Lab Automation System - Project Report

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1. Introduction

The **Lab Automation System** is designed to streamline the testing process of electrical appliances, developed using **Laravel**. The system addresses challenges faced by the SRS Electrical Appliances company, which manufactures electrical products like switch gears, fuses, capacitors, and resistors. These products are subjected to various tests, and the results determine whether they proceed to further stages or need re-manufacturing. The system is proposed to automate the record-keeping of these tests to prevent errors, misplacement of data, and to increase efficiency.

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2. Problem Statement

The current scenario in the company is highly manual and error-prone. Testing details of the products are maintained on paper, which leads to the following issues:

- Difficulty in tracking which products have been successfully tested and which have failed.
- Misplacement or incorrect entry of test results due to manual processing.
- Tedious process to retrieve or update the records.

The testing process is also fragmented, with multiple departments involved, each performing different tests on the same product. The absence of a centralized automated system makes tracking and managing these records challenging.

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3. Proposed Solution

To address these issues, the **Lab Automation System** is proposed, which includes the following features:

- **Modular Design**: Different modules for each type of test based on the product.
- **Unique Identifiers**: Automatic generation of unique product IDs and testing IDs.

- **Advanced Search Option**: Easy retrieval of records through advanced search functionality.
- **Testing Remarks**: Detailed descriptions of test criteria, results, and remarks.
- **Status Tracking**: Ability to check the status of each product's testing process.
- **User Access Control**: Access based on product ID or testing ID.
- **Automatic Record Generation**: Automatic entry of test results, including the name of the person performing the test.

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4. Functional Requirements

- **Product & Testing Details**: All relevant details such as product code, product ID, testing ID, and test results need to be captured.
- **Modular Structure**: The system must be able to support various testing types and product categories in a modular format.
- **Status Tracking**: Users should be able to check the status of a test and its outcome.
- **Advanced Search**: The system should allow users to search efficiently by product ID or testing ID.
- **Remarks Section**: Detailed remarks for each test should be included to provide context to the results.
- **Auto-Generation of Test IDs**: A unique 12-digit test ID should be generated automatically for each testing record.
- **Personnel Details**: The name(s) of the tester(s) should be recorded with each test entry.

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5. Non-Functional Requirements

- **Database**: All product and testing details need to be stored in a secure and reliable database.
- **Reliability**: The system should be reliable and ensure that no data is lost or misplaced.
- **Security**: Sensitive information should be protected through secure access controls.

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6. Technology Stack

- **Frontend**: HTML, CSS, JavaScript
- **Backend**: Laravel Framework (PHP)
- **Database**: MySQL
- **Other Technologies**: Bootstrap for responsive design

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7. Team Members

This project was developed by a team of four people:

- **Abu Sufyan** - Lead Developer & Backend Developer
- **Aatiqa Irfan** - Frontend Developer
- **Nibras Khan** - Backend Developer
- **Anus Raees** - Database and Testing

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8. Conclusion

The **Lab Automation System** aims to automate the testing process, reduce human error, and increase efficiency in the testing and manufacturing cycle. By transitioning from a manual to an automated process, the company will be able to track testing records easily, reduce delays, and ensure that products are ready for market release on time.

THANK YOU!