**IT101 – Project Guidelines**

1. The project is an individual work or by pair of two.
2. The project must be a database of your information system in Computer Programming 1 (Java Programming).
3. You can use tools like Workbench, Pgadmin4, PhpMyadmin, HeidiSQL, Oracle .
4. The project is due on ***December 16, 2024***.
5. Schedule of Final Project Panel Defense will be on ***December 16, 2024, onwards.***
6. No late work will be accepted.
7. Marks will be awarded for Completeness of the project database.
8. Any images downloaded from the Internet should be given credence.
9. Project materials of each student cannot be shared with others. The results will be withheld for further investigation if any identical projects are found.
10. Proper backup has to be maintained. You should not copy the softcopy of projects into any of school computers to avoid any identical pairs of projects.
11. You can use alternative storage media like internet cloud services.
12. The school will not be responsible for any missing storage media due to the student’s negligence.
13. Please refrain from using AI tools to generate any content (text, video, audio, images, code, etc.)
14. Passing off any AI generated content as your own (e.g., cutting and pasting content into project content, or paraphrasing AI content) constitutes a violation of BLUE PHENIX academic integrity policy. If you have any questions about using generative AI consult your trainer.

**Tools Allowed**

1. Students are to use tools that they have learned in the course.
2. Students may use alternative tools approved by the lecturer.

**Project Submission**

1. Soft copy of all raw and processed files must be submitted.
2. Student should **print the documentation** with a front page that follows the format.
3. The printed final project documentation must be in **soft bind / ring bind (*see annex 2*)**.
4. Submit the printed documentation on the said due date.
5. Burn all your files in a CD/DVD.
6. Write your name on the CD/DVD and attached it at the back of your project documentation.

**Project Phases and Deliverables**

### ****Phase 1: Conceptual Design (ERD)****

This phase focuses on planning the database structure and identifying data relationships.

1. **Entity-Relationship Diagram (ERD):**
   * Design a complete ER diagram representing all the entities, attributes, and relationships based on the system's functional requirements.
   * Clearly show the cardinality of the relationships (e.g., one-to-many, many-to-many).
   * Define primary keys (PK) and foreign keys (FK) for each entity.
2. **Data Dictionary:**
   * Provide a data dictionary that includes detailed descriptions of all entities, attributes, data types, constraints (e.g., NULL, UNIQUE), and relationships.
   * Describe the role of each attribute in the system and any validation rules (e.g., length, format).

**Deliverable for Phase 1 (RDBMS):**

* ERD Diagram
* Data Dictionary

### ****Phase 2: Logical Database Design****

This phase involves translating the ERD into a normalized database schema and designing the relationships between the tables.

1. **Normalized Database Schema:**
   * Normalize the database up to at least **Third Normal Form (3NF)** to avoid redundancy and ensure data integrity.
   * Provide the schema showing tables, attributes, and relationships.
2. **SQL Queries for Table Creation:**
   * Write SQL scripts to create each table with primary keys, foreign keys, and necessary constraints.
   * Ensure that the relationships between tables are maintained via referential integrity (i.e., foreign key constraints).
3. **Sample Data:**
   * Insert sample data into each table using SQL INSERT statements to demonstrate the functionality of the tables and relationships.

**Deliverable for Phase 2 (RDBMS):**

* Normalized Database Schema (3NF)
* SQL Table Creation Scripts
* Sample Data Insertion Scripts

### ****Phase 3: Physical Database Implementation****

In this phase, the database will be fully implemented and ready for integration with the Java system.

1. **Database Deployment:**
   * Deploy the database on a relational database management system MySQL
   * Test each table for data integrity and proper relationships.
2. **Advanced SQL Queries:**
   * Develop complex SQL queries for:
     + Retrieving specific data (e.g., JOIN, GROUP BY, ORDER BY).
     + Searching for data based on conditions.
     + Aggregating data for reports (e.g., SUM, AVG, COUNT).
   * Ensure that the queries are optimized for performance.
3. **Stored Procedures and Functions (Optional):**
   * Develop and implement stored procedures or functions to automate complex data operations if applicable to the system.

**Deliverable for Phase 3 (RDBMS):**

* Deployed Database (Backup or SQL Dump File)
* Advanced SQL Queries (SELECT, JOIN, AGGREGATE, etc.)
* Stored Procedures or Functions (Optional)

### ****Phase 4: Integration and Testing with the Application****

At this stage, the database should be fully integrated with the Java system.

1. **Database Connectivity Testing:**
   * Test and ensure that the Java application can connect to the RDBMS.
   * Debug any connectivity or query execution issues.
2. **Data Validation:**
   * Perform validation to check data consistency when inserted, updated, or deleted via the Java application.
   * Ensure that the application correctly handles errors like foreign key violations or missing data.
3. **Backup and Recovery Plan:**
   * Document a simple backup and recovery plan for the database, ensuring that data integrity can be maintained in case of system failure.

**Deliverable for Phase 4 (RDBMS):**

* Database Connectivity Testing Results
* Data Validation Report
* Backup and Recovery Documentation

ERD Symbols and Notations

