DISASTER MANAGEMENT SYSTEM

A PROJECT REPORT

Submitted by

NETHAJI J (2303811724321077)

in partial fulfillment of requirements for the award of the course

CGB1201 – JAVA PROGRAMMING

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

DECEMBER, 2024

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **“DISASTER MANAGEMENT SYSTEM”** is the bonafide work of **NETHAJI J (2303811724321077)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

Signature

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Submitted for the viva-voce examination held on 3.12.24

S. Geetha

INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I declare that the project report on "**DISASTER MANAGEMENT SYSTEM**" is the result of original work done by me and best of my knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **CGB1201 – JAVA PROGRAMMING.**

J. Netha

SIGNATURE

NETHAJI J

Place: Samayapuram

Date: 3/12/2024

ACKNOWLEDGEMENT

It is with great pride that I express our gratitude and indebtedness to our institution, **"K. Ramakrishnan College of Technology (Autonomous)",** for providing us with the opportunity to do this project.

I extend our sincere acknowledgement and appreciation to the esteemed and honourable Chairman, **Dr. K. RAMAKRISHNAN, B.E.,** for having provided the facilities during the course of our study in college.

I would like to express our sincere thanks to our beloved Executive Director, **Dr. S. KUPPUSAMY, MBA, Ph.D.,** for forwarding our project and offering an adequate duration to complete it.

I would like to thank **Dr. N. VASUDEVAN, M.TECH., Ph.D.,** Principal, who gave the opportunity to frame the project to full satisfaction.

I thank **Dr.T.AVUDAIAPPAN, M.E.,Ph.D**., Head of the Department of **ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**, for providing her encouragement in pursuing this project.

I wish to convey our profound and heartfelt gratitude to our esteemed project guide **Mrs.S.GEETHA M.E**., Department of **ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**, for her incalculable suggestions, creativity, assistance and patience, which motivated us to carry out this project.

I render our sincere thanks to the Course Coordinator and other staff members for providing valuable information during the course.

I wish to express our special thanks to the officials and Lab Technicians of our departments who rendered their help during the period of the work progress.

VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfill industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

The **Disaster Management System** is a Java-based graphical user interface (GUI) application aimed at streamlining the management of disaster reports and rescue team coordination. Built using AWT components such as Frame, TextArea, TextField, and Button, the system offers a user-friendly interface for efficient interaction. Users can add and view disaster reports and rescue team information while tracking real-time updates through a dedicated message display area. Key features include buttons for adding and reviewing disasters and rescue teams, along with an option to exit the application gracefully. The system emphasizes simplicity and ease of use, making it accessible for managing critical disaster-related data. By enhancing disaster preparedness and response capabilities, the application supports timely decision-making and organized handling of emergencies, ultimately contributing to effective disaster relief efforts. This integrated tool ensures that vital information is available promptly, aiding in better coordination and resource allocation during crises.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The **Disaster Management System** is a Java-based application designed to simplify disaster and rescue team management. Using an intuitive GUI built with AWT components, it allows users to add, view, and track disaster reports and rescue team information. Real-time updates are displayed in a message area for improved communication. The system promotes efficient disaster response by ensuring critical information is organized and accessible. This tool enhances coordination, enabling faster decision-making and better preparedness during emergencies.

1.2 OBJECTIVE

- To provide an efficient platform for managing disaster reports and rescue team data.
- To simplify the process of adding, viewing, and retrieving critical disaster-related information.
- To enable real-time updates through an intuitive message display area.
- To enhance coordination between rescue teams and disaster management personnel.
- To support timely decision-making during emergencies.
- To improve disaster preparedness and response efforts.

CHAPTER 2

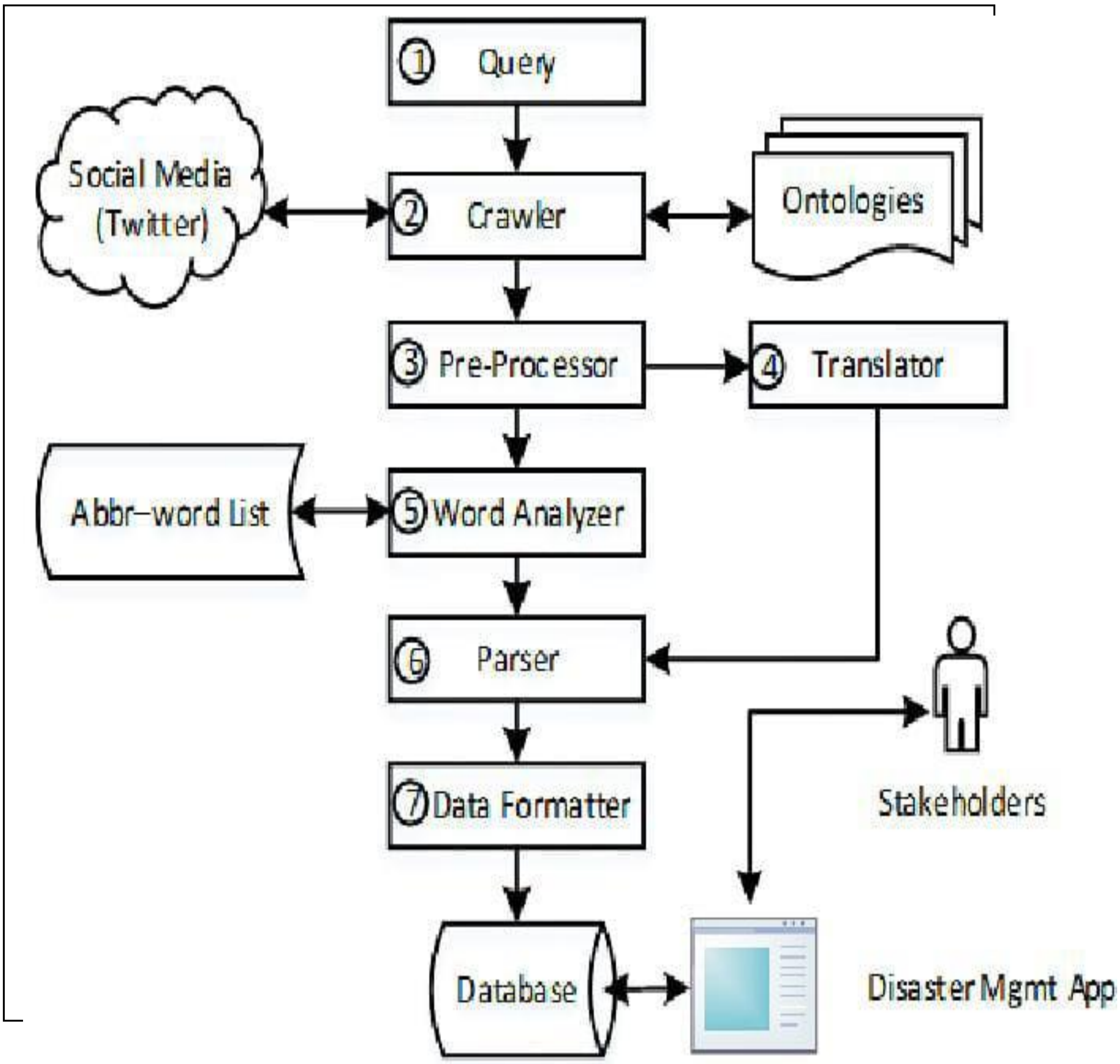
PROJECT METHODOLOGY

2.1 PROPOSED WORK

The proposed work focuses on designing and implementing a **Disaster Management System** using Java's Abstract Window Toolkit (AWT). The system provides an interactive platform for disaster response coordination by allowing users to manage disaster reports and rescue team information. Key functionalities include:

- Adding and viewing disaster details.
- Recording and displaying rescue team data.
- Maintaining real-time updates in a dedicated message area.
- Offering an intuitive and accessible graphical user interface.

2.2 BLOCK DIAGRAM



CHAPTER 3
JAVA PROGRAMMING CONCEPTS

3.1. COLLECTION FRAMEWORK (ARRAYLIST)

The Disaster Management System uses the ArrayList from Java's Collection Framework to store and manage disaster and rescue team information. ArrayList is a dynamic array that provides an efficient way to manage collections of objects, such as a list of reported disasters or registered rescue teams.

The ArrayList allows for dynamic resizing and provides methods to add, remove, or retrieve elements efficiently. For example, when a new disaster is reported, it is added to the ArrayList. Similarly, the system can retrieve the entire list of disasters to display updates or filter by specific criteria. This dynamic and efficient data structure ensures scalability and performance, even as the number of disasters or rescue teams increases.

3.2. EVENT-DRIVEN PROGRAMMING

The Disaster Management System implements event-driven programming through the use of AWT (Abstract Window Toolkit) components such as buttons, text fields, and message areas. Event handling is achieved using the ActionListener interface, which listens for user interactions like button clicks.

For instance, when the **"Add Disaster"** button is clicked, the system triggers the actionPerformed method to collect input data, store it in memory, and update the real-time message board. Similarly, the **"View Disasters"** button retrieves and displays all reported disasters dynamically. This event-driven approach makes the application interactive and ensures seamless user engagement, where each user action directly triggers a corresponding system response.

CHAPTER 4

MODULE DESCRIPTION

4.1 DISASTER INFORMATION MANAGEMENT

Purpose:

The purpose of the Disaster Information Management Module is to collect, store, and manage disaster-related data. This module serves as the central hub for inputting and retrieving disaster details such as disaster type, location, severity, and status.

Description:

The disaster information could include details like natural disaster events (earthquakes, floods, fires), their locations, dates, and severity levels. Data for this module might be entered manually through forms, imported from external sources, or updated in real-time via integration with news or weather services.

Key Functions:

1. **Add Disaster Information**:
   - Allows authorized users to input details about a new disaster, including type, location, severity, and date.
   - The system ensures the data is complete and correctly formatted before saving.
2. **View Disaster Updates**:
   - Enables users to retrieve and view the list of all disasters and their current status.
   - Provides real-time updates on ongoing disaster situations.
3. **Update Disaster Information**:
   - Allows users to update the status or details of an existing disaster (e.g., change severity or update response efforts).

4.2 RESCUE TEAM MANAGEMENT

Purpose:

The Rescue Team Management Module is designed to manage and coordinate the assignment of rescue teams during disaster events. It ensures that teams with the appropriate skills and resources are deployed to the relevant disaster zones, improving the effectiveness of the disaster response.

Description:

Rescue teams vary in size and expertise, and their management is critical for a timely and effective disaster response. The module allows the entry and management of details about rescue teams, such as team name, members, skills, availability, and location. This system ensures that the teams are tracked, and their availability is updated in real-time to avoid over-assigning or underutilizing resources.

Key Functions:

1. **Add Rescue Teams**:
   - Enables users to input details about new rescue teams, such as team members, specialties (e.g., medical, fire-fighting), and contact information.
2. **View Rescue Team Information**:
   - Provides the ability to view the list of all rescue teams, their availability, and skills.
3. **Assign Teams to Disasters**:
   - Allows users to assign rescue teams to specific disasters based on the disaster's nature and the team's expertise.

4.3 REAL-TIME COMMUNICATION

Purpose:

The Real-Time Communication and Notification Module is designed to send and receive real-time updates related to disaster information and response efforts. This module ensures all stakeholders, including disaster response teams, government agencies, and the public, are informed promptly.

Description:

This module integrates with disaster management systems to send notifications about new disasters, changes in status, rescue team deployment, and other critical updates. Communication can be done through various channels, including emails, SMS, or app notifications. The module ensures that all relevant parties receive timely and accurate information, minimizing delays in response efforts.

Key Functions:

1. **Send Disaster Alerts**:
   - Sends immediate alerts to stakeholders when new disaster information is added or when important status changes occur.
2. **Real-Time Updates**:
   - Provides notifications to teams about changes in disaster status, deployment instructions, or new resource allocations.
3. **Track Communication**:
   - Logs all communication for auditing purposes and to ensure that messages have been received by the appropriate recipients.

4.4 RESOURCE ALLOCATION AND MANAGEMENT

Purpose:

The Resource Allocation and Management Module is responsible for tracking and distributing resources (e.g., medical supplies, vehicles, equipment) required for disaster response. It ensures that resources are allocated to the right disaster zones and teams in a timely and efficient manner.

Description:

Resources such as medical kits, food, rescue vehicles, and firefighting equipment are critical during disaster response. This module allows users to track resource availability, allocate them to various disaster zones, and update resource statuses in real-time. It ensures that supplies are distributed to areas of greatest need and that resources are not wasted.

Key Functions:

1. **Track Resource Availability**:
   - Maintains an up-to-date inventory of resources, including current stock levels and their location.
2. **Allocate Resources**:
   - Allows users to allocate specific resources to disaster zones based on urgency and need.
3. **Monitor Resource Usage**:
   - Tracks the consumption of resources and notifies users when stocks are low or additional resources are required.

4.5 REPORTING AND ANALYTICS

Purpose:

The Reporting and Analytics Module provides detailed reports and data insights on disaster management efforts. It enables decision-makers to analyze the effectiveness of response operations, optimize resource allocation, and improve future disaster preparedness.

Description:

This module generates a variety of reports related to disaster types, response times, resource allocation, and the performance of rescue teams. By analyzing trends and patterns in disaster data, the system can offer valuable insights into operational efficiency and highlight areas for improvement in future responses.

Key Functions:

1. **Generate Disaster Reports**:
    - Generates detailed reports on disaster events, response actions, and outcomes for evaluation and planning.
2. **Analyze Response Performance**:
    - Provides insights into rescue team performance, resource utilization, and disaster resolution timelines.
3. **Create Resource Management Reports**:
    - Tracks resource usage and distribution efficiency, helping optimize future resource allocation strategies.

CHAPTER 5
CONCLUSION

The Disaster Management System (DMS) aims to provide an efficient and integrated solution for managing disaster response efforts. By incorporating key modules such as Disaster Information Management, Rescue Team Coordination, Resource Allocation, and Real-Time Communication, the system ensures that all aspects of disaster management are streamlined and interconnected. The system facilitates better planning, response coordination, and resource utilization, which are essential during critical disaster situations.

The Disaster Information Management Module ensures that disaster data is accurately collected, updated, and accessible to relevant stakeholders, enabling informed decision-making. The Rescue Team Management Module optimizes the deployment of skilled teams to disaster zones, ensuring rapid and effective intervention. Through real-time communication and notification features, the system ensures that all parties, including rescue teams, government agencies, and the public, are kept informed and can act swiftly.

In conclusion, the Disaster Management System enhances disaster preparedness and response by providing a comprehensive platform for data management, coordination, and analysis. By improving communication, resource allocation, and operational efficiency, the system plays a crucial role in mitigating the impact of disasters and saving lives.

REFERENCES:

1. Book: "Effective Java" by Joshua Bloch

- **Description**: This book is highly recommended for Java developers who want to write better, more efficient code. It covers best practices and design patterns, with tips on optimizing Java code for better performance and maintainability.
- **Link**: Effective Java on Amazon

2. Website: Oracle Java Documentation

- **Description**: The official Java documentation from Oracle is one of the most comprehensive resources for learning Java. It includes guides, tutorials, and API documentation for all the standard Java libraries.
- **Link**: Oracle Java Documentation

3. Book: "Java: The Complete Reference" by Herbert Schildt

- **Description**: This is a comprehensive guide for beginners as well as experienced developers. It covers the entire Java programming language, including syntax, libraries, and advanced features.
- **Link**: Java: The Complete Reference on Amazon

4. YouTube: "Java Programming" by Programming with Mosh

- **Description**: This YouTube playlist by Mosh Hamedani provides clear and structured video tutorials for learning Java programming. Mosh covers topics ranging from basic Java syntax to more advanced concepts like object-oriented programming.
- **Link**: Java Programming with Mosh

APPENDICES

APPENDIX A – SOURCE CODE

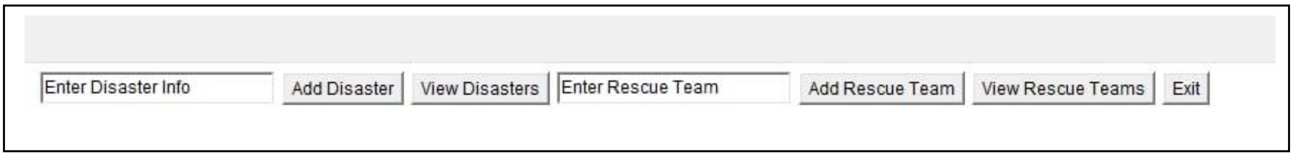
```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class DisasterManagementSystem {

    // Components
    private Frame mainFrame;
    private TextArea realTimeMessageArea;
    private TextField disasterInputField, rescueTeamInputField;
    private Button addDisasterButton, viewDisasterButton, addRescueTeamButton,
viewRescueTeamsButton, exitButton;

    // Storage for disaster and rescue team data
    private String disasterMessages = "";
    private String rescueTeams = "";

    // Constructor to initialize and set up the GUI components
    public DisasterManagementSystem() {
        mainFrame = new Frame("Integrated Disaster Management System");
        mainFrame.setSize(600, 500);
        mainFrame.setLayout(new BorderLayout());

        // Real-Time Message Area
        realTimeMessageArea = new TextArea();
        realTimeMessageArea.setEditable(false);
```

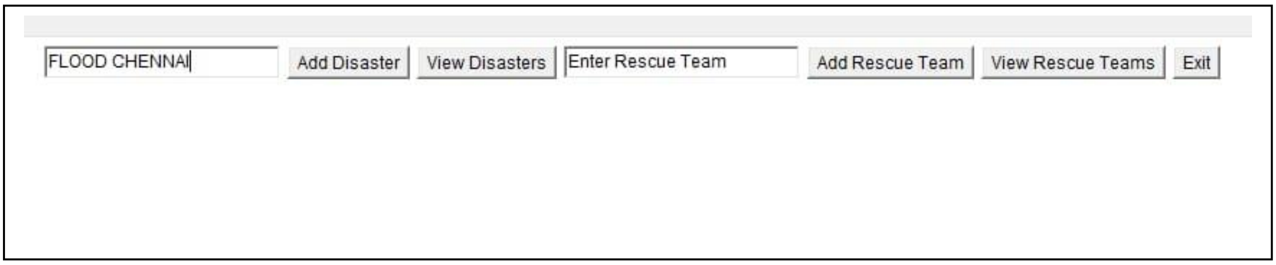
```
mainFrame.add(realTimeMessageArea, BorderLayout.NORTH);

// Disaster and Rescue Team Management Panel
Panel inputPanel = new Panel();
inputPanel.setLayout(new FlowLayout());

disasterInputField = new TextField("Enter Disaster Info", 20);
rescueTeamInputField = new TextField("Enter Rescue Team", 20);

addDisasterButton = new Button("Add Disaster");
viewDisasterButton = new Button("View Disasters");
addRescueTeamButton = new Button("Add Rescue Team");
viewRescueTeamsButton = new Button("View Rescue Teams");
exitButton = new Button("Exit");

inputPanel.add(disasterInputField);
inputPanel.add(addDisasterButton);
inputPanel.add(viewDisasterButton);

inputPanel.add(rescueTeamInputField);
inputPanel.add(addRescueTeamButton);
inputPanel.add(viewRescueTeamsButton);

inputPanel.add(exitButton);

mainFrame.add(inputPanel, BorderLayout.CENTER);

// Event Listeners
// Add Disaster
```

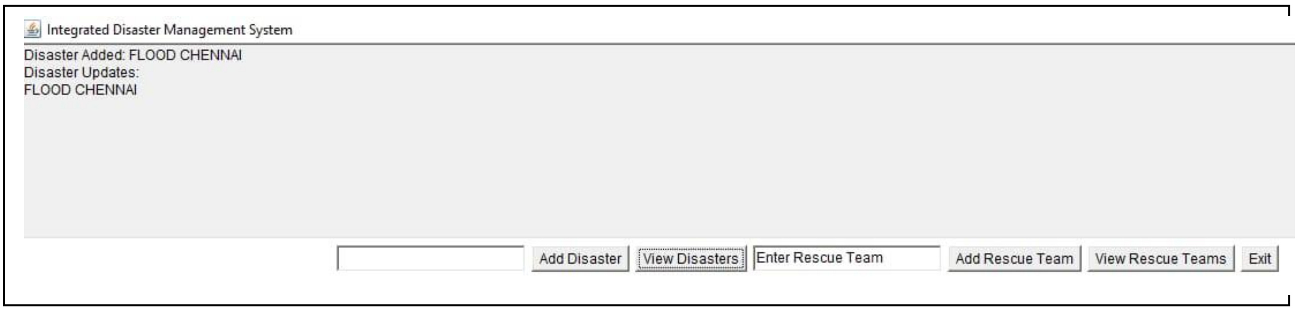
```
        addDisasterButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                String disaster = disasterInputField.getText();
                disasterMessages += disaster + "\n";
                disasterInputField.setText(""); // Clear input field after adding
                realTimeMessageArea.append("Disaster Added: " + disaster + "\n");
            }
        });

        // View Disasters
        viewDisasterButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                if (disasterMessages.isEmpty()) {
                    realTimeMessageArea.append("No disasters reported.\n");
                } else {
                    realTimeMessageArea.append("Disaster Updates:\n" + disasterMessages);
                }
            }
        });

        // Add Rescue Team
        addRescueTeamButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                String rescueTeam = rescueTeamInputField.getText();
                rescueTeams += rescueTeam + "\n";
                rescueTeamInputField.setText(""); // Clear input field after adding
                realTimeMessageArea.append("Rescue Team Added: " + rescueTeam + "\n");
        }
    });

    // View Rescue Teams
    viewRescueTeamsButton.addActionListener(new ActionListener() {
        public void actionPerformed(ActionEvent e) {
            if (rescueTeams.isEmpty()) {
                realTimeMessageArea.append("No rescue teams available.\n");
            } else {
                realTimeMessageArea.append("Rescue Teams:\n" + rescueTeams);
            }
        }
    });

    // Exit the application
    exitButton.addActionListener(new ActionListener() {
        public void actionPerformed(ActionEvent e) {
            System.exit(0);
        }
    });

    mainFrame.addWindowListener(new WindowAdapter() {
        public void windowClosing(WindowEvent we) {
            System.exit(0);
        }
    });

    mainFrame.setVisible(true);
}
```

```
    // Main method to launch the system
    public static void main(String[] args) {
        new DisasterManagementSystem();
    }
}
```

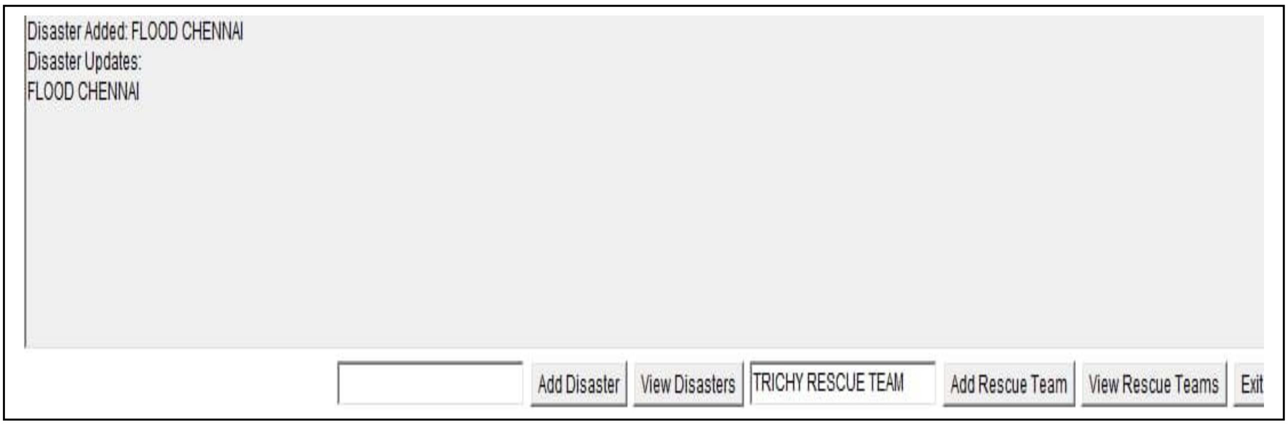
APPENDIX B - SCREENSHOTS



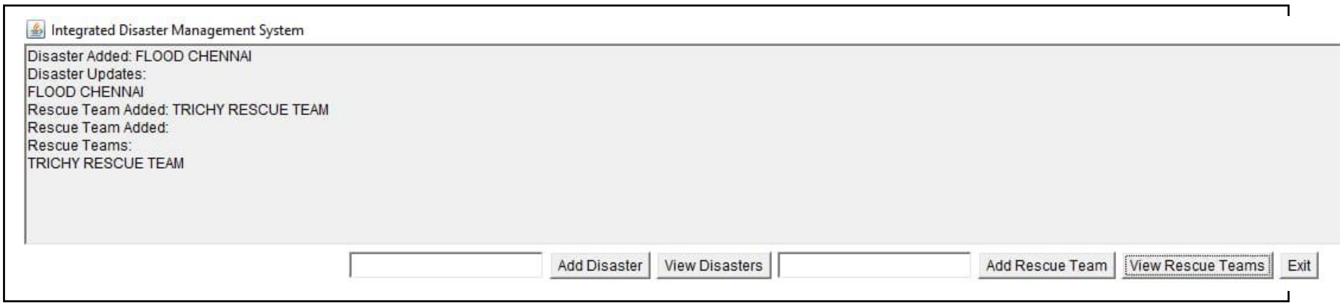

FLOOD CHENNAI



Disaster Added: FLOOD CHENNAI
Disaster Updates:
FLOOD CHENNAI



```
Disaster Added: FLOOD CHENNAI
Disaster Updates:
FLOOD CHENNAI
```



```
Disaster Added: FLOOD CHENNAI
Disaster Updates:
FLOOD CHENNAI
Rescue Team Added: TRICHY RESCUE TEAM
Rescue Team Added:
Rescue Teams:
TRICHY RESCUE TEAM
```