Advanced Web Technologies Coursework 2

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1 Introduction

The aim of this assignment is to design and implement a web app of any theme of your choice. The theme I have chose was a Text based role playing game called "Hitman Nation" which theme is a nation of hitman's in a fantasy world doing missions, attacking each other or going to the gym for any sort of reasons. The server-side elements are handled by Flask where as the front end is HTML templates which are called from python flask built in function "render template". I have used a database to store user accounts, messages and articles. I have also used password hashing to encrypt users when they register a account. The decryption happens to password every time a user a signs in to the website. The user details is stored in session. When user signs out, the session is cleared. I have made this game because of my love for the Hitman movie and video game series. The fact that there is no text-based game which has a hitman theme, I thought that I should make one. The structure of the game is inspired by the text based game called 'Torn City' that I have been playing on since I was 11 years old.
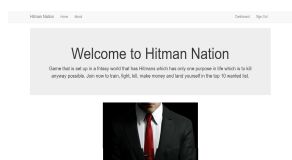

Figure 1: **Homepage Screenshot** - Screenshot of my Homepage

2 Design

The server aspect is upheld through Flask. The HTML is made by many templates which contains data from a sqlite3 database. The whole site was programmed on the class development server to easily find bugs while I am debugging the site. I initially used the workbook [1] and Youtube tutorial Web App Flask from Scratch [2] to guide me while I was developing this app. I followed the tutorials for routing, redirects, requests, password hashing, database and bootstrap, sessions to implement various of features of the web app. The URL variables easily allows users to register account, login, send messages to other users, upload image or simply add article to the game newspaper.

There are many URLs in this site as there is many functions and many things for the users to do. Nevertheless, the site is very user friendly. Each page HTML is made by Flask templates that has similar design but contains different information. The main page is the simplest part of the app. Contains the navigation bar at the top and a description of the game in the centre of the page within a grey box. An image is below the description. The register page contains input boxes where user can input username, password, email address and confirmed password. The user is then redirected to the register page. The login page is similar, but user only need to input username and password in order to login. The user is then redirected to the dashboard where there is various of buttons on the top of the dashboard, articles that have user submitted in a table format below the buttons and battle stats below the articles. Users can interact with other users by clicking on users list button and click on individual user, message each user or attack a user. A user can do missions, buy points and use points to refill brave, energy, health or happiness.

I have implemented over 1500 lines of python code which mostly used for the server side part of the app such as inserting, updating or deleting data from the main database called Game.db. Also, the python code renders various of templates, validates various of user actions and secures password.I have also used python to make the web app to store each registered user username to session and make the session to clear the username when the user signs out so specific contents can only be shown to to a specific user such as specific messages in the user mailbox. Also, I have used session's to make the web app to make certain features only accessible to users who are signed in to the site. I have used the tutorial Create Flask web app from scratch to help me design the site in a way that there is a white background, grey navigation bar and black font. In the mailbox, outbox, user and articles pages, I have used a table to show all these information. This was achieved by using certain css div's from a bootstrap that I have downloaded from getBootstrap site.[3] This have made the game much more attractive and eye catching. I have used a list-group type of list to display articles in the newspaper page which have made the game much more neat and structured. In the navigation bar, when user clicks on a button, the button changes colour. The user is expected to input data when the user registers a account, log in, send message to a user or make a new article. The user password is private and secured through password hashing. I wanted to use cryptography to secure messages but kept giving me type errors which I could not fix before the deadline. All these data is inserted into a database table called 'Game.db'.
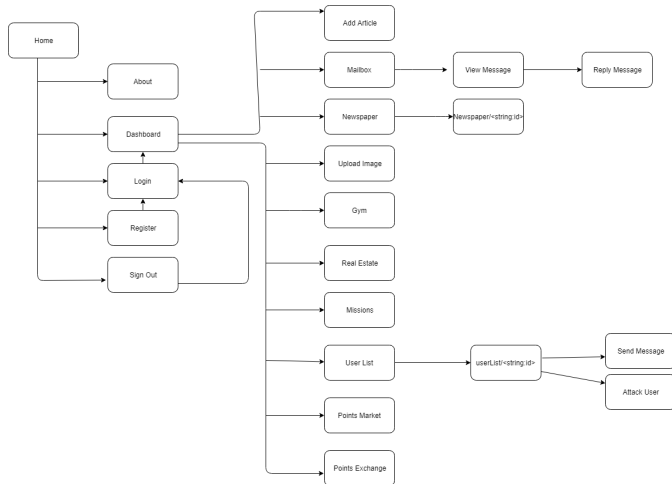
Figure 2: **HTML Diagram** - a navigation map representing the URL hierachy of my site

3 Enchancement

The features I would like to add is an item feature where users can purchase items such as weapons from a fantasy shop which would increase the user battle stats when user equips a weapon. This would be useful for the app because it can be fun for the user to save game money and at the same time, have the ability to purchase awesome items. I would like to improve the send message feature in a way that the message is encrypted when user sends a message to a user, so any personal information is secured. That message would be decrypted when the user that message have been sent to open that same message. This would be useful as each user would not worry that anyone that has access to the messages table in the database can view any personal messages. I would also like to add a pay pal feature where each user can have the opportunity to donate to the site and gain extra game money, points and items for a reward and at the same time I can make a profit in real life. This would be useful for the web app because It can give some users a advantage over users who have not donated to the website in game play such as able to purchase more expensive property in a shorter period of time so able to gain higher battle stats while training in the gym. I would also like to change the background colour to black and make the navigation bar red and all font white to make the game much more attractive to hitman fans which would be useful for the web app as they more likely be active in the game and invite their friends as well. I would also like to add cron jobs to the website which would be useful for the web app as users do not always have to use points to refill their energy, happiness, health or brave, these attributes can increase every 10 minutes instead.

4 Critical Evaluation

I have built a web app called Hitman Nation that has a theme where users can become a hitman in a fantasy world where they can do various of missions, befriend each other or just attack each other for various of rewards such as money and points. The features that I have worked well was the gym, login, articles, user, users list, missions, real estate, points market and points exchange feature. I have worked well with these features because these features have been well implemented. The user can easily navigate through the site while having many options to do various of activities. The user can do various of missions which can help users to earn game money and experience.A user can only do a specific mission if the user has specific amount of experience which can make the user to view this game as a lifelong game. The user can use this same money to purchase points or buy a property within the Real Estate page. The user can use points to refill energy, brave, health or happiness. When a user buys a property from the Real Estate page, the user maximum happiness increases which increases the user gym gains in the gym. In the gym page, the user can input any amount of times he or she wants to train their strength, defence or speed by inputting that specific number in the appropriate input box. However, the limit is 100. The higher the total stats, the higher the chance the user can win a battle against an opponent. When a user does win, the user can steal all of the defeated opponent money, user experience increases, and the opponent health is emptied. When user loses, the user health is emptied. When the experience reaches a specific point, the user level is incremented by 1. I have also created a newspaper page. This page had worked well as the user can view any article they want by clicking on the title name that is displayed on a group items in the newspaper page. Each article contains the title name, author, date that the article been created and the message body. There is also a function where each registered user can add a article to the newspaper. This had worked well because each registered user can create an article that every registered user of the game can view. The article can also be edited or deleted but only by the creator of the article. I have created a message function. This worked well because each user can send message to any user and the user that message been sent to can view it in their mail box.

Thanks for the database, any data that has been entered can be altered. Also, user data can also be deleted from the database which mean the user do not have to worry about any personal information being stolen. The main problem is that message is not encrypted. I tried to encrypt the message but kept causing server and type errors which I could not fix before the deadline. However, this issue is not a big deal as the fact that the web app has sessions, only users who has sent the message or received the message can view the message which mean the messages are very private and secured. The sender can view the message in the outbox page and the recipient can view the message in the mailbox page.

5 Personal Evaluation

I think I have done well implementing this web app. I have learned how to use sqlite3 database to allow users to insert data, update data or delete data by using python. This is very beneficial for the site because it can make the user to interact with the website and have access to same data after the next time the user have signed into the site. I have also learned how each password can be encrypted when a user

registers a account and the password can be verified when they lo-gin into the site as long the password is correct. The username is stored in the session so no one else can access to the user account and also, each registered user can access certain features that non registered users can not. This is beneficial for the website because user can log in and sign out without worrying that any other person can access to that specific account. I have also learned how to structure data in a table format such as articles sections of the dashboard page and user page. This was useful for the website because it made the website much more attractive and eye catching which would encourage users to be active in the game and invite their friends.

The challenges that I have faced was the query execution where every time a user inserts or update data. This was a challenge because many server and also syntax errors was being formed. I have solved this problem by reading many articles about sqlite3 execution, did many practices and experimented what I have learned on the web app itself until I have managed to fix these errors. Another challenge I have faced was encrypting and decryption of user passwords. The passwords were easily to encrypt but decryption of passwords was a big challenge as it kept giving me type errors which was stating that the passwords are not in correct format. I have solved this challenge by making the web app encode passwords to byte when user registers an account and decode the password to string before verifying password. Overall, I think I have performed really well, and I like to make this website to go live so users around the globe can register an account and enjoy an amazing role playing game. However, I first like to make the game in a beta test mode so I can receive feedback from users who have volunteered to test the site on how I can improve the game before I start advertising the game on various of advertisement pages.

References

[1] S. Wells, "Advanced web technology workbook,"

[2] T. Media, "Python flask from scratch," Apr. 2017.

[3] getBootstrap, "Get bootstrap,"