNo`, `$mark`, `$time`, `$emp`);"
```

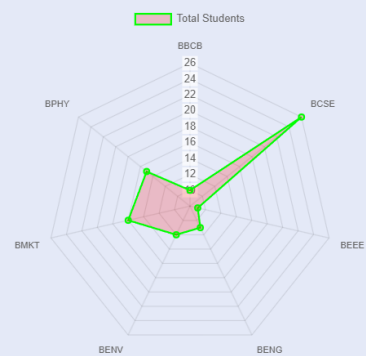
School Wise Enrollment



Department Wise Enrollment



Program Wise Enrollment



Upload CSV File

Sample Format: [Click to Download](#)

Select CSV file to upload:



No file chosen

Student Data Form









Semester wise result

Course Section Load

Student ID	Student Name	Evaluation Status	Action
2022523	Fahim Shahriar Eran	Incomplete	<input type="button" value="Update"/>
2030069	Mehedi Hasan Surem	Complete	<input type="button" value="Updated"/>
2020975	Fardin Ahsan Shafi	Complete	<input type="button" value="Updated"/>
2020977	Anannya Preeta	Incomplete	<input type="button" value="Update"/>



SPRM



Course Outline

Course Code

Section

Credit Value

Enter Course Code

Enter Section

Enter Credit Value

Room Number

Semester

Year

Enter Room Number

Enter Semester

Enter Year

Lesson Plan

Enter Lesson Plan here

Course Policy

a. It is the student's responsibility to gather information about the assignments/project and cover topics during the lectures missed. Regular class attendance is mandatory. Points will be taken off for missing classes. Without 70% of attendance, sitting for the final exam is NOT allowed. Students should come on time to get the attendance. In the event of failing 70% of attendance, a student will receive a W grade automatically.

b. Same project work is assigned to all sections. Students should work in groups for the project. They are required to prepare a final report on the project which will be incrementally developed through assignments.

c. The date and syllabus of class tests, Mid-Term and Final-Term will be announced in the class. There is NO provision for make-up.

d. Both the Mid-Term and Final-Term exams will be coordinated exams and will be held on a specific date for all the sections.

e. The reading materials for each class will be given prior to that class so that students may have a cursory look into the materials.

f. Class participation is vital for a better understanding of the topics of this course. Students are invited to raise questions.

g. Students should take tutorials with the instructor during office hours. Prior appointment is required.

h. Students must maintain the IUB code of conduct and ethical guidelines offered by the school of computer science and engineering.

i. No working mobile phones are allowed in class. Using one for any purpose will result in serious consequences.

ACADEMIC DISHONESTY

a. A student who cheats, plagiarizes, or furnishes false, misleading information in the course is subject to disciplinary action up to and including an F grade in the course and/or suspension/expulsion from the University.

b. Students must maintain the code of IUB.

CHAPTER 5: CONCLUSION

5.1 Problems & Solution

Previously, our system didn't allow users to give individual marks to students for specific exam questions that were linked to course outcomes. Additionally, there was no way to track user input timestamps, which created a security vulnerability. To address these issues, we implemented a timestamp recording system to track user inputs and added a feature to evaluate individual student performance by assigning marks to exam questions based on their connection to course outcomes and program learning outcomes. We also made it possible to upload a CSV file of grade marks that would automatically assign course and program outcomes. These changes ensure better security and more accurate student evaluation.

5.2 Additional Feature & Future Development

Future Development Scope:

1. The number of users will be increased to include advisers, who will receive pertinent data on the students they are advising for better and more advantageous interactions between students and advisors.
2. Implement Student Success Center into the system.

5.3 Conclusion & Recommendation

In order to track and manage student performance data, schools and other educational institutions can benefit from using SPRM systems. A method like this can show particular student achievement. Our SPRM system can help instructors recognize where their students might benefit from extra help, modify their course plans and curriculum to better fulfill the needs of specific students, and make data-driven informative decisions that can improve academic outcomes of students.