INFO1111: Computing 1A Professionalism

2025 Semester 1

Skills: Team Project Report

Submission number: T4 SL Group 6 (1)

Github link: `https://github.com/KaltsitFan/INFO1111_GROUP.git`

Team Members:

Name	Student ID	Target * Foundation	Target * Advanced	Selected Major
Fan Kaffa	510041359	A	NA	Computer Science
Lin Link	540801400	A	NA	Data Science
Song Jared	550155230	A	NA	SW Development
Zheng Barnett	550718806	A	NA	Cyber Security

* Use the following codes:

- NA = Not attempting in this submission
- A = Attempting (not previously attempting)
- AW = Attempting (achieved weak in a previous submission)
- AG = Attempting (achieved good in a previous submission)
- S = Already achieved strong in a previous submission

Contents

1. Group Response

Our team consisted of four members from different computing majors: Computer Science, Data Science, Software Development, and Cyber Security. The primary objective of this project was to practice collaborative skills using GitHub rather than developing a complete solution. We effectively utilized GitHub's issue tracking system to clearly divide and allocate tasks according to our individual specialties. This structured approach facilitated cross-disciplinary support; for instance, the Software Development member helped the Cyber Security member resolve coding challenges, while the Data Science member guided the team through data-related aspects.

A significant challenge arose during documentation writing with LaTeX. Initially, we wrote LaTeX files directly without any real-time PDF previews. Due to this limitation, we frequently introduced syntax errors, such as incorrectly matched or entirely omitted commands like `\begin{itemize}` and `\end{itemize}`. These mistakes went unnoticed until compilation attempts, resulting in numerous difficulties and considerable debugging efforts later on. To mitigate this, we transitioned to using Visual Studio Code with LaTeX extensions, providing an Overleaf-like real-time PDF preview. This allowed us to immediately detect and correct errors as they occurred, significantly streamlining the documentation process and enhancing overall productivity.

Ultimately, by collaboratively addressing challenges and leveraging tools like GitHub and VS Code, we greatly improved our team's efficiency, communication, and task management capabilities.

2. Individual Response

2.1. Skills for Computer Science: Kaffa Fan

Personal Skill Reflection (Computer Science)

In the disaster response system project, my primary responsibilities included the establishment of the overall system architecture, the setup of the GitHub collaboration framework, and the configuration of the LaTeX documentation environment. Reflecting based on the SFIA framework, I selected the following two skills:

1. Software Development (PROG)

According to the SFIA framework [1], software development is foundational to implementing various technological solutions within the computer science domain. Mastery of LaTeX as a report-writing tool requires proficiency in real-time debugging and structured document organization. **Skill Enhancement (Team Collaboration Details):**

Initially, I decided that the team would use a plain text editor to write LaTeX code because most of my teammates had not installed any latex environments. And Unlike Overleaf, these editors lacked real-time output previews, leading to frequent errors, such as missing commands like `\end{itemize}`, resulting in significant debugging time.

Later, by transitioning to Visual Studio Code (VS Code) and installing plugins like LaTeX Workshop and LaTeX Language Support, we enabled real-time compilation and error notifications. This substantially improved coding efficiency and code quality.

Areas for Further Improvement:

Currently, there is an over-reliance on real-time feedback from development tools. Moving forward, I aim to strengthen my proactive code review and logical self-checking skills to enhance code robustness.

2. Systems Integration and Build (SINT)

According to the SFIA framework [1], systems integration and build skills emphasize efficient integration of various modules to ensure smooth operation of the final system. **Skill Enhancement (Team Collaboration Details):**

Initially, communication barriers existed within our team due to different personal communication habits. This caused vague task allocation and reduced efficiency.

To address these communication issues, the team adopted GitHub Issues for clear task division and tracking. Tasks such as "Frontend Interface Design" and "Data Interface Development" were specifically defined, allowing team members to clearly understand and take responsibility for their respective areas.

Areas for Further Improvement:

Technical discussions still contained excessive professional jargon, and unfamiliarity with various software and environments led to difficulties in comprehension among other team members. In the future, I should enhance my ability to explain complex technical concepts in simpler terms to improve cross-disciplinary communication effectiveness.

3. Git Response

1. Clone the repository

Clone the remote repository to your local computer:

```
git clone https://github.com/KaltsitFan/INFO1111_T4_SL_GROUP_6
```

This picture illustrates the cloning process:

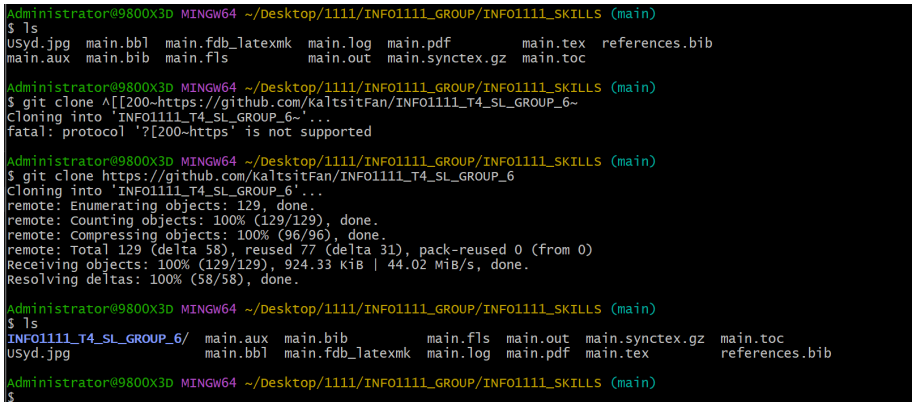


Figure 1: Cloning the repository

2. Stage, Commit, Push, and Check Status

Stage all modified files, commit the changes with a clear message, push the committed changes to GitHub, and verify the repository status:

```
git add .
git commit -m "Your commit message"
git push
git status
```

This picture demonstrates staging, committing, pushing, and checking status:

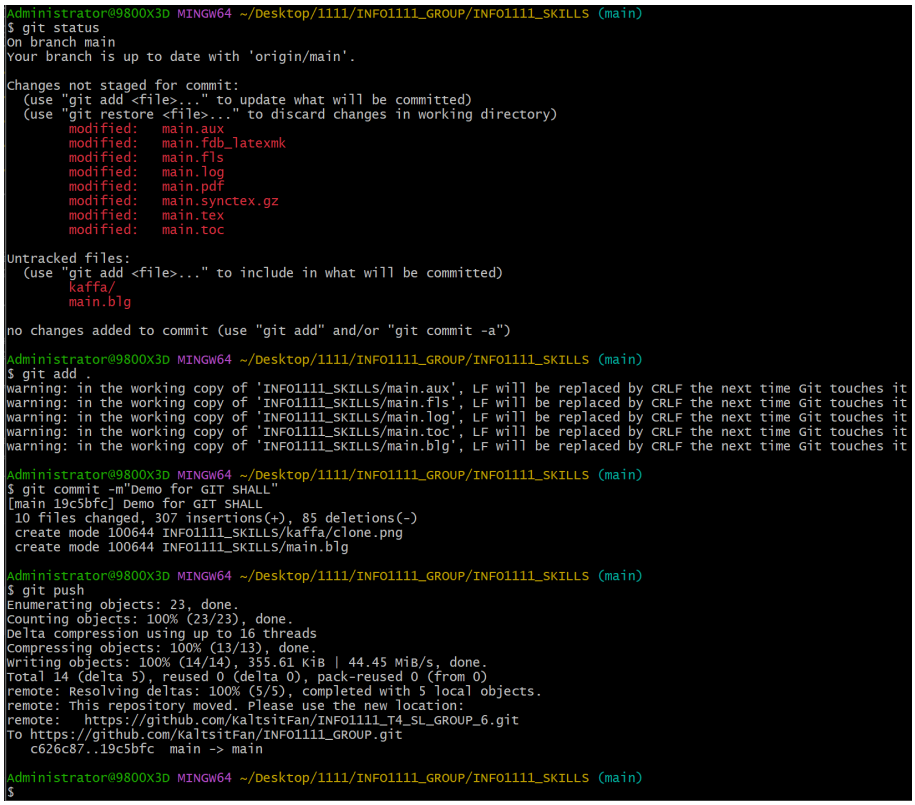


Figure 2: Staging, committing, pushing changes, and checking status

3. Synchronize with remote repository

Pull the latest updates from the GitHub repository to synchronize your local repository:

`git pull origin main`

This picture shows synchronizing the local repository with remote updates:

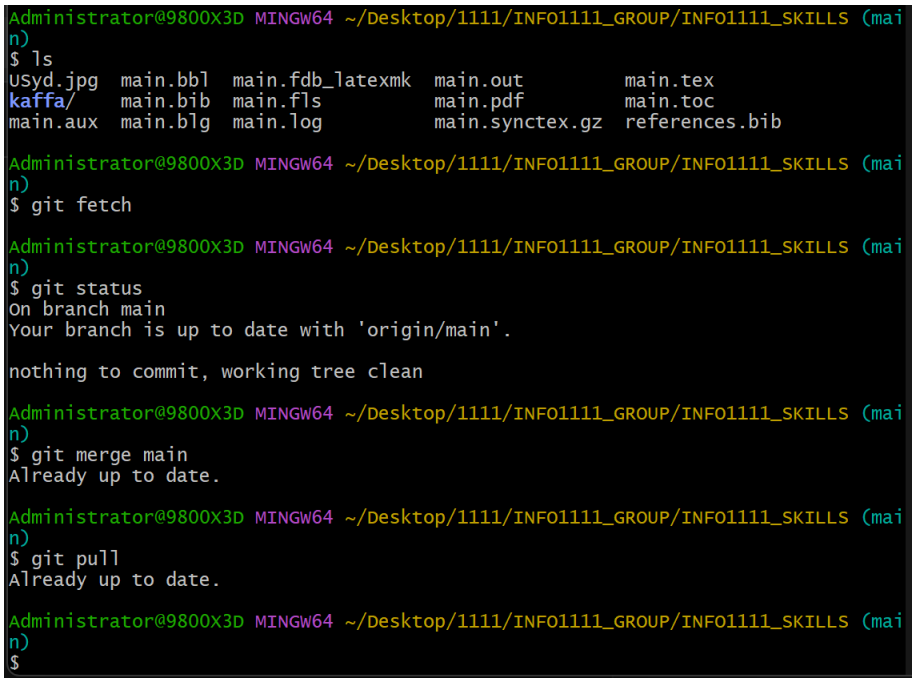


Figure 3: Pulling latest changes from remote repository

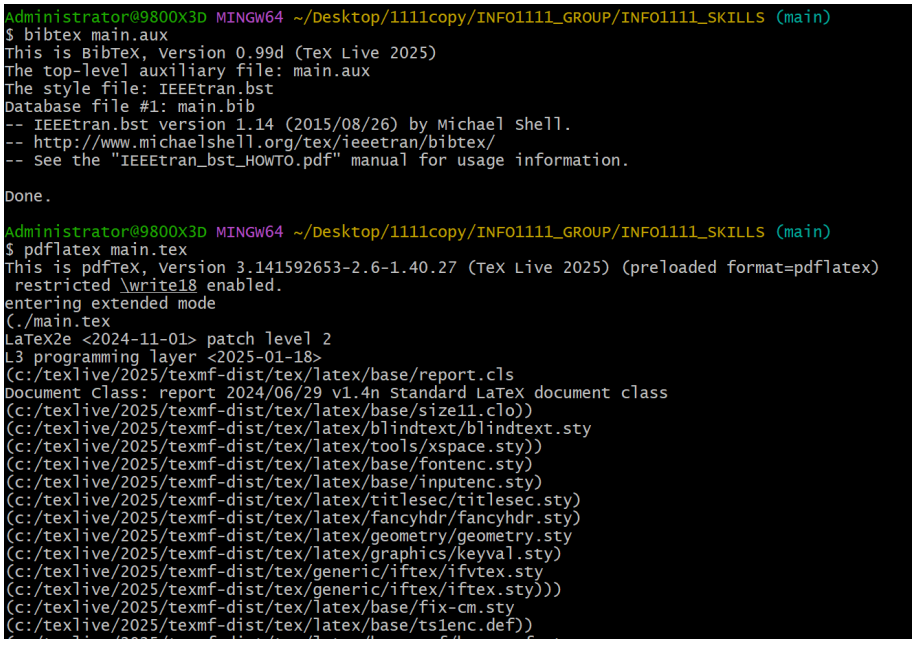
4. Generate PDF using Git Terminal

Compile your LaTeX document into PDF using Git terminal commands:

`bibtex main.aux and pdflatex yourfile.tex`

This generates a PDF document from your LaTeX file directly via terminal. Bibtex make sure citation correct

This picture illustrates generating a PDF using terminal:



2.2. Skills for SW Development: Jared Song

Through this project, I identified two critical skills from the SFIA framework relevant to software development:

Key Technical Skills

- **PROG (Programming/Software Development)**
  According to the SFIA framework [1], developing the disaster system's offline functionality required:
  - Implementing local data caching using Python's `shelve` module
  - Writing thread-safe code for concurrent access during emergencies
- **TEST (Software Testing)**
  Establish comprehensive test coverage for disaster scenarios:
  - Parameterized test suite covering distinct failure modes:
    * Network partitions (simulated with `pytest-timeout`)
    * Data corruption (CRC32 validation tests)
    * Resource exhaustion (memory/stress tests)
  - Mock service framework featuring:
    * Configurable failure injection
    * Latency simulation
    * Stateful behavior modeling

Skill Development through Collaboration

According to the SFIA framework [1], The team environment enhanced these skills by:

- **Cross-domain feedback**: Data Science members' statistical analysis helped refine our cache invalidation algorithm, the data collected has also simplified the work and made the work more straightforward.
- **Collective problem-solving**: Pair programming sessions fixed race conditions in the resource allocator module
- **Tool knowledge sharing**: Learned GitHub Actions CI configuration from Computer Science teammate, which really helps me enhance my skills and understanding of GitHub.

Areas for Improvement

Through my work on the disaster response system, I've identified several technical and professional skills that require refinement:

- **Performance Optimization**: Need deeper understanding of profiling tools (e.g. cProfile) - evidenced when our stress tests failed at 10,000+ concurrent users, be able to learn more about Python and be proficient in using Python.
- **Technical Documentation**: Find difficulty in using Github and Latex, so learning more skills and implementing automated documentation generation are important.

2.3. Skills for Cybersecurity: Barnett Zheng

Through this project, I identified two critical skills from the SFIA framework relevant to cybersecurity:

Key Technical Skills

- **SCTY (Network Security)** [2]
  Securing communication channels in the disaster response system required:
  - Implementing firewall rules to restrict unauthorized access
  - Encrypting data transmissions using TLS to ensure confidentiality
  - Deploying intrusion detection systems (IDS) to monitor for suspicious activity
- **SCTY (Data Protection)** [3]
  Ensuring the privacy and integrity of user data involved:
  - Utilizing AES encryption for sensitive personal information storage
  - Implementing access controls to restrict unauthorized data retrieval
  - Performing regular security audits to detect vulnerabilities

Skill Development through Collaboration

The team environment enhanced these cybersecurity skills by:

- **Interdisciplinary Insights**: Working with software engineers helped me align security mechanisms with application logic, ensuring seamless integration.
- **Incident Response Drills**: Collaborating with the team in security simulations improved my ability to detect and mitigate threats quickly.
- **Knowledge Sharing**: Gained practical experience with GitHub security features, such as dependency scanning and secret detection.

Areas for Improvement

Through my work on the disaster response system, I've identified several cybersecurity skills that require further refinement:

- **USUP (Incident Response)** [4]: Need to enhance my ability to analyze and react to security breaches in real time, particularly in high-pressure situations.
- **RESL (Risk Assessment)** [5]: Improve my ability to evaluate and prioritize security threats, ensuring that mitigation efforts focus on the most critical risks.

Skills for Data Science: Link Lin

Through my work exploring data science applications, particularly in disaster response and predictive analytics, I identified two critical skills relevant to data science based on their practical importance:

Key Technical Skills

- **Data Integration**
  Effective data integration for disaster scenarios required:
  - Combining diverse datasets (e.g., satellite imagery, weather forecasts) using Python's `Pandas` library
  - Normalizing inconsistent formats for real-time visualization during emergencies
- **Predictive Modeling**
  Building robust predictive models for fire prevention involved:
  - Analyzing historical weather and topographic data with:
    * Machine learning algorithms (e.g., Random Forests)
    * Cross-validation to prevent overfitting
  - Simulating fire spread scenarios featuring:
    * Temperature and humidity forecasting
    * Wind speed impact modeling
    * Risk area prioritization

Skill Development through Collaboration

The team environment enhanced these skills by:

- **Cross-disciplinary input**: Feedback from software development teammates improved data pipeline efficiency, optimizing how integrated data fed into predictive models.
- **Group troubleshooting**: Collaborative debugging sessions refined model accuracy by addressing data preprocessing errors.
- **Tool adoption**: Learned Jupyter Notebook workflows from a teammate, enhancing my ability to prototype and visualize data integration outputs.

Areas for Improvement

Through my data science efforts, I've identified key areas for growth:

- **Data Quality Handling**: Need better proficiency in manual data cleaning techniques (e.g., handling missing values), as shown when inconsistent weather data skewed early predictions.
- **Model Interpretability**: Struggle to explain complex model outputs clearly; improving visualization skills with tools like Matplotlib or Seaborn will aid communication with non-technical stakeholders.

3. Submission contribution overview

For each submission, outline the approach taken to your teamwork, how you combined the various contributions, and whether there were any significant variations in the levels of involvement. (Target = ∼100-300 words).

3.1. Submission 1 contribution overview

As above, for submission 1

3.2. Submission 2 contribution overview

As above, for submission 2

3.3. Submission 3 contribution overview

As above, for submission 3

Bibliography

[1] SFIA, "The global skills and competency framework for the digital world," 2022, see https://sfia-online.org/en/sfia-8/all-skills-a-z.

[2] National Institute of Standards and Technology (NIST), "Computer system security and privacy advisory meeting," 2002, see https://csrc.nist.gov/CSRC/media/Events/CSSPAB-JUNE-2002-MEETING/documents/Lainhart-06-2002.pdf.

[3] European Union Agency for Cybersecurity (ENISA), "A trusted and cyber secure europe," 2024, see https://www.enisa.europa.eu/sites/default/files/2025-02/A%20Trusted%20and%20Cyber%20Secure%20Europe%20-%20ENISA%20Strategy%20-%20Indicators.pdf.

[4] SANS Institute, "Incident response," 2021, see https://www.sans.org/security-resources/glossary-of-terms/incident-response/.

[5] International Organization for Standardization (ISO), "Information security, cybersecurity and privacy protection," 2022, see https://www.iso.org/obp/ui/en/#iso:std:iso-iec:27005:ed-4:v1:en.