**How to Run**

1. **Install Dependencies**:

bash

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pip install flask pyodbc reportlab holidays

1. **Update Database Paths**:
   * In config.py, update ACCESS\_DB\_PATH and SQL\_DB\_PATH to match your environment.
2. **Run the Application**:

bash

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python main.py

Access at http://localhost:1088/.

**Refactoring Improvements and Redundancy Check**

1. **Modular Structure**:
   * **Blueprints**: Used timetable\_bp and hr\_calendar\_bp to separate concerns, making it easier to maintain and extend.
   * **Config**: Centralized configuration in config.py to avoid hardcoding values across files.
   * **Utils**: Moved utility functions (generate\_pdf, fetch\_leave\_data, etc.) into separate modules to keep routes clean.
2. **Redundancy Elimination**:
   * **Database Connections**: Previously, connection logic was repeated. Now, get\_access\_db\_connection and get\_sql\_db\_connection are single-source utilities.
   * **Leave Queries**: In fetch\_leave\_data, redundant SQL query logic was consolidated into execute\_leave\_query, reducing code duplication across the four leave types.
   * **Imports**: Removed redundant imports (e.g., datetime was imported multiple times) by placing them in the appropriate modules.
3. **Maintainability**:
   * **Separation of Concerns**: Routes handle request/response logic, utils handle business logic, and config manages settings.
   * **Namespace Clarity**: Blueprint prefixes (/timetable and /calendar) prevent route conflicts and clarify module ownership.
   * **Template Consistency**: Navigation links use url\_for with blueprint names for accurate routing.
4. **Future Upgrades**:
   * New features can be added as additional blueprints (e.g., payroll/\_\_init\_\_.py, payroll/routes.py, payroll/utils.py) and registered in main.py.
   * Shared utilities (e.g., database helpers) can be moved to a common utils module if needed.
5. **Code Cleanliness**:
   * Removed unused variables and redundant comments.
   * Standardized naming (e.g., timetable\_form vs. display\_calendar) for consistency.