Dear Intern

Interim project report is an inherent component of your internship. We are enclosing a reference table of content for the interim project report.

The key objective of this report is for you to capture how far you have got in completing the internship work against milestones expected to be achieved within a specific duration and seek the mentor’s feedback. Depending on the internship project and your progress (IT/Non-IT, Technical/Business Domain), you may choose to include or exclude or rename sections or leave some sections blank from the table of content mentioned below. You can also add additional sections. You can refer the project presentation to view the milestones related to your internship project. Please populate milestone# (1 / 2 / 3) and the milestone description in the interim project report based on the milestone for which you are submitting the interim project report.

You can refer the project presentation to view the milestones related to your internship project.

|  |  |
| --- | --- |
| Internship Project Title | TCS iON RIO- 45: Create a CAPTCHA Service to Secure a Simple Web-based Application |
| Name of the Company | TCS iON |
| Name of the Industry Mentor | Vidhya Renganathan |
| Name of the Institute | Sri Sri University |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Start Date | End Date | | Total Effort (hrs.) | | Project Environment | Tools used |
| 09/12/2024 | 12/01/2025 | | 45 | | Eclipse IDE, windows | Java, HTML, CSS, JavaScript |
| Milestone # |  | Milestone: | |  | | |

**TABLE OF CONTENTS**

1. **Acknowledgements:  
   A note of gratitude to mentors, TCS iON, parents, and academic advisors for their guidance and support during the internship.**
2. **Objective:  
   Clearly state the goal of developing a CAPTCHA service to secure a simple web-based application.**
3. **Introduction / Description of Internship:  
   Overview of CAPTCHA services, their significance, and the purpose behind the project.**
4. **Internship Activities:  
   Detailed activities undertaken during the internship, including research, development of CAPTCHA logic, and UI design.**
5. **Approach / Methodology:  
   Steps followed during the project:**
   * **Designing the login page.**
   * **Implementing CAPTCHA functionality using Java.**
6. **Assumptions:  
   Key assumptions made during the development process, such as user capabilities to interpret CAPTCHA and platform compatibility.**
7. **Exceptions / Exclusions:  
   Scope limitations, such as compatibility with mobile applications or support for visually impaired users.**
8. **Charts, Tables, Diagrams**

**In this section, you can include visual aids that represent the technical and functional aspects of your project. These could be as follows:**

**a. CAPTCHA Logic Flow Diagram**

**A flowchart illustrating the CAPTCHA generation and validation process:**

**User Requests a Page: User accesses the login page.**

**CAPTCHA Generation: Backend logic generates a random sequence of characters and applies distortion.**

**Display CAPTCHA: CAPTCHA image is rendered on the login page.**

**User Input: User enters the displayed CAPTCHA text.**

**Validation: User input is sent to the server for validation against the original sequence.**

**Grant/Deny Access: Based on validation, the system allows or denies access.**

**b. Table Example: CAPTCHA Properties**

| **Property** | **Description** |
| --- | --- |
| **Random Sequence** | **Randomly generated characters or numbers.** |
| **Distortion Techniques** | **Noise, skew, rotation, and color patterns.** |
| **Input Mechanism** | **Textbox for user-entered CAPTCHA.** |
| **Validation Technique** | **String comparison in the backend logic.** |

**c. Diagrams**

**UI Design Mockup: Show an annotated screenshot or sketch of your login page with the CAPTCHA field.**

**Backend Data Flow: A diagram showcasing how data moves between the server, the CAPTCHA generator module, and the user interface.**

**9. Algorithms**

**CAPTCHA Generation Algorithm**

**Below is an outline of the algorithm used to create a CAPTCHA image:**

**Input: Set parameters such as character length, font style, distortion level, and background noise.**

**Generate Random String:**

**Use a random number generator to create a sequence of alphanumeric characters.**

**Example: "ABC123".**

**Apply Distortion:**

**Add noise by overlaying random lines, dots, or colors.**

**Skew the text by applying transformation functions.**

**Render CAPTCHA:**

**Use a graphics library to create an image with the distorted sequence.**

**Save the image temporarily or serve it directly to the user.**

**CAPTCHA Validation Algorithm**

**Input: User-entered CAPTCHA text and the original string generated.**

**Compare Strings:**

**Check if the entered string matches the original sequence (case sensitivity can be considered).**

**Validation Result:**

**If matched, return "Valid User".**

**If not matched, prompt the user to re-enter.**

**Sample Code Snippet (Using Java)**

**import java.awt.\*;**

**import java.awt.image.BufferedImage;**

**import java.util.Random;**

**public class CaptchaGenerator {**

**public String generateCaptchaText(int length) {**

**String characters = "ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890";**

**StringBuilder captchaText = new StringBuilder();**

**Random random = new Random();**

**for (int i = 0; i < length; i++) {**

**int index = random.nextInt(characters.length());**

**captchaText.append(characters.charAt(index));**

**}**

**return captchaText.toString();**

**}**

**public BufferedImage generateCaptchaImage(String captchaText) {**

**int width = 200, height = 50;**

**BufferedImage image = new BufferedImage(width, height, BufferedImage.TYPE\_INT\_RGB);**

**Graphics g = image.getGraphics();**

**g.setColor(Color.WHITE);**

**g.fillRect(0, 0, width, height);**

**g.setFont(new Font("Arial", Font.BOLD, 24));**

**g.setColor(Color.BLACK);**

**g.drawString(captchaText, 20, 35);**

**// Add noise or distortion here**

**return image;**

**}**

**}**

**These details will help you describe the technical and visual aspects comprehensively. Let me know if you need further explanations!**

1. **Challenges & Opportunities::**
   * **Challenges faced, such as distortion techniques for CAPTCHA.**
   * **Opportunities to enhance the project's features or expand its application.**
2. **Risk vs. Reward:  
   Assessment of risks involved in deploying CAPTCHA (e.g., usability vs. security trade-offs) and their benefits.**
3. **Reflections on the Internship:  
   Insights and learnings gained during the internship period.**
4. **Recommendations:  
   Suggestions for future interns or improvements to the project.**
5. **Outcome / Conclusion:  
   Summarize the completed milestones, including a functional CAPTCHA-enabled login page.**
6. **Enhancement Scope:  
   Potential areas for improvement, such as multi-language support, improved visual styles, or advanced CAPTCHA types.**
7. **Link to Code and Executable File:  
   Provide a URL or repository link for the source code and executables.**
8. **Research Questions and Responses:  
   Address research questions related to the implementation and optimization of CAPTCHA services.**