530 PROJECT FINAL REFLECTION

Securing Your Home Network

Garrett Thompson

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Project Description

The proposed project, “Securing Your Home Network,” is an interactive Android application designed to educate users on best practices for protecting their home networks. The app will guide users through realistic scenarios where they make decisions about network configurations, device management, and security settings, helping them understand the implications of each choice. Users will encounter lessons on topics such as enabling strong Wi-Fi encryption, managing connected devices, updating firmware, and implementing firewalls and secure communication protocols. By actively engaging with these scenarios, users will gain practical knowledge of network security concepts and learn how to apply them to protect their home environments. This project falls into the programming category, as it involves developing a functional Android app that delivers interactive educational content, combining both network security instruction and user engagement. The app is designed to be achievable within the project timeframe, with a clear sequence of planning, content creation, development, testing, and review found below.

Target Audience

The audience for this project will be homeowners or individuals who control their own internet (e.g., some apartment tenants). The target audience's age range is approximately 20-70 years old.

Audience Skill Level

The audience will have varying levels of computer literacy. Many are unlikely to understand the implications of different network security settings and the risks associated with devices in their home.

Learning objectives

After a participant views or interacts with the project, they should be able to ...
Objective 1 – Understand how to configure their home network with security in mind.
Objective 2 – Understand the risks associated with different devices and practices within their home.
Objective 3 – Identify best practices for network security within a home.

Project Impact

This project addresses a significant gap in consumer knowledge regarding home network security. While enterprise networks are managed by professionals, home networks are often left vulnerable due to insecure default settings and a lack of user awareness. "Securing Your Home Network" addresses this by acting as an

interactive Android application that translates complex concepts—such as WPA3 encryption, UPnP risks, and firmware management—into accessible, decision-based scenarios.

The project contributes to the broader network security knowledge base by providing a practical, interactive tool that empowers non-technical users to secure their own environments. Unlike static articles, the application tailors the content to the audience's skill level by utilizing a localized, scenario-based approach. It fills the knowledge gap by guiding users through realistic decisions and providing immediate feedback on why a specific configuration is dangerous. This effectively links high-level security standards, such as those from CISA, to everyday applications for homeowners and tenants.

Expected Outcomes, Evaluation, and Assessment

The primary deliverable of this project will be a fully functional Android app that provides an interactive learning experience in securing a home network. Users will be able to navigate scenarios that teach key network security practices, such as configuring Wi-Fi encryption, updating router firmware, and managing connected devices. These deliverables align with the project objectives by offering hands-on education that reinforces core network security concepts, including confidentiality, integrity, and availability. The success of the project will be evaluated through both functional and educational criteria. Functionally, the app will be considered complete when all interactive scenarios work as intended, all screens are accessible, and user interactions are properly handled. Educationally, effectiveness will be measured by whether users can correctly apply the concepts demonstrated in the app, as assessed through in-app feedback mechanisms or scenario outcomes. Additional indicators of quality will include clarity of instructions, intuitive navigation, and a lack of technical errors or crashes.

Project Evaluation and Outcomes

Since the content submission update, the primary addition to the project has been the full technical implementation of the research content into a fully functional Android application. While the previous phase focused on research and scriptwriting, this phase involved building the UI layouts, implementing navigation logic, and coding the interactive decision-making engines within Android Studio.

Reflecting on the expected outcomes, the project successfully met its intended objectives. The first objective regarding configuration was achieved through the "Router Credentials & SSID" and "Maintenance" modules, where users must actively select secure settings to proceed. The second objective concerning risks was met through the feedback mechanisms in the app; when a user selects an unsafe option, the app explains the specific risk before allowing them to retry. Finally, the third objective regarding best practices was achieved through the structured flow of the application, which enforces a checklist of proper security measures.

Regarding the project's analysis, the greatest strength is the clarity of the user flow and the approachable UI. I am very proud of how the final application looks; the flow is clear, easy to follow, and effectively guides the user without being overwhelmed. A weakness of the project is the scope limitation regarding device-level security. As noted in the research phase, including topics like antivirus software would have diluted the focus on network/router security, but their absence leaves a small gap in the overall security picture.

Personal Impact

I chose this topic because I plan to pursue a career in cybersecurity, and I believe that security practices should be accessible to everyone, not just enterprise environments. This project is significant to me because I have

observed that many non-technical users are unaware of the features and risks within their home network systems. Bridging the gap between technical security protocols and the average user is a skill I wanted to cultivate, as it is essential for a security professional to communicate risks effectively.

Personal Learning Goals

Through this project, I hope to strengthen my understanding of network security by applying them in a practical format. I hope to improve my skills in Android app development in addition to my work performed in COMS 3090. Additionally, I want to develop a project I would be proud to share with a future employer or colleague, as my currently public projects are not in-line with my abilities. By developing this project, I also aim to improve my project planning and time management skills, particularly in balancing development, content creation, and testing within a structured timeline. Overall, this project will help me gain hands-on experience in both network security education and mobile application development.

Skills and Knowledge Gained

This project helped me build specific technical skills, particularly in Android App Development. I learned how to design XML layouts for the interface and write the logic to manage user states. I also improved my knowledge of Home Networking, specifically regarding encryption standards and the vulnerabilities in protocols like UPnP and WPS. I successfully met my personal learning goals of learning app development and completing a functional project. Researching exactly why certain defaults are insecure so I could explain them to users helped me understand the material better myself. There were no major setbacks, and I was able to complete the project exactly as intended.

Lessons Learned

The main challenge was taking general network security information and presenting it in a way that would actually hold the interest of a non-technical user. I had to focus on my communication skills, specifically determining which details to leave out so the app didn't feel cluttered. I also improved my time management, as I realized that coding the UI logic takes significantly longer than just drafting the text. If I were to start this project again, I would begin the prototyping phase in Android Studio much earlier. I spent a lot of time perfecting the written script first, but starting the development sooner would have given me more time to add interactive testing features.

Future Impact

The potential future impact of this project lies in its ability to demystify network security for the average homeowner, transforming passive internet users into active defenders of their own data. By effectively teaching non-technical users to identify and mitigate risks, such as weak encryption or insecure defaults, the application could lead to a tangible reduction in vulnerable home networks. Ultimately, this program demonstrates that accessible, interactive education is a viable defense strategy, helping to create a more resilient digital ecosystem where security is a standard practice rather than an afterthought.

Explanation of Submitted Materials

Each file listed below is included in the Canvas submission. The application video demonstrates the application's use as a standard user would typically use it. The included APK allows for the installation of the application on an Android system. All primary program files are included in text files, while the code for the entire program is available at the linked GitHub repository. The GitHub repository includes a simple README file.

Project Content Deliverables

GitHub Code Repository
- Item Description: All source code for the application created for this project
- File name/path/link: https://github.com/garrett-lane/cpre-5300-project

App Video
- Item Description: A video of the app in use.
- File name/path/link: AppRecording.mp4

App APK
- Item Description: Installation file for the app
- File name/path/link: app-release.apk
- Relevant information: Tested on Pixel 9 Pro using Android 16

Source Code and READMEs

AppContent.kt
- Item Description: Contains the written content for each page.
- File name/path/link: AppContent.txt

CompletionScreen.kt
- Item Description: Design and content for the final screen of the app.
- File name/path/link: CompletionScreen.txt

EducationScreen.kt
- Item Description: Framework for each educational screen.
- File name/path/link: EducationScreen.txt

IntroductionScreen.kt
- Item Description: Design and content for the introductory/explanatory screen for the app.
- File name/path/link: IntroductionScreen.txt

MainActivity.kt
- Item Description: Base file which assembles the pieces of the application.
- File name/path/link: MainActivity.txt

Navigation.kt
- Item Description: Handles navigation between pages to simplify transitions
- File name/path/link: Navigation.txt

PageContent.kt
- Item Description: Data structures for types of page content.
- File name/path/link: PageContent.txt

Question.kt
- Item Description: Framework for each question formatting as well as answers.
- File name/path/link: Question.txt

TestScreen.kt
- Item Description: Framework for test pages.

- File name/path/link: TestScreen.txt
WelcomeScreen.kt
- Item Description: Title screen for the app.
- File name/path/link: WelcomeScreen.txt

Dependencies, Resources & Tools

- To run this in a development environment, users will need Android Studio, Android SDK 36.0 (Baklava), Gradle, and a system that can handle the device emulator within Android Studio.
- To run this in a consumer environment, users will need to install the app using the provided Signed APK.

Citations

[1] “Module 5: Securing Your Home Wi-Fi | CISA,” Cybersecurity and Infrastructure Security Agency CISA, 2025. https://www.cisa.gov/audiences/high-risk-communities/projectupskill/module5 (accessed Oct. 13, 2025).

[2] National Security Agency, “Best Practices for Securing Your Home Network,” Feb. 2023. Available: https://media.defense.gov/2023/Feb/22/2003165170/-1/-1/0/CSI_BEST_PRACTICES_FOR_SECURING_YOUR_HOME_NETWORK.PDF

[3] E. office, “Making technology work for adult learners: our 6 key research findings - European Association for the Education of Adults,” European Association for the Education of Adults, Sep. 04, 2025. https://eaea.org/2025/09/04/making-technology-work-for-adult-learners-our-6-key-research-findings/ (accessed Oct. 13, 2025).

[4] “Driving widespread adoption of WPA3,” Wi-Fi Alliance, https://www.wi-fi.org/system/files/WPA3_Deployment_Options_Highlights_20241125.pdf (accessed Nov. 16, 2025).