Cybersecurity Project Documentation: Password Generator

Introduction

This project involves building a simple password generator using Python. The generator creates a password based on user-defined criteria, including the number of letters, symbols, and numbers. This can be useful for creating strong, random passwords to enhance security.

Code Explanation

Libraries Used

- **random**: This library is used to generate random choices from lists of characters.

Character Sets

The character sets used for generating the password include:

- **letters**: Both uppercase and lowercase English letters.
- **numbers**: Digits from 0 to 9.
- **symbols**: Common special characters.

```
import random

letters = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o',
'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z', 'A', 'B', 'C', 'D', 'E', 'F',
'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W',
'X', 'Y', 'Z']
numbers = ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9']
symbols = ['!', '#', '$', '%', '&', '(', ')', '*', '+']
```

User Input

The user is prompted to enter the number of letters, symbols, and numbers they want in their password.

```
print("Welcome to the PyPassword Generator!")
nr_letters = int(input("How many letters would you like in your password?\n"))
nr_symbols = int(input("How many symbols would you like?\n"))
nr_numbers = int(input("How many numbers would you like?\n"))
```

Password Generation

The password is generated by randomly selecting characters from the specified character sets based on user input.

```
password_list = []

for char in range(1, nr_letters + 1):
    password_list.append(random.choice(letters))

for char in range(1, nr_symbols + 1):
    password_list.append(random.choice(symbols))

for char in range(1, nr_numbers + 1):
    password_list.append(random.choice(numbers))
```

Shuffling and Output

The list of characters is shuffled to ensure randomness, and then converted into a string to form the final password.

```
print(password_list)
random.shuffle(password_list)
print(password_list)

password = ""
for char in password_list:
    password += char

print(f"Your password is: {password}")
```

Complete Code

Here is the complete code for the password generator:

```
import random

letters = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o',
'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z', 'A', 'B', 'C', 'D', 'E', 'F',
'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W',
'X', 'Y', 'Z']
numbers = ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9']
symbols = ['!', '#', '$', '%', '&', '(', ')', '*', '+']

print("Welcome to the PyPassword Generator!")
nr_letters = int(input("How many letters would you like in your password?\n"))
nr_symbols = int(input("How many symbols would you like?\n"))
nr_numbers = int(input("How many numbers would you like?\n"))

password_list = []

for char in range(1, nr_letters + 1):
    password_list.append(random.choice(letters))

for char in range(1, nr_symbols + 1):
    password_list.append(random.choice(symbols))

for char in range(1, nr_numbers + 1):
    password_list.append(random.choice(numbers))

print(password_list)
random.shuffle(password_list)
print(password_list)

password = ""
for char in password_list:
    password += char

print(f"Your password is: {password}")
```

Conclusion

This simple password generator demonstrates the basics of creating a random password using Python. It can be further enhanced by adding more complex features such as user input validation and additional character sets.
