Windows Top 20 Vulnerability Scanner

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Statement of Purpose

- Provide a simple, easy to use program that helps increase system security & threat awareness
- Alert & remind users of vulnerabilities, improve digital safety & security best practices awareness
- Program is extensible and open-source

Problem Statement

- People often do not update their system and apps unless forced to
- This can be due to a variety of reasons, including:
  - Forgetting to
  - Being too busy to check
  - Lack understanding of how vulnerabilities can affect them
- Failure to update significantly increases the likelihood of vulnerabilities being exploited
- This puts the user's security at risk

Research and Background

- **Background:**
  - I wanted my project to relate to my field of study
  - I determined that a vulnerability scanner would fit that criteria
- **Research:**
  - Assessed multiple sources to determine where I should retrieve vulnerability information from
  - The program Grabber (a Python vulnerability scanner) was my inspiration and was used as a reference

Features

- **Scanning –** Uses platform and subprocess libraries to retrieve Operating System and application versions, respectively.
- **Web scraping –** Uses BeautfifulSoup to scrape vulnerability information from the CVE Details HTML pages for the OS and applications.
- **Email –** Uses Multipurpose Internet Mail Extension (MIME) and smtplib libraries to send the user an email containing their scan results.
- **Graphical User Interface –** Uses tkinter and threading libraries to create and update the GUI.

Project Language(s), Software, and Hardware

- **Language:** Python
  - Familiarity with HTML, though no HTML code was written
- **Libraries:** Numerous Python libraries
- **Software:** Visual Studio Code
- **Hardware:** Windows 10 Pro PC and Laptop

Project Requirements

- **Vulnerability Scanner**
  - Scans the user's Windows computer and determines the OS and installed application version(s)
  - Pulls relevant information from CVE Details
- **Email**
  - Emails scan results to the user once the scan is complete.
- **Other**
  - Program is acceptable in terms of look, feel, and performance
  - Program does not violate industry ethical standards and guidelines

Error Messages

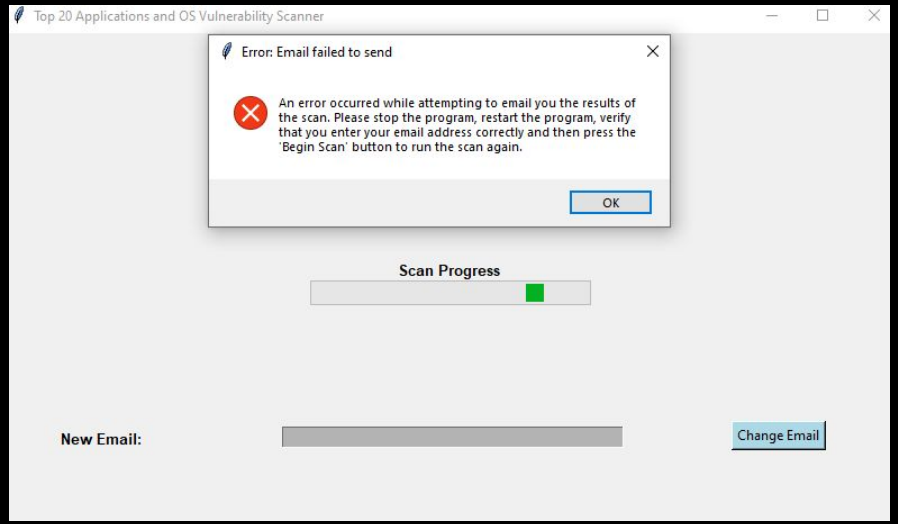

Figure 1.
Error message informing the user that the email was unable to be sent

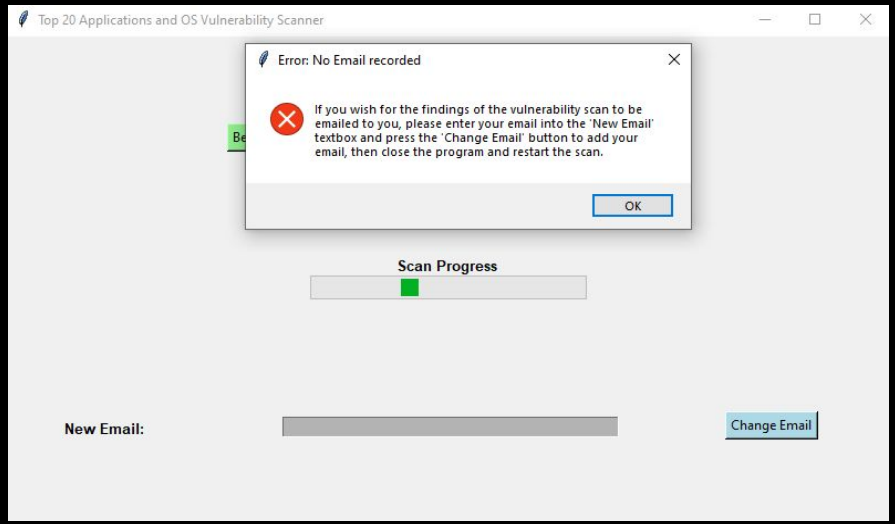

Figure 2.
Error message informing the user that their email is not recorded

Test Plan and Results

- **Manual Tests**
  - Primarily focused on program reliability and functionality
  - An ethical evaluation was also conducted as part of this test group
- **User Acceptance Tests**
  - Total of eight user acceptance test cases
  - Testing consisted of a user survey, where test cases were represented by questions
  - Each test case had to receive an average of four stars (out of five) in order to be considered as passing
  - Five total users performed the evaluation, four of which could be considered less technologically-inclined

Challenges Overcome

- Gained proficiency in Python
- Learned how to web scrape from an HTML page
- Figured out how to send an email to the user
- Developed the ability to to create a simple GUI in Python
- Met user expectations in testing

Future Enhancements

- **Implementing a database element:** User's email, vulnerability information, and the program's email would be stored more securely and appropriately
- **Use PowerShell more effectively:** Frequent PowerShell reloading is inefficient, command optimization would improve performance
- **Split the functionality of the program:** Increased efficiency and a minor degree of user agency for the scan
- **Alter how the program retrieves data:** Ensure that web scraped data is current and would remove the need for manual changes
- **Implement installer with start-up script:** Guarantee that the scan is run more frequently, reducing the risk of vulnerabilities being exploited

Conclusion

- The *Windows Top 20 Vulnerability Scanner* helps increase security and risk awareness for users
- My program demonstrates my ability to develop a practical solution to a widespread issue
- Use of an easy-to-understand language with an extensible structure allows for easy changes and improvements

Successful Scan Result

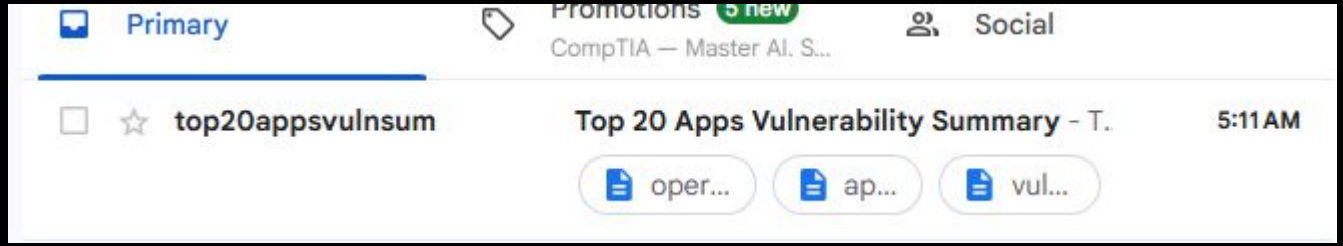

Figure 3.
The scan was successful and an email containing the information was sent to the user