

Yash Puranik (NetID: yap13) & Olivia Duong (NetID: ond3)

Internet Technology

Professor Badri Nath

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Project 2 Report

Language Used: Python2.7

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Questions

1. Team Details

Total Team Members: 2

Team Member #1: Yash Puranik (NetID: yap13)

Team Member #2: Olivia Duong (NetID: ond3)

2. Collaboration

Project 3, HTTP Server with Authentication, was a collaboration between Yash Puranik and Olivia Duong, and our primary mode of communication was via Discord. Puranik began the project with pseudocodes for server.py, summarizing the program's flows.

Preliminary Draft

**subjected to modifications*

- We should create a few defs to sort the passwords and secrets
- The code should check if a cookie is present in the request header, if so, it looks up the corresponding user in a dictionary. (We can call this something like cookies_dict)
- If the request is a user who is submitting a form, the code should check the form data to determine what it's going to do next (nested if's) If the form data indicates that the user wants to change their password, a new password is extracted from the form data and stored in a database which we will create (could be called password_database). If the form data indicates that the user wants to log in, the code will check the username and password against the password database dictionary. If they match, it will generate a new random token to associate with the user and sends to header
- If the cookie is invalid or missing, the code should checks the form data to determine what action to take (again, nested if's). If the form data indicates that the user wants to change their password or log in, the code should check the username and password against the password database dictionary, and if they match, it generates a new random token to associate with the user and sends it in a cookie header.

The pseudocode formed by Puranik was incredibly vital for organization purposes and provided a general layout of how we would proceed with starting the project. The general layout was altered multiple times throughout the coding process since the preliminary draft was too

complicated to implement. Working off of Puranik's initial code for the server.py, Duong was able to provide the initial implementation for the success welcome page, the new password page, and the logging out page. However, Duong's implementation did not take into account cookie authentication. Puranik was then able to proceed with various changes with Duong's code. Puranik implemented the cookie authentication, which did require major modifications to the code's core logic. Passing server.py off to Duong, Duong fixed minor errors that resulted in incorrect html_content_to_send pages within the code. For example, an issue that was encountered included reaching the bad creds page upon clicking submit after creating a new password. Duong was able to fix this minor issue by altering the html_content_to_send destinations, and also resolved the logging out issue successfully with a similar approach. Puranik then finalized the project by fixing the password issue and updating the new password into the passwords.txt file with its respective username. Additionally, Puranik simplified the code to provide efficiency. To do this, he assigned each action within an array for logout, password = new, NewPassword, username, password and cookie. This aided within the while True loop as each if statement or else if statement were called by actions[1] or actions[3], with each number of the array corresponding to the type of action. Lastly, Duong compiled this report. Overall, the group's task allocations were evenly distributed with Puranik taking the lead with the coding and its concept, and Duong aiding with the code implementation and final report. The team members provided accountability for one another to produce a successful outcome.

The sources we both utilized are listed in the next section of this report labeled ["Resources."](#)

3. Code

Every section of our code performs as described in the “instructions.pdf” specifications without any issues. Reviewing over the testing criterias, our code passes each test case. Our code reaches the login page when no username or password is posted. Upon entering the correct username and password posted with no cookies, the code reaches the success welcome page. With a non-existent username posted with the correct password, the result is bad credentials. Likewise, with a non-existent password posted with the correct username, the result is also bad credentials. With only one field inputted in the login screen with the other field blank, the result is bad credentials. For the case in which there is a valid cookie with no username or password posted, a non-existent username or bad password for existing username, or correct username and password, the code reaches the success welcome page. With an invalid cookie for the correct username and password, the code reaches bad credentials. Upon submitting a new password with no cookies involved, the code reaches the new password page and then reaches the success welcoming page. Lastly, the group implemented the extra credit page that displays logout successfully regardless of valid cookie or invalid cookie.

4. Challenges

The group encountered various difficulties during this project. The initial challenge that was encountered involved creating the databases, also known as the dictionary for the credentials (username and password) and the secrets. To do so, the group had to recall the split method and the strip method. The next challenge was understanding how to extract certain information from the body and the header, a major one including updating the new password into the password.txt file. To achieve this, the rewritten password had to be split among the equals sign. Additionally, implementing the cookie authentication section was difficult with the number of nested-if

statements that were required, the concept of tokens, and also since the group had to take into account invalid versus valid cookies. Additionally, updating the newly created password into the password.txt file, specifically in its respective correct location was quite challenging to implement. Lastly, another challenge that was quite tedious was testing the code with new ports everytime. Since Puranik tested his code on iLab while others were utilizing it, the testing process was very time consuming. Duong and Puranik acknowledge the process of trial and error with this project and even a small error as an indentation of an if statement within the nested if statements may result in an incorrect page destination. Thus, various different ports were utilized many times to test our code.

5. Reflection & Observations

Overall, the group learned how to implement an HTTP server that serves secret user data. An HTTP server is software that understands URLs (web addresses) and HTTP, which is the protocol our browser uses to view webpages. The group observed that the secret displayed within the welcome success page requires the usage of cookies. The group had to consider cookies for each part of the project, which made some of the code and if statements very redundant. However, this was needed to do an authentication check for each part. Without it, the secret data corresponding to its respective user would be incorrect. Additionally, the group observed that one can create their own content pages and after creating a set of if statements, all one would have to do is “html_content_to_send = ___.”

Resources

“How to Use the If Not Python Statement?: Flexiple Tutorials: Python.” *Flexiple Tutorials | Python*, <https://flexiple.com/python/if-not-python/>.

Real Python. “Reading and Writing Files in Python (Guide).” *Real Python*, Real Python, 23 Sept. 2022, <https://realpython.com/read-write-files-python/>.

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ShriramShriram 4, et al. “How to Search and Replace Text in a File?” *Stack Overflow*, 1 Apr. 1960,<https://stackoverflow.com/questions/17140886/how-to-search-and-replace-text-in-a-file>.

“Python If ... Else.” *Python Conditions*, https://www.w3schools.com/python/python_conditions.asp.

freeCodeCamp.org. “Python String Methods Explained with Examples.” *FreeCodeCamp.org*, FreeCodeCamp.org, 28 Apr. 2021,<https://www.freecodecamp.org/news/the-string-strip-method-in-python-explained/#:~:text=There%20are%20three%20options%20for,is%20to%20strip%20whitespace%20characters>.

“Python: Sort Python Dictionaries by Key or Value.” *GeeksforGeeks*, GeeksforGeeks, 23 Jan. 2023, <https://www.geeksforgeeks.org/python-sort-python-dictionaries-by-key-or-value/>.

Class Piazza

Referenced to Project 1 & 2

Instructions PDF