Senior Design Project: Codemonkey

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Overview

The goal of this project is to create an online program that will introduce and teach students to the Python programming language and gain their interest in it. Python is "used across fields, including web development, machine learning, data analysis, server management, software building, and more. It's incredibly versatile and considered easy to learn, making it a great fit for beginners because its simple syntax is closer to natural language" (Tech, 2022). Also, coding in any language "exposes students to computational thinking" (Scherer et al., 2021). The website will be made by using HTML, CSS, JavaScript, and the Python module Flask, and Python to create the website. These languages were chosen because of their extensive documentation on the Internet and the designers' intermediate knowledge. The specific objectives which have been set during the planning process of this project are as follows: get a working website, create a layout for the website, create a login form and session management, implement the layout, add code submission and execution, and save user progression in a database. A challenge that may be faced is running a user's code and sending it back to them. Users with varying levels of Python knowledge will be tasked to complete the course, however, it is expected that most users will have little to no knowledge of programming in Python. A user's interest in the course is determined by their course completion and pre-course and post-course surveys. Course material will be organized in order from easier lessons to more difficult lessons. The material will be taught using a combination of interactive lessons and videos. While other online programs teach Python, this design differs given it does not track users and does not show any advertisements. The whole course is free; there are no paid plans and therefore no paywalls for areas of the course.

Intellectual Merit

As the use of technology continues to grow every day, the need for people in IT continues to grow as well. The number of open job positions in the cybersecurity field alone is over 750,000 with 60,000 of those being in Virginia (Cyberseek, 2023). It is recommended that "cybersecurity professionals learn at least one object-oriented programming language" (Cybersecurity Guide, 2022). Python is both an object-oriented programming language and can "perform malware analysis, create intrusion detection systems, and send TCP packets to machines without third-party tools" (Cybersecurity Guide, 2022). This project will increase student knowledge of the cybersecurity field and will transform the field because it will increase the programming knowledge of the average cybersecurity employee. By teaching Python to those who are interested in the cybersecurity field, the course is setting them up for success, along with the business that they work for. By giving employees highly searched-for skills, they will be successful in finding a job because they can achieve more with less help and in a shorter amount of time. In addition, if the program can reach elementary and middle school students, they can learn how to code and will therefore have more time to design new, impactful products. This single project will impact a large number of regions including economics, individual knowledge, and public knowledge and advancement. Lastly, knowing one programming language helps to understand many others because many of them have common syntax.

Broader Impacts

The desired social outcome of the project is to increase the number of cybersecurity professionals in career positions across the world. This will benefit society because the cybersecurity field is growing exponentially and technology continues to encompass our daily lives. In a broader scope, the project allows users to start their careers in information technology

from an early age. This will make it easier for them in the future when they continue to pursue

this career. Python has many uses in the field of cybersecurity, and its uses will continue to grow.

References

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