

Strong Password Checker

The program takes a string *s* as input from the user and checks whether it is a strong password or not. It is considered to be a strong password if all three conditions are met:

- It has at least 6 characters and at most 20 characters.
- It must contain at least one lowercase letter, at least one uppercase letter, and at least one digit.
- It must NOT contain three repeating characters in a row ("...aaa..." is weak, but "...aa...a..." is strong, assuming other conditions are met).

With my approach in resolving this problem, the program offers the user the possibility to check multiple passwords in one session, until 0 is pressed to exit the program.

The code consists of several helping functions and a main program. The purpose of these functions is:

1. *int case1(int n,int missing)* -this function is called when the length of the password is less than 6. It takes two arguments: *n*, the length of the password, and *missing*, the number of missing characters (lowercase letter, uppercase letter, or digit) required to make the password strong. It returns the minimum number of changes required to make the password strong.
2. *int case2(int changes,int n,vector<int> repeat,int missing)* -this function is called when the length of the password is greater than 20. It takes four arguments: *changes*, the number of changes made so far, *n*, the length of the password, *repeat*, a vector that stores the number of times each character in the password is repeated, and *missing*, the number of missing characters required to make the password strong. It returns the minimum number of changes required to make the password strong.
3. *int case3(int n,vector<int> repeat,int changes,int missing)* -this function is called when the length of the password is between 6 and 20. It takes four arguments: *n*, the length of the password, *repeat*, a vector that stores the number of times each character in the password is repeated, *changes*, the

number of changes made so far, and missing, the number of missing characters required to make the password strong. It returns the minimum number of changes required to make the password strong.

4. *int password_checker(string s)* -this is the function that checks whether the given password is strong and returns the minimum number of changes required to make it strong. It takes one argument: s, the password to be checked. It first checks if the password is already strong, if yes, it returns 0. Otherwise, it calls the appropriate case function depending on the length of the password and returns the minimum number of changes required to make the password strong.
5. *int main()* -this is the main program that accepts input from the user and calls the password_checker function to determine the minimum number of changes required to make the password strong.

Examples:

12strOng → the password is strong because it has at least 6 characters, at most 20, it contains a lower case letter(ex: s), an upper case letter(ex: O), a digit(ex: 2), and does not have three repeating characters in a row.

pass1 → Minimum change is 1 because it has 5 characters(<6) so the user must add one more character which is an upper letter, the other requirements are fulfilled.

passwordpasswordpassswprd123 → Minimum change is 9 because it has 28 characters(>20) so the user must delete 8, and there is a repeating sequence "sss" and one character can be deleted from there, the other requirements are fulfilled.

paRolaaaaaaa → Minimum change is 3 because it has two sets of three repeating characters in a row(2 changes) and it does not contain at least one digit(1 change), the other requirements are fulfilled.

Paaaaasswoooord12 → Minimum change is 2 because it has 5 repeating characters "a" (1 change) and 4 repeating characters "o"(1 change), the other requirements are fulfilled.

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Welcome to the Strong Password Checker!
Please input the password to be checked.
Press 0 if you want to exit.
>> 12str0ng
The password is already strong!
Please input the password to be checked.
Press 0 if you want to exit.
>> pass1
MINIMUM change required to make s a strong password:2
Please input the password to be checked.
Press 0 if you want to exit.
>> passwordpasswordpassswprd123
MINIMUM change required to make s a strong password:10
Please input the password to be checked.
Press 0 if you want to exit.
>> paRolaaaaaaa
MINIMUM change required to make s a strong password:3
Please input the password to be checked.
Press 0 if you want to exit.
>> Paaaaasswooord12
MINIMUM change required to make s a strong password:2
Please input the password to be checked.
Press 0 if you want to exit.
>> 0
Exiting the Strong Password Checker...
Process finished with exit code 0
```