

IT 313 – ADVANCED DATABASE SYSTEMS

Culminating Activity

BSIT 3B – Group 9

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Project Title:

- EduConnect: School Student-Family Portal

Project Description:

- **Nature of Establishment:**
 - St. Joseph Academy of Barugo Inc. serves K-12 students and their families, providing comprehensive educational services and administrative support.
- **Current Problems:**
 - The school's outdated information system creates difficulties for families accessing academic and administrative information. Students and parents struggle to track academic progress, access resources, and complete administrative tasks efficiently.
- **Proposed Solution:**
 - A comprehensive web-based portal that provides students and families with centralized access to academic information, resources, and administrative tools while streamlining connections with school staff.

Objectives of the Project:

1. Create a secure, unified platform for academic and administrative access
2. Enable students to actively monitor their educational progress
3. Enhance school-family communication and engagement
4. Simplify administrative processes
5. Enable data-driven educational decisions

Major Functionalities:

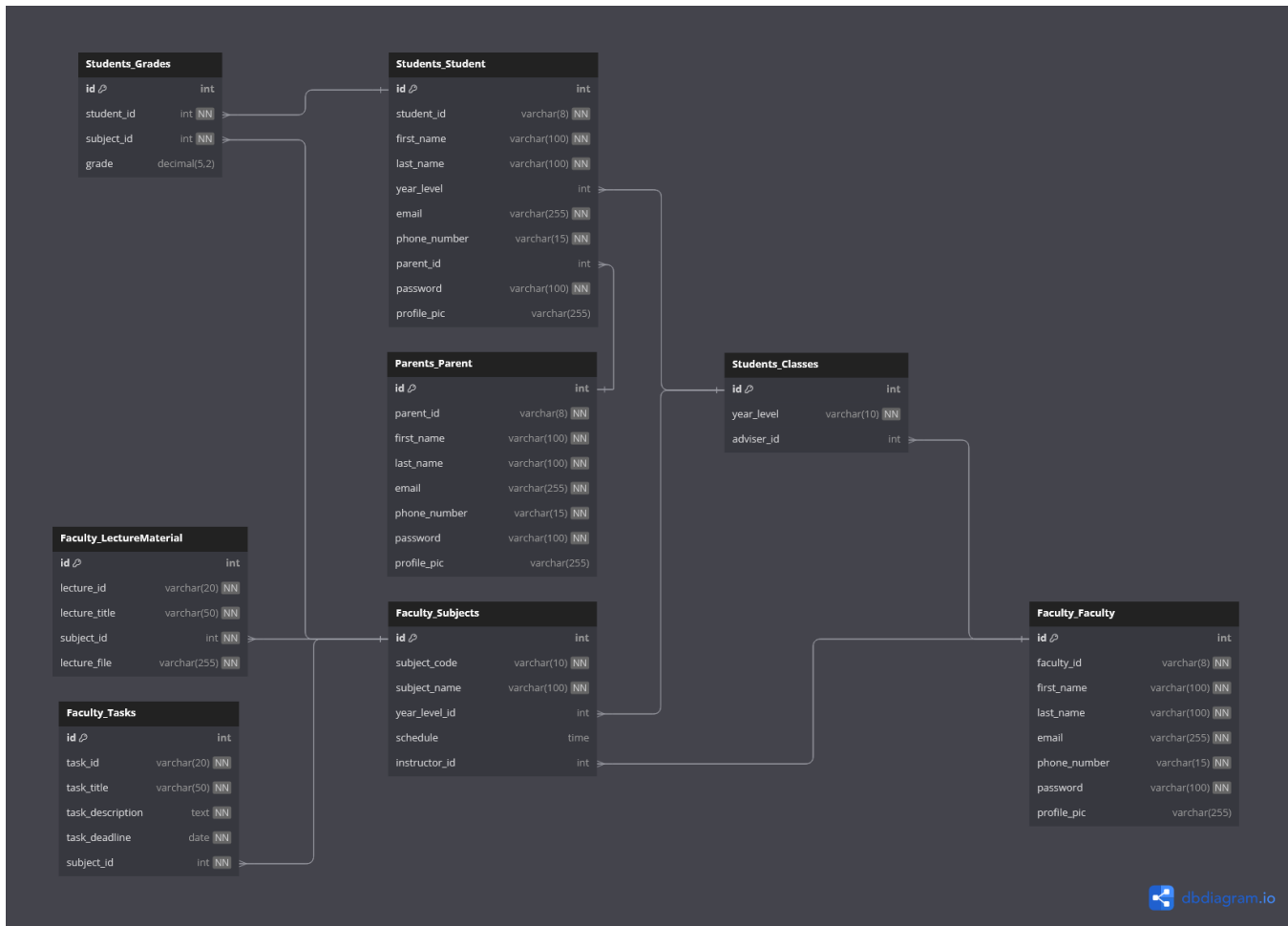
- **Student Portal**
 - A personalized interface where students can access their academic information, including schedules, assignments, and grades. Students can view educational resources and communicate with school staff through a secure messaging system.
- **Parent/Guardian Portal**
 - A comprehensive platform for parents to monitor their children's progress, receive school updates, and manage family information. Parents can complete administrative tasks and maintain communication with school staff efficiently.
- **Faculty Portal**
 - A personalized platform for school faculty to manage academic resources, manage advisory classes, provide assignments and tasks, and review student performance.
- **Administrative Controls**
 - A secure management system for handling student enrollment, academic records, and user permissions. Administrators can oversee all portal activities and manage system access effectively.

Resources Used:

- Django Development Environment
- SQLite Database
- PythonAnywhere Web hosting Platform

Database Features:

- **Database Design**



- **Security Implementation**

- Django uses the Object-Relational Mapping (ORM) system, which abstracts database queries and sanitizes inputs to prevent SQL injection. By default, Django also stores database connection credentials securely in settings files and recommends using environment variables or secrets management for sensitive data.

- **Advanced SQL Features**

- Triggers were implemented in the database to handle audit trails, ensuring that every Create, Read, Update, and Delete (CRUD) operation is automatically recorded. These triggers capture detailed information such as the operation type, and timestamps, providing a reliable and automated method for tracking changes and maintaining data integrity.

- **Transaction Management**

- By default, Django wraps each HTTP request in an atomic transaction, ensuring database operations are committed only if no errors occur. It relies on the database's locking mechanisms and provides `select_for_update` for explicit locks to handle concurrency safely.

- **Indexing and Optimization**

- Django supports database indexing through field options like `db_index=True` and the `indexes` option in a model's Meta class, enabling efficient query lookups. Query optimization features such as `select_related`, `prefetch_related`, and `queryset.explain()` help reduce query overhead and improve performance.