# List of Requirements through Questionnaire

# **Team Composition**

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# **Forms’ Link** <https://docs.google.com/forms/d/e/1FAIpQLScSvrRii1mUMTIrVeb28ecC9H9uxLnNyPAIuqMUDG2zoUEx5A/viewform?usp=sf_link>

# **Requirements**

**(Most Frequent to the Least Frequent)**

1. The system shall be able to allow users to create an account by providing their email, username, and password through the system interface. Upon clicking the "Create Account" button, the system shall validate the input and display a confirmation message once the account is successfully created.
2. The system shall be able to allow users to input the household size through an interface. Upon clicking the "Save" button, the system shall adjust the appliance usage accordingly by updating the schedules based on electricity rates.
3. The system shall be able to generate a clear and user-friendly prompt requesting users to input their electricity usage data. Upon submission, the system shall securely transmit the data using encryption and store it in a secure file. The system shall ensure data integrity and prevent unauthorized access by implementing appropriate security measures, such as access control and encryption.
4. The system shall be implemented as a desktop-based application and shall be compatible with Windows operating systems.
5. The system shall have a simple user interface with readable text, clear labels for buttons, and basic navigation (e.g., home, appliance settings, schedule view). Tooltips or pop-up messages shall explain any non-intuitive features to users, including the use of readable typography and a uniform color scheme across all interfaces.
6. The system shall be designed in such a way that users should be able to enter the appliance name, the power factor, preferred usage period for at least ten appliances per household in one session.
7. The system shall be able to monitor the amount of power consumed by any appliance registered in the system and produce the result for the user after every five seconds of entry.
8. The system shall be able to display peak and off-peak hour time slots, along with the corresponding electricity tariffs, within 2 seconds after retrieving the data from the utility provider.
9. The system shall be able to allow users to select the type of appliance (e.g., refrigerator, washing machine) and its size (small, medium, large) through an interface. Upon clicking the "Save" button, the system shall adjust the power consumption forecasts accordingly based on the selected appliance type and size.
10. The system shall be able to allow users to optimize appliance usage by scheduling appliances to operate during cost-effective time slots. These slots will be determined based on electricity tariffs for peak and off-peak hours, and the system shall notify users at least 15 minutes before a cost-effective slot begins.
11. The system shall be able to display a 24-hour schedule for optimum operation of all the appliances with a distinction between peak and off-peak within 3 seconds on the request of the user.
12. The system shall be able to perform optimization of the appliance usage schedule, and the goal function shall be the minimization of electricity bills through the determination of the optimal time slots for appliance usage and, on average, achieve at least a 10% reduction in electricity costs, given Tariff data
13. The system shall be able to optimize appliance schedules to operate during periods of lower electricity tariffs, where feasible. Users who follow the recommended schedules should expect to see a potential reduction of up to 5% in their electricity costs.
14. The system shall be able to provide an appliance usage timetable within 10 seconds of providing requisite appliance information and electricity tariffs for reducing electricity costs charged according to peak and off-peak tariffs.
15. The system shall be able to maintain and provide the ability for the user to see historical information on the appliance schedule and the pertinent electricity cost for the last six months. The history must be retrievable within five seconds of the request being made.
16. The system shall be able to make a comparison of the current electricity use with data of the previous three months and produce the results within five seconds of the request.
17. The system shall be able to allow users to provide feedback on the generated schedule through a designated feedback form, which includes options for rating the schedule (e.g., 1 to 5 stars) and leaving comments.
18. The system shall be able to implement robust error handling by providing meaningful error messages to users in case of invalid inputs or system failures. In the event of an error, the system shall log the issue for further investigation and display a user-friendly notification explaining the problem.
19. The system shall be built with modular functions (e.g., separate functions for user authentication, appliance management, and scheduling). Each module should be well-commented and easy to update independently of other modules.