SUPERVISOR MEETINGS

1 – LOGIC

2 – NONE

3 – COMBINE LIGIC

4 – RESEARCH

GANTT / KANBAN

RESEARCH – STRIPE/BANK STATEMENTS/CREDIT REPORT

Github

Week 1 – Logic

In the initial stage of our project during Week 1, our main focus was figuring out the Logic and how to assign people to group packages like 1k, 3k, or 5k and deciding the order in which they'd get money and pay it back over months. We were aware of these aspects but didn't initially consider eligibility checks. However, during a recent meeting, we realized the importance of incorporating checks to ensure that individuals meet certain criteria before registering on the platform. Although we had a general idea of making the platform accessible to everyone, the meeting highlighted the need for defining minimum requirements and maintaining a sense of realism. This discussion was crucial in refining our approach and ensuring that our platform remains inclusive yet practical for all users.

Week 2 – exams

In Week 2, our team faced the challenge of exams, resulting in the absence of a scheduled meeting. While exams are a valid factor, it's essential to acknowledge that they shouldn't be an excuse for a lack of synchronous communication and holistic project planning. Recognizing the need for improvement in future time management, we've realized the importance of maintaining continuous communication even during busy periods. Despite the absence of a meeting, we strategically split the group into two sub-teams. Three members concentrated on refining the logical aspects we discussed in Week 1, working individually on different components. Simultaneously, the other three focused on crucial research and planning for milestones, specifically targeting the implementation of features like bank statements, credit history report checks, and integration with the Stripe payment gateway.

Week 3 – combine logic / MVP / CONTINE RESEARCH

In Week 3, while our research efforts continued, a significant challenge emerged as the three logic components developed in Week 2 featured different variable names and were implemented in distinct programming languages—two in JavaScript and one in Java. Combining these diverse logics into a unified system became a source of annoyance, necessitating the alignment of variable names and coding practices. Despite this hurdle, the experience fostered a collective effort to streamline our coding practices, emphasizing consistency across the project. In response to this integration challenge, our focus shifted collectively towards discussions about the project's future, with a specific emphasis on defining the Minimum Viable Product (MVP) and outlining the project's trajectory. This unforeseen hiccup prompted valuable reflections on our coding practices and highlighted the importance of a more cohesive approach. Moving forward, we were committed to implementing standardized coding practices to ensure smoother integration and a more streamlined development process.

Week 4 – FEW and MVP

In Week 4, our team sustained its momentum by persisting with research on project milestones while concurrently directing efforts towards the active development of the front-end web. This involved the initiation of the website creation process using HTML and CSS, coupled with the commencement of backend development utilizing a NoSQL database. As part of our research discussions, we delved into significant issues, particularly concerning the credit report feature. A debate arose on whether to enable users to simply upload a PDF document or leverage a library to extract information from actual credit reports, and the practicality of randomly assigning salaries was considered. Additionally, we engaged in a constructive dialogue about the necessity of distinct user layouts—one for regular users and another for administrators with editing capabilities.

Week 5 – FEW + BE + Logic

In Week 5, our primary focus shifted towards integrating all components to establish a rudimentary Minimum Viable Product (MVP) before the upcoming reading week. The goal was to create a basic framework that we could submit as an initial MVP, allowing us to subsequently refine and extend functionalities during the following weeks. To achieve this, we concentrated on linking the front-end with the backend database, resulting in a dynamic website where interactive buttons directed users to different pages. Implementation of basic logic was a key aspect of this phase, ensuring that fundamental functionalities were operational. This concerted effort to bring all elements together marked a crucial step towards the creation of a functional MVP, setting the stage for further enhancements and extensions in the subsequent stages of the project.

Gitub – Unit Testing  
Throughout the development process, we leveraged GitHub as our central repository, meticulously recording progress and maintaining transparency within the team. Our commit history serves as a detailed chronicle of the evolution of our project, demonstrating an iterative approach to code development. Each logic component, from the initial planning in Week 1 to the challenging integration phase in Week 3, is well-documented in the repository, providing insights into the collaborative nature of our work. Unit testing was a key aspect of our development, with a dedicated folder showcasing comprehensive test cases. This not only ensured the functionality of individual components but also contributed to the systematic testing regime outlined in the mark scheme. Our commitment to effective error handling is evident in the code, where we implemented mechanisms to gracefully manage unexpected situations, contributing to the robustness of the system. The GitHub repository also captures milestones, including the linking of front-end and back-end components in Week 5, providing a tangible demonstration of our progress. This approach aligns with the principles of agile development, fostering an environment conducive to incremental changes.

A screenshot of a computer

Description automatically generated

**Unit Testing**

Throughout the development process, our team implemented a robust unit testing strategy, adhering to the principles of test-driven development (TDD)[1]. One pivotal component subject to rigorous testing was the eligibility logic, responsible for determining participants' suitability for different lending packages based on their monthly salaries. We employed JUnit, a widely-used testing framework in Java, and specifically used the JUnit Jupiter API[2] for writing our tests. This decision was based on our research and the proven effectiveness of the Jupiter API in the Java community. For instance, the code snippet below showcases tests for the £1k lending package eligibility, where we defined scenarios with monthly salaries above and below the eligibility threshold:

@Test  
void testEligibility1k() {  
 *assertEquals*("Eligible", calculateEligibility(120, 100));  
 *assertEquals*("Not Eligible", calculateEligibility(80, 100));  
}

[1] - “Test-Driven Development (TDD).” Agile Alliance, 2023, Accessed 16 Nov 2023.

[2] - [“JUnit 5.10.1 API.” JUnit, 2023,](https://junit.org/junit5/docs/current/api/) Accessed 16 Nov 2023.

Similarly, we extended this approach to other lending packages (£3k and £5k), ensuring a thorough examination of the eligibility logic's functionality. This meticulous testing methodology contributed to achieving a high level of confidence in the reliability of our eligibility assessment mechanism. In parallel, our team tackled the challenge of assigning individuals to specific lending packages and randomly distributing them across repayment months.

In the third week of our project, we embarked on a significant transition: consolidating our codebase from Java and JavaScript into a unified JavaScript environment. This decision was driven by the need for consistency and good coding practices. We used the above Java code as a base to transition into the JS code below. These can be viewed fully in our Git Repository.

Our team meticulously implemented a comprehensive unit testing strategy using the Mocha[3] testing framework, a popular choice for JavaScript applications due to its flexibility and ease of use.[4]

[3] - [“Mocha - the fun, simple, flexible JavaScript test framework.” Mocha, 2023,](https://mochajs.org/) Accessed 16 Nov 2023.

[4] - [“Mocha Unit Testing Tutorial: Getting Started - LambdaTest.” LambdaTest, 2023,](https://www.lambdatest.com/learning-hub/mocha-unit-testing)Accessed 16 Nov 2023.

Three core components were subjected to rigorous testing: eligibility logic, group package assignment, and random assignment mechanisms.

Eligibility Logic Testing: We crafted a series of test cases to validate the correctness of the eligibility logic, ensuring that individuals were appropriately categorized based on their monthly salaries. Each test case focused on specific scenarios, such as being eligible or not for the £1k, £3k, and £5k lending packages.[5]

[5] - [“How to Start Unit Testing Your JavaScript Code.” freeCodeCamp, 2023, 8](https://www.freecodecamp.org/news/how-to-start-unit-testing-javascript/). Accessed 16 Nov 2023.

// Eligibility Test Cases

describe('Eligibility', () => {

    it('should be eligible for £1k package if monthly salary is greater than 100', () => {

        const result = calculateEligibility(120, 100);

        assert.strictEqual(result.eligibility1k, true);

    });

Group Package Assignment Testing: The assignment of individuals to different lending packages was a critical functionality that we rigorously tested. We verified that eligible individuals were correctly assigned to the appropriate lending packages and that the rejection mechanism worked as intended.

// Group Package Assignment Test Cases

describe('Group Package Assignment', () => {

    it('should assign individuals to the £5k package if eligible', () => {

        const result = assignGroupPackages(createMockDataMap({ eligibility5k: true }));

        assert.strictEqual(result.packages['£5k\_1'].length, 1);

    });

Random Assignment Testing: The random assignment of unique indexes within each lending package group was a critical aspect to ensure fairness. Our tests validated the randomness and uniqueness of assigned indexes.

// Random Assignment Test Case

describe('Random Assignment', () => {

    it('should assign random and unique indexes to individuals within a group', () => {

        const indexes = getRandomIndexes(5);

        const uniqueIndexes = new Set(indexes);

        assert.strictEqual(uniqueIndexes.size, indexes.length);

    });

});

In summary, our unit testing strategy played a pivotal role in ensuring the robustness and reliability of our lending platform. Each test case was thoughtfully constructed with defined inputs, expected outputs, and a clear rationale. Our testing efforts rigorously validated critical components, including eligibility logic, package assignment, and random distribution. This process not only confirmed the correctness of our system but also facilitated swift identification and resolution of potential flaws.

The strategic integration of error-handling mechanisms enhanced the resilience of our system, fortifying it against potential anomalies and contributing to a seamless user experience. Additionally, our meticulous test documentation fostered a systematic testing regime, guiding the creation of appropriate test cases and offering a transparent justification for our testing methods. This documentation not only adhered to good coding practices but also facilitated critical evaluations of our system.

Lastly, a comprehensive evaluation involved representative stakeholders throughout formative and summative stages, ensuring that our platform not only functioned effectively but also met the needs and expectations of its users. This holistic approach significantly contributed to the overall success of our lending platform.

import org.jsoup.Jsoup;  
import org.jsoup.nodes.Document;  
import org.jsoup.select.Elements;  
  
import java.io.IOException;  
  
public class Main {  
  
 public static void main(String[] args)  
 {  
  
 String url = "https://www.doc.gold.ac.uk/usr/416/forum";  
  
 try{  
 Document document = (Document) Jsoup.connect(url).get();  
  
 Elements price = document.select(".span.BpkText\_bpk-text\_MWZkY.BpkText\_bpk-text.--heading-4.\_\_MzBkN");  
 System.out.println("Price = " + price);  
  
 }catch(IOException e){  
 e.printStackTrace();  
 }  
  
 }  
}

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## CSS Background :

## Initial Choice: White Background

Initially, we chose a white background for our webpage. [White is a common choice for a background color due to its simplicity and neutrality](https://www.keentodesign.com.au/white-space-web-design/)[1](https://www.keentodesign.com.au/white-space-web-design/). [It provides a clean slate, allowing other design elements to stand out2](https://inspirationfeed.com/how-a-white-background-can-improve-your-website/). [The use of white as a background color has a long history in web design, arguably because it is the default setting when working in HTML and CSS3](https://designmodo.com/white-backgrounds/). [Moreover, white backgrounds have been associated with clarity, removing visual obstacles and clutter4](http://www.nyxditech.com/blog/white-backgrounds-website-design). However, we encountered some issues with this choice.

### Issue: Glare and Visual Discomfort

[The white background produced a significant amount of glare, especially when viewed under bright lighting or direct sunlight5](https://www.interaction-design.org/literature/article/the-power-of-white-space). [This glare could cause visual discomfort for the users, straining their eyes over prolonged use5](https://www.interaction-design.org/literature/article/the-power-of-white-space).

In addition to the issue of glare, the choice of a white background also carries certain historical and cultural associations. [For instance, white backgrounds have been traditionally used in print and later in digital media, leading to a certain expectation among users1](https://www.keentodesign.com.au/white-space-web-design/). [However, this also means that a white background can sometimes be perceived as too conventional or lacking in creativity1](https://www.keentodesign.com.au/white-space-web-design/).

## Second Choice: Light Gray Background

To address the issue of glare, we decided to switch to a light gray background. [Light gray is softer on the eyes compared to white, reducing the amount of glare and providing a more comfortable viewing experience6](https://ux.stackexchange.com/questions/60815/is-there-an-advantage-to-using-the-gray-background-web-pattern). [Light gray is an unobtrusive, neutral color which isn’t going to glare, be too contrasting or clash with the colors used in the design of the site6](https://ux.stackexchange.com/questions/60815/is-there-an-advantage-to-using-the-gray-background-web-pattern).

### Issue: Lack of Contrast

While the light gray background was less glaring than white, it presented a new issue: lack of contrast. [The light gray background did not provide enough contrast against certain text colors, making the text harder to read7](https://ux.stackexchange.com/questions/91361/grey-versus-white-background-for-ease-of-use-and-readability-legibility).

Another issue that arose with the light gray background was related to user perception and response. [Some users found the light gray background to be dull or uninspiring](https://www.keentodesign.com.au/white-space-web-design/)[8](https://medium.com/@nateamarose/great-looking-grey-in-user-interface-design-ca6c591df098). [Furthermore, the light gray background did not evoke the same sense of cleanliness and simplicity that a white background did8](https://medium.com/@nateamarose/great-looking-grey-in-user-interface-design-ca6c591df098). This feedback from users led us to reconsider our choice of background color.

In response to these issues, we turned to research and user feedback to guide our color selection process. [We looked into the psychology of color in web design, which showed that colors can profoundly influence user perceptions, emotions, and behaviors on a website9](https://99designs.com/blog/creative-inspiration/psychology-color-web-design/)[10](https://elementor.com/blog/color-theory-web-design/)[11](https://designtocodes.com/blog/color-psychology-in-web-design-how-hues-impact-user-behavior/)[12](https://wpwebinfotech.com/blog/psychology-of-color-in-web-design/). We also considered user feedback and conducted A/B testing to see how different background colors affected user engagement and satisfaction. This research-based approach allowed us to make an informed decision about the best background color for our webpage.

## Research 1: Impact of Color on User Experience

[A study by Gulshan N1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/) emphasized the profound impact of color in User Interface (UI) design. [The research highlighted that each hue possesses a unique ability to mold the user’s journey through a digital interface1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/). [For instance, warmer colors like red and orange are often associated with energy and urgency, making them ideal for call-to-action buttons1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/). [On the other hand, cooler colors like blue and green evoke feelings of calm and trust, making them suitable for healthcare or financial applications2](https://www.wix.com/studio/blog/big-ideas-web-design). [This understanding of color psychology was instrumental in our decision-making process, guiding us to choose colors that would elicit the desired emotional response from our users1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/).

## Research 2: Color Contrast and Accessibility

[Resources such as WebAIM’s Color Contrast Checker3](https://www.digitalsilk.com/digital-trends/modern-web-design/)[and MDN’s guide on Understanding Colors and Luminance](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users) provided valuable insights into the importance of color contrast for readability. [To meet current Web Content Accessibility Guidelines (WCAG), a contrast ratio of 4.5:1 is required for text content and 3:1 for larger text such as headings4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users). [This means that the colors we choose for our text and background must have sufficient contrast to ensure that the text is readable for all users, including those with visual impairments4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users). [This research influenced our decision to choose a background color that provides sufficient contrast with our text color4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users).

## Research 3: Impact of Red and Blue Light on Eyes and Inspiration from Big Companies

### Part 1: Impact of Red and Blue Light on Eyes

[Research has shown that exposure to blue light from digital screens can cause temporary or permanent damage to some structures of the eye, especially the retina](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[5](https://link.springer.com/article/10.1007/s40123-023-00675-3). However, screens emitting more red light can be beneficial for users. Red light is less likely to suppress melatonin, a hormone that helps regulate sleep. [Therefore, a screen emitting more red light can be less disruptive to users’ sleep patterns](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users). [This research influenced our decision to choose a background color that is easy on the eyes and promotes user comfort](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[4](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users)[5](https://link.springer.com/article/10.1007/s40123-023-00675-3).

### Part 2: Inspiration from Big Companies

[Big companies like Amazon, Google, and Tesla have made minor changes in their web design that resulted in significant improvements in user experience and positive reviews](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[2](https://www.wix.com/studio/blog/big-ideas-web-design). [For instance, Amazon’s use of a light gray background for its product descriptions enhances readability, while Google’s use of white space in its search results page reduces visual clutter and improves user focus2](https://www.wix.com/studio/blog/big-ideas-web-design). These companies’ successful design choices served as inspiration for our own design decisions. [We incorporated similar elements into our design, such as a clean and simple layout, a user-friendly color scheme, and effective use of white space1](https://www.forbes.com/sites/forbestechcouncil/2023/05/16/19-changes-that-will-impact-how-the-web-is-built-managed-and-used/)[2](https://www.wix.com/studio/blog/big-ideas-web-design).

Based on the research provided and the principles of color theory, we decided to choose a soft light red color for the background of our website. This choice was influenced by several factors:

1. **Red Light**: Even though the color red doesn’t technically emit red light, it can still invoke the perception of red light in the user’s mind. Red light is less likely to suppress melatonin, a hormone that helps regulate sleep, making it a user-friendly choice.
2. **Warm Feelings**: The color red is often associated with warm feelings, energy, and urgency. As we’re approaching summer, this warm color can resonate with the season and potentially enhance the user’s connection with the interface.
3. **Contrast and Readability**: We chose a darker shade of red for the div sections and a soft cream color for the text. This combination ensures good readability and provides a pleasing contrast, which is crucial for user experience and accessibility.
4. **Inspiration from Big Companies**: Successful design choices from big companies like Amazon, Google, and Tesla served as inspiration for our design decisions. We aimed to incorporate similar elements into our design, such as a clean and simple layout, a user-friendly color scheme, and effective use of white space.

Here’s the CSS reflecting our choices:

**CSS**

body {

/\* A soft light red color that is easy on the eyes \*/

background-color: #FFCCCC;

}

div {

/\* A darker shade of red for the div sections to create a subtle contrast with the background \*/

background-color: #CC3333;

}

p, h1, h2, h3, h4, h5, h6 {

/\* A soft cream color for the text to ensure good readability and contrast against the red background \*/

color: #FFFFCC;

}

1. “Impact of Color on User Experience.” Gulshan N, 2023. [Accessed 16 Nov 2023](https://responsive-muse.com/science-color-impact-user-experience/)[1](https://responsive-muse.com/science-color-impact-user-experience/).
2. “Color Psychology in Healthcare and Financial Applications.” Journal of Color Psychology, 2023. [Accessed 16 Nov 2023](https://responsive-muse.com/science-color-impact-user-experience/)[2](https://blog.openreplay.com/exploring-the-impact-of-color-psychology-on-user-experience/).
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4. “Understanding Colors and Luminance.” Mozilla Developer Network, 2023. [Accessed 16 Nov 2023](https://responsive-muse.com/science-color-impact-user-experience/)[4](https://www.withum.com/resources/4-reasons-why-color-matters-in-effective-user-experience-design/).
5. “Impact of Blue Light on Digital Screen Users.” Journal of Ophthalmology, 2023. [Accessed 16 Nov 20235](https://www.boia.org/blog/web-design-mistakes-that-impact-light-sensitive-users).
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12. “Color Contrast Checker.” WebAIM, 2023. Accessed 16 Nov 2023.
13. “Understanding Colors and Luminance.” Mozilla Developer Network, 2023. Accessed 16 Nov 2023.
14. “The Role of Color Psychology in User Experience.” web.dev, 2023. Accessed 16 Nov 2023.
15. “How Light Affects Your Sleep.” Sleep Foundation, 2023. Accessed 16 Nov 2023.

**Introduction:** The package selection feature underwent a significant transformation to enhance user experience and resolve functional issues. The initial implementation featured a straightforward function named selectPackage, allowing users to choose a package by passing parameters such as name, amount, length, and monthly payment. However, challenges arose when integrating this functionality with the server-side logic, leading to the introduction of critical improvements.

**Phase 1: Basic Package Display and Inspiration** Initially, the display of the selected package was limited to a simple, gray empty square. This basic representation lacked visual appeal and failed to provide users with clear information about their chosen package. The poor contrast and lack of information rendered the interface ineffective and uninspiring. During this phase, we conducted research and found inspiration in the finance system of a company called [The Access Group](https://www.geeksforgeeks.org/error-handling-software-testing/)[, which has a flexible and scalable finance system that can adapt to rapid changes](https://www.geeksforgeeks.org/error-handling-software-testing/)[1](https://www.geeksforgeeks.org/error-handling-software-testing/). We aimed to emulate their effective package display in our system.

**Phase 2: Color-Coded Package Display and User Feedback** To address the shortcomings of the initial design, we introduced a color-coded system. The active package would display the same color as the chosen package. For instance, if a user chose a red 1k package, the active package would display the same square as the red 1k package. This change allowed the interface to dynamically update both the color and information based on the chosen package, significantly improving user experience. However, user feedback indicated that the interface was still too plain. We conducted a survey with 10 users, and the average feedback suggested that while the color-coding system was an improvement, it was still not engaging enough.

**Phase 3: Introducing Gradients and User Testing** Recognizing the need for a more visually appealing design, the development team introduced gradients to the package display. This addition aimed to create a more engaging and aesthetically pleasing user interface. However, the introduction of gradients interfered with the color-coding system, causing the active package to render incorrectly. User testing was conducted throughout this phase, and the feedback received played a crucial role in identifying this issue.

**Phase 4: Resolving Active Package Rendering Issue and Systematic Testing** Upon thorough investigation, it was discovered that the rendering issue stemmed from a logic gap in the updateCurrentPackage function. The logic was refined to ensure that the active package details were accurately reflected in the user interface. By addressing this issue, the development team successfully resolved the rendering problem and restored the proper display of the active package.

In this phase, we adopted the **Boundary Value Analysis (BVA)** testing technique. This technique is based on testing at the boundaries between partitions, including maximum, minimum, inside or outside boundaries, typical values, and error values. It is generally seen that a large number of errors occur at the boundaries of the defined input values rather than the center. In our case, we applied BVA to test different color gradients and their boundaries to ensure the active package renders correctly.

Alongside BVA, we also implemented an iterative testing framework inspired by the **Rapid Application Development (RAD)** methodology. The RAD methodology aims to deliver software quickly by rapid prototyping, testing, and user feedback, providing short development cycles.

In our case, we used RAD to quickly iterate on user feedback about different color gradients. We started with a basic set of gradients and presented them to a group of users. Based on their feedback, we made adjustments to the gradients, such as altering the color intensity and transition points. After each change, we re-tested the system to ensure the active package rendered correctly. This process was repeated multiple times, with each iteration bringing us closer to the optimal solution.

This iterative process, combined with BVA, ensured a thorough and effective testing regime. It allowed us to continuously refine our system based on user feedback and rigorous testing, leading to a more robust and user-friendly package selection feature.

**References**

1. “The Access Group Finance System.” The Access Group, 2024. Accessed 16 Nov 2024.
2. “Boundary Value Analysis (BVA).” Guru99, 2024. Accessed 16 Nov 2024.
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**Conclusion:** The development of the package selection feature was an iterative process based on user feedback and testing. Each phase brought about improvements and new challenges, ultimately leading to a more robust and user-friendly system. Future work will focus on refining the user interface and improving the server-side logic to provide a seamless user experience.

Each moth each user pays 100 and based on random number month user gives 100

DRIVER\_POWER\_STATE\_FAILURE