

# 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 BeautifulSoup 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

# 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 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

# Error Messages

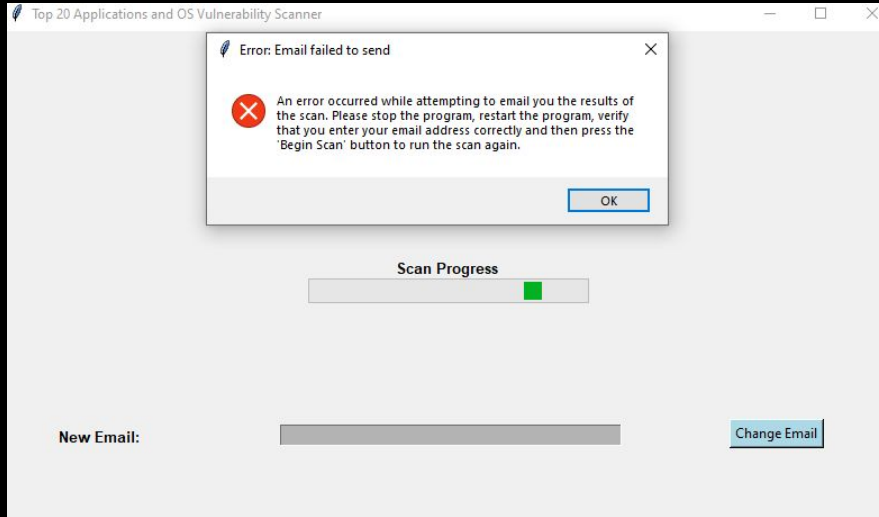


Figure 1.  
Error message informing the user that the email was unable to be sent

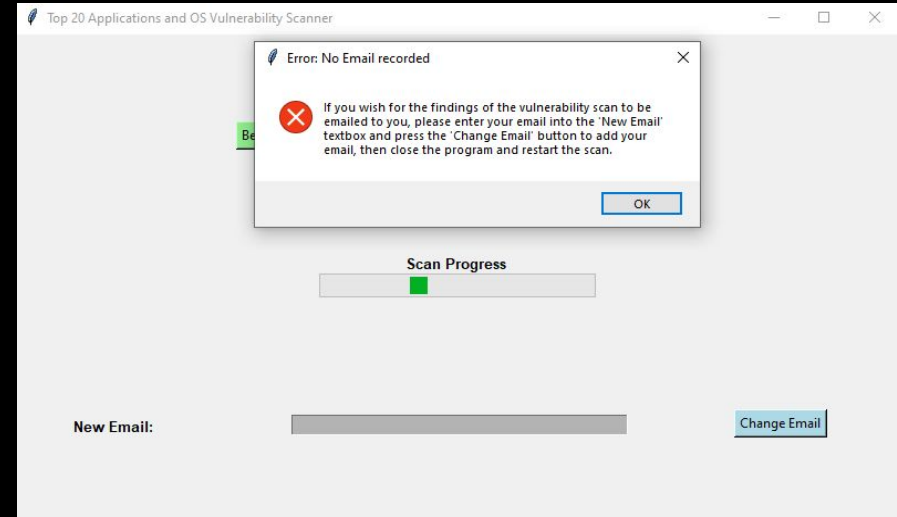


Figure 2.  
Error message informing the user that their email is not recorded