Deliverable 1

Title: Final Project - Deliverable 1
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1. Introduction to the Deliverable

Objective: Identify and outline the key elements and intentions of the semester project for CSC 472.

This deliverable aims to identify a semester project for CSC 472, highlight key elements of the project, the group's intentions, and the historical basis for the project. Below is an overview:

1. This group has selected to design a DBMS for a grading and feedback system, as outlined in Project 9.7 of the provided Course Project list.
2. The project will consist of two primary components:
   (a) The first component will satisfy the course requirements.
   (b) The second component will extend beyond the scope of the course to aid us in future job hunts by enhancing our resumes.
3. This group aims to submit all required deliverables and documentation in a timely manner throughout the semester. This includes, but is not limited to:
   (a) The overall and complete design of the database for a grading and feedback system, pursuant to Project 9.7 of the Course Project Selection List.
4. Additionally, some group members may choose to implement our design after all required submissions are met. This will be done to boost our portfolios, though we understand it will not impact our course grade.
5. We will use Discord for meetings and communication, and GitHub to track project iterations. This applies to both the mandatory submissions and any optional implementations.

2. Identify the Project

Objective: Explain what business or process that is to be addressed in the design of the Database Management System.

The project is a Course Performance Information Management System, designed to record and manage student performance data in various courses. Specifically, the system allows:

- Input and storage of marks for each student across multiple assignments, quizzes, or exams in a course.

- The ability to add new assessments (assignments/exams) without predefined limits.
- Calculation of a weighted sum of marks to derive total course marks.
- A grading system that allows for the specification of cutoff values for various letter grades (e.g., A, B, C, D, F).

3. Reason for Analysis

Objective: Explain the motivation for addressing the business situation, and why it was chosen.

This project addresses the need for a streamlined, flexible system in educational institutions to manage student performance data efficiently. Traditional methods of maintaining student marks, such as using spreadsheets or paper records, can become cumbersome, especially when dealing with a large number of students, assignments, and grade calculations.

Motivation:

- *Efficiency:* Automating the process of recording, updating, and calculating grades saves significant time for instructors, allowing them to focus on more critical tasks like teaching and student engagement.
- *Flexibility:* Instructors often need to add new assignments or assessments during the course. The system allows for dynamic addition of assignments/exams without predefined limits, ensuring scalability and flexibility.
- *Accuracy:* Manual calculation of weighted totals and final grades is prone to errors, especially in large classes. A system that automatically computes grades based on preset weights ensures accurate grade calculation and fair assessments.
- *Customization:* Every course might have different grading structures, weights for assignments, and grade cutoffs. This system allows instructors to set their specific course structure and grading criteria, accommodating diverse educational needs.

By addressing these issues, the system improves the academic workflow, reduces errors, and enhances both student and instructor experience.

4. Benefit of Analysis

Objective: Explain what is to be expected from improving the business process.

While an overnight success is not promised through the improvement of said business process, we guarantee that data will be easy to access, understandable to the layman, and thoroughly insightful. Here are a few benefits:

1. Whereas the reason, identification, and the overview of the project point to feedback systems, it is also important to highlight other contexts where such a project may exist. There are two forms of existence that this project can benefit:
   (a) The first is the improvement of an existing feedback/grading system with no DBMS.

(b) The second is the upgrade to a dedicated feedback/grading system where no such digital system exists (e.g., paper copies are returned to employers/students as the main feedback).

2. Scenario 1: There exists a system with no adequate DBMS.
   (a) The main improvement here would be that of convenience and redundancy over the existing system. Imagine a professor tracks grades manually in a notebook. A proper system with a dedicated DBMS would offer:
      i. **Flexibility:** The professor can easily add another assignment/relation for each student without worrying about space.
      ii. **Redundancy/Security:** It would be much more difficult for a student to tamper with grades compared to simply stealing a grade notebook.
      iii. **Convenience:** Both the professor and student would have access to the grades at any time, making feedback and responses more streamlined.
      iv. **Efficiency:** The professor can provide feedback on past grades, enabling a more informed and positive learning environment.
3. Scenario 2: There exists no system and no DBMS.
   (a) For example, in performance reviews for employees, feedback is often on paper, making it easy to lose or misplace. Improvements would include:
      i. All the benefits from Scenario 1.
      ii. **More Data:** Having more data on performance and feedback can lead to better decision-making and tracking, providing valuable insights.

5. Project Overview

Objective: Outline the project steps.

In the following list, we attempt to show what the project creation timeline will be:

1. Brainstorm:
   Identify all the elements needed to allow the automation of the project.
2. Table Creation:
   Create tables through categorization and organization of elements decided upon in the brainstorming process.
3. Normalization:
   Identify and eliminate redundant data, verify data dependencies.
4. Schema Design:
   Identify the storage and space needs for the storage of the data model. Create a data model.
5. Project Review Report:
   Report on efforts, methodologies and educational benefits of the project.

This timeline is modeled after the deliverables required to complete the project. There may be additional steps added or taken at any point in time depending on the needs of the project and team.

6. Documents Needed

Objective: Explain the role and importance of documentation in the design and implementation of a DBMS.

Documentation is crucial not only for the initial success of the system but also for maintaining its long-term functionality. Below is an outline of the documentation that is both needed and already exists:

1. Documentation to be developed:
   (a) **Overview of DBMS Design:** This aligns with the 3rd to 5th deliverable, as it covers the assembly of project components.
   (b) **Reasoning Behind Design Choices:** For instance, why was Table A included but not Table C?
   (c) **Iterative Changes:** What modifications were made from Design K to Design P? What steps were taken, and was this an improvement?
   (d) **Project Timeline and Updates:** Keeping a project journal is beneficial, especially for projects built from scratch.
2. Documentation that already exists and is needed:
   (a) Course book.
   (b) Geek-for-Geeks articles.
   (c) Research papers on feedback to distinguish essential features from unnecessary components in the design.

6. References and Use of Tools

References:

Sebesta, R. W. (2019). *Concepts of Programming Languages*(12th ed.). Pearson Education, Inc.