

## Task 6: Create a strong password and evaluate its strength

Sample passwords :

| Test Your Password |   | Minimum Requirements   |
|--------------------|---|--|
| Password:          | <input type="text" value="Awsedrf@1234"/> | <ul style="list-style-type: none"> <li>Minimum 8 characters in length</li> <li>Contains 3/4 of the following items: <ul style="list-style-type: none"> <li>Uppercase Letters</li> <li>Lowercase Letters</li> <li>Numbers</li> <li>Symbols</li> </ul> </li> </ul> |
| Hide:              | <input type="checkbox"/>                  |  |
| Score:             | <div>100%</div>                           |  |
| Complexity:        | Very Strong                               |  |

| Additions  |                                      | Type      | Rate         | Count                           | Bonus |
|------------|--------------------------------------|-----------|--------------|---------------------------------|-------|
|            | Number of Characters                 | Flat      | $+(n*4)$     | <input type="text" value="12"/> | + 48  |
|            | Uppercase Letters                    | Cond/Incr | $+(len-n)*2$ | <input type="text" value="1"/>  | + 22  |
|            | Lowercase Letters                    | Cond/Incr | $+(len-n)*2$ | <input type="text" value="6"/>  | + 12  |
|            | Numbers                              | Cond      | $+(n*4)$     | <input type="text" value="4"/>  | + 16  |
|            | Symbols                              | Flat      | $+(n*6)$     | <input type="text" value="1"/>  | + 6   |
|            | Middle Numbers or Symbols            | Flat      | $+(n*2)$     | <input type="text" value="4"/>  | + 8   |
|            | Requirements                         | Flat      | $+(n*2)$     | <input type="text" value="5"/>  | + 10  |
| Deductions |                                      |           |              |                                 |       |
|            | Letters Only                         | Flat      | $-n$         | <input type="text" value="0"/>  | 0     |
|            | Numbers Only                         | Flat      | $-n$         | <input type="text" value="0"/>  | 0     |
|            | Repeat Characters (Case Insensitive) | Comp      | -            | <input type="text" value="0"/>  | 0     |
|            | Consecutive Uppercase Letters        | Flat      | $-(n*2)$     | <input type="text" value="0"/>  | 0     |
|            | Consecutive Lowercase Letters        | Flat      | $-(n*2)$     | <input type="text" value="5"/>  | - 10  |
|            | Consecutive Numbers                  | Flat      | $-(n*2)$     | <input type="text" value="3"/>  | - 6   |
|            | Sequential Letters (3+)              | Flat      | $-(n*3)$     | <input type="text" value="0"/>  | 0     |
|            | Sequential Numbers (3+)              | Flat      | $-(n*3)$     | <input type="text" value="2"/>  | - 6   |
|            | Sequential Symbols (3+)              | Flat      | $-(n*3)$     | <input type="text" value="0"/>  | 0     |

| Test Your Password |  | Minimum Requirements   |
|--------------------|--|--|
| Password:          | <input type="password" value="Agswder"/> | <ul style="list-style-type: none"> <li>Minimum 8 characters in length</li> <li>Contains 3/4 of the following items: <ul style="list-style-type: none"> <li>Uppercase Letters</li> <li>Lowercase Letters</li> <li>Numbers</li> <li>Symbols</li> </ul> </li> </ul> |
| Hide:              | <input type="checkbox"/>                 |  |
| Score:             | 25%                                      |  |
| Complexity:        | Weak                                     |  |

| Additions  |                                      | Type      | Rate          | Count                          | Bonus |
|------------|--------------------------------------|-----------|---------------|--------------------------------|-------|
| ✖          | Number of Characters                 | Flat      | $+(n*4)$      | <input type="text" value="7"/> | + 28  |
| ✔          | Uppercase Letters                    | Cond/Incr | $+(len-n)*2)$ | <input type="text" value="1"/> | + 12  |
| ★          | Lowercase Letters                    | Cond/Incr | $+(len-n)*2)$ | <input type="text" value="6"/> | + 2   |
| ✖          | Numbers                              | Cond      | $+(n*4)$      | <input type="text" value="0"/> | 0     |
| ✖          | Symbols                              | Flat      | $+(n*6)$      | <input type="text" value="0"/> | 0     |
| ✖          | Middle Numbers or Symbols            | Flat      | $+(n*2)$      | <input type="text" value="0"/> | 0     |
| ✖          | Requirements                         | Flat      | $+(n*2)$      | <input type="text" value="2"/> | 0     |
| Deductions |                                      |           |               |                                |       |
| ⚠          | Letters Only                         | Flat      | $-n$          | <input type="text" value="7"/> | - 7   |
| ✔          | Numbers Only                         | Flat      | $-n$          | <input type="text" value="0"/> | 0     |
| ✔          | Repeat Characters (Case Insensitive) | Comp      | -             | <input type="text" value="0"/> | 0     |
| ✔          | Consecutive Uppercase Letters        | Flat      | $-(n*2)$      | <input type="text" value="0"/> | 0     |
| ⚠          | Consecutive Lowercase Letters        | Flat      | $-(n*2)$      | <input type="text" value="5"/> | - 10  |
| ✔          | Consecutive Numbers                  | Flat      | $-(n*2)$      | <input type="text" value="0"/> | 0     |
| ✔          | Sequential Letters (3+)              | Flat      | $-(n*3)$      | <input type="text" value="0"/> | 0     |
| ✔          | Sequential Numbers (3+)              | Flat      | $-(n*3)$      | <input type="text" value="0"/> | 0     |
| ✔          | Sequential Symbols (3+)              | Flat      | $-(n*3)$      | <input type="text" value="0"/> | 0     |

| Test Your Password |   | Minimum Requirements   |
|--------------------|---|--|
| Password:          | <input type="text" value="Gtyjdvejfhuito1234"/> | <ul style="list-style-type: none"> <li>Minimum 8 characters in length</li> <li>Contains 3/4 of the following items: <ul style="list-style-type: none"> <li>Uppercase Letters</li> <li>Lowercase Letters</li> <li>Numbers</li> <li>Symbols</li> </ul> </li> </ul> |
| Hide:              | <input type="checkbox"/>                        |  |
| Score:             | <div>100%</div>                                 |  |
| Complexity:        | Very Strong                                     |  |

| Additions  |                                      | Type      | Rate          | Count | Bonus |
|------------|--------------------------------------|-----------|---------------|-------|-------|
| ★          | Number of Characters                 | Flat      | $+(n*4)$      | 18    | + 72  |
| ✓          | Uppercase Letters                    | Cond/Incr | $+(len-n)*2)$ | 1     | + 34  |
| ★          | Lowercase Letters                    | Cond/Incr | $+(len-n)*2)$ | 13    | + 10  |
| ★          | Numbers                              | Cond      | $+(n*4)$      | 4     | + 16  |
| ✗          | Symbols                              | Flat      | $+(n*6)$      | 0     | 0     |
| ★          | Middle Numbers or Symbols            | Flat      | $+(n*2)$      | 3     | + 6   |
| ✓          | Requirements                         | Flat      | $+(n*2)$      | 4     | + 8   |
| Deductions |                                      |           |               |       |       |
| ✓          | Letters Only                         | Flat      | $-n$          | 0     | 0     |
| ✓          | Numbers Only                         | Flat      | $-n$          | 0     | 0     |
| !          | Repeat Characters (Case Insensitive) | Comp      | -             | 6     | - 1   |
| ✓          | Consecutive Uppercase Letters        | Flat      | $-(n*2)$      | 0     | 0     |
| !          | Consecutive Lowercase Letters        | Flat      | $-(n*2)$      | 12    | - 24  |
| !          | Consecutive Numbers                  | Flat      | $-(n*2)$      | 3     | - 6   |
| ✓          | Sequential Letters (3+)              | Flat      | $-(n*3)$      | 0     | 0     |
| !          | Sequential Numbers (3+)              | Flat      | $-(n*3)$      | 2     | - 6   |
| ✓          | Sequential Symbols (3+)              | Flat      | $-(n*3)$      | 0     | 0     |

| Legend |   |
|--------|---|
| ★      | <b>Exceptional:</b> Exceeds minimum standards. Additional bonuses are applied.      |
| ✓      | <b>Sufficient:</b> Meets minimum standards. Additional bonuses are applied.         |
| !      | <b>Warning:</b> Advisory against employing bad practices. Overall score is reduced. |
| ✗      | <b>Failure:</b> Does not meet the minimum standards. Overall score is reduced.      |

#### Observation:

To build a strong password, we should use:

- Minimum 8 characters in length
- Use mixture of Uppercase, lowercase letters; numbers and symbols
- Don't use dictionary words or names.

## **Common password attacks :**

**1. Brute Force Attack :** A simple brute-force attack is a method employed by attackers to crack passwords by systematically trying every possible combination of characters. This attack can be laborious and resource-intensive, as it involves going through all possible character permutations until the correct password is identified.

**2. Dictionary Attack :** A type of brute-force password attack, a dictionary attack is based on a list of commonly used words and phrases, as well as often-used passwords. To avoid having to crack a long list of possible passwords, attackers narrow down the list to what's known as dictionary words. Those words are not limited to actual words in the dictionary. They could also include popular names of pets, movie characters, and people. Hackers will also utilize variations by appending letters with numbers and special characters (e.g., substituting the letter O with the number 0).

**3. Man-in-the-middle Attack :** A man-in-the-middle scenario involves three parties: the user, the attacker, and the third party with whom the person is trying to communicate. In a password attack, cyber criminals typically impersonate a legitimate third party, often through a phishing email. The email looks authentic and may spoof the third party's email address to throw off even savvy users. The attackers try to convince the recipient to click on a link that goes to a fake but authentic-looking website, then harvest the credentials when the user logs in.

**4. Credential stuffing Attack :** Credential stuffing is a cyber attack method in which attackers use lists of compromised user credentials to breach into a system. The attack uses bots for automation and scale and is based on the assumption that many users reuse usernames and passwords across multiple services.

**5. Password sniffing Attack :** Password sniffing is an attack on the Internet that is used to steal user names and passwords from the network. The typical implementation of a password sniffing attack involves gaining access to a computer connected to a local area network and installing a password sniffer on it. The password sniffer is a small program that listens to all traffic in the attached network(s), builds data streams out of TCP/IP packets, and extracts user names and passwords from those streams that contain protocols that send clear text passwords.

## **How password complexity affect security?**

Password complexity significantly impacts security by making it more difficult for unauthorized individuals to guess or crack passwords. A complex password, typically using a mix of uppercase and lowercase letters, numbers, and symbols, increases the number of possible combinations, thus extending the time and resources needed for a successful brute-force or dictionary attack.