Flood Monitoring and Early Warning System

1. Project Title

Flood Monitoring and Early Warning System with Simulation Capabilities

---

2. Introduction

Floods are among the most devastating natural disasters, posing significant risks to human life, infrastructure, and the environment. With the increasing effects of climate change and unpredictable rainfall patterns, the need for an efficient, real-time flood monitoring and warning system is critical. This project proposes the development of a software-based flood detection and response simulation system using the C programming language.

---

3. Objectives

- To simulate and monitor real-time water level data.
- To predict flood risk based on rainfall and threshold analysis.
- To simulate various flood scenarios using random and time-based data.
- To control a virtual water pump system based on water levels.
- To implement a basic SMS alert system simulation.
- To log real-time and simulated data for analysis and auditing.

---

4. System Features

The system comprises the following key features:

Feature	Description
Water Level Monitoring	Manual input of current water level with flood alert trigger based on thresholds.
Flood Risk Prediction	Predictive analysis using recent rainfall data to determine flood risk level (low, moderate, high).
Pump Control System	Simulates an automatic water pump operation triggered when water level exceeds a defined threshold.
Data Logging	Logs water level data with timestamp into a text file for historical analysis.
SMS Alert System (Simulated)	Simulates sending an SMS alert when flood risk is detected.

Feature	Description
Manual Simulation Input	Allows user to simulate flood behavior by manually entering values.
Simulation Data Logging	Logs simulated data to a separate log file for analysis.

---

5. Tools and Technologies

- **Programming Language**: C
- **Standard Libraries**: `stdio.h`, `stdlib.h`, `math.h`, `time.h`, `unistd.h`, `string.h`
- **Environment**: Linux-based terminal (for optional features like audio alerts using `paplay`)
- **Output Mediums**: Console display and text log files

---

6. Expected Outcomes

- A working command-line interface (CLI) tool that can simulate and monitor flood conditions.
- Enhanced understanding of system response through simulated data inputs and analysis.
- Insightful data logs that reflect realistic water level patterns for academic or research use.
- A foundational system that can later be integrated with real-time sensors or IoT modules (e.g., GSM modules, water level sensors).

---

7. Conclusion

This flood monitoring and warning system provides a cost-effective and educational simulation environment for studying flood conditions and system responses. It can serve as the foundation for more complex IoT-based disaster management systems and can be expanded for real-world deployment with appropriate sensors and communication modules.

8. Team Members / Author

Name:	Register No:
Hasun Prabhanuka	SEU/IS/22/ICT/008
Chamindu Ravishan	SEU/IS/22/ICT/010
Harshika Gayashan	SEU/IS/22/ICT/029
Hashika Prabhath	SEU/IS/22/ICT/034
Kaveeja Rathnakoon	SEU/IS/22/ICT/042
Gayanika Ishani	SEU/IS/22/ICT/108

- Supervisor: Miss. Deshani malawana