

## Task 6: Create a Strong Password and Evaluate Its Strength.

### 1. Prepare workspace & install tools (Kali)

- `$mkdir -p ~/password-eval/{scripts,reports,screenshots}`
- `$cd ~/password-eval`
- `$sudo apt update`
- # Install python3/pip if not present
- `$sudo apt install -y python3 python3-pip openssl curl`
- # Install zxcvbn python wrapper
- `$python3 -m pip install --user zxcvbn`
- Or `$pip3 install zxcvbn-python`

### 2. Create a set of test passwords (varied complexity)

- password123
- Summer2023!
- Tr0ub4dor&3
- correct horse battery staple
- G7!vR8#kPq2\$T9
- P@ssw0rd!P@ssw0rd!
- qwertyuiop
- L0ngButNo\$ymbols123
- Th!s is a long passphrase with spaces

#### Notes on types:

- **Very weak:** password123, qwertyuiop (common/dictionary)
- **Medium:** Summer2023! (mixed classes but predictable)
- **Strong (random):** G7!vR8#kPq2\$T9 (high entropy, random chars)
- **Passphrase:** correct horse battery staple or Th!s is a long passphrase... (long, memorable)

### 3. Evaluate passwords locally with zxcvbn (Python)

- Run Python Script and Check passwords
- If you use web checkers ([passwordmeter.com](https://passwordmeter.com), [howsecureismypassword.net](https://howsecureismypassword.net) (<https://www.security.org/how-secure-is-my-password/>)), do not enter real passwords.

## The Password Meter

Test Your Password		Minimum Requirements			
Password:	<input type="text" value="password123"/>	<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:	43%				
Complexity:	Good				
Additions		Type	Rate	Count	Bonus
+	Number of Characters	Flat	$+(n^4)$	<input type="text" value="11"/>	+ 44
✗	Uppercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="0"/>	0
+	Lowercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="8"/>	+ 6
+	Numbers	Cond	$+(n^4)$	<input type="text" value="3"/>	+ 12
✗	Symbols	Flat	$+(n^6)$	<input type="text" value="0"/>	0
+	Middle Numbers or Symbols	Flat	$+(n^2)$	<input type="text" value="2"/>	+ 4
✗	Requirements	Flat	$+(n^2)$	<input type="text" value="3"/>	0
Deductions					
✓	Letters Only	Flat	$-n$	<input type="text" value="0"/>	0

## The Password Meter

Test Your Password		Minimum Requirements			
Password:	<input type="text" value="Summer2023!"/>	<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:	100%				
Complexity:	Very Strong				
Additions		Type	Rate	Count	Bonus
+	Number of Characters	Flat	$+(n^4)$	<input type="text" value="11"/>	+ 44
✓	Uppercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="1"/>	+ 20
+	Lowercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="5"/>	+ 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

## The Password Meter

Test Your Password		Minimum Requirements			
Password:	<input type="text" value="Tr0ub4dor&amp;3"/>	<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:	100%				
Complexity:	Very Strong				
Additions		Type	Rate	Count	Bonus
+	Number of Characters	Flat	$+(n^4)$	<input type="text" value="11"/>	+ 44
✓	Uppercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="1"/>	+ 20
+	Lowercase Letters	Cond/Incr	$+\left(\frac{len-n}{len}\right)^2$	<input type="text" value="6"/>	+ 10
+	Numbers	Cond	$+(n^4)$	<input type="text" value="3"/>	+ 12
✓	Symbols	Flat	$+(n^6)$	<input type="text" value="1"/>	+ 6
+	Middle Numbers or Symbols	Flat	$+(n^2)$	<input type="text" value="3"/>	+ 6
+	Requirements	Flat	$+(n^2)$	<input type="text" value="5"/>	+ 10
Deductions					
✓	Letters Only	Flat	$-n$	<input type="text" value="0"/>	0

## The Password Meter

Test Your Password		Minimum Requirements	
Password:	<div><input type="text" value="correct horse battery staple"/></div>	<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:	<div><input type="checkbox"/></div>		
Score:	<div><div>40%</div></div>		
Complexity:	Good		

Additions		Type	Rate	Count	Bonus
<div>+</div>	Number of Characters	Flat	$+(n^4)$	28	+ 112
<div>✗</div>	Uppercase Letters	Cond/Incr	$+\left(\frac{len-n}{2}\right)^2$	0	0
<div>+</div>	Lowercase Letters	Cond/Incr	$+\left(\frac{len-n}{2}\right)^2$	25	+ 6
<div>✗</div>	Numbers	Cond	$+(n^4)$	0	0
<div>✗</div>	Symbols	Flat	$+(n^6)$	0	0
<div>✗</div>	Middle Numbers or Symbols	Flat	$+(n^2)$	0	0
<div>✗</div>	Requirements	Flat	$+(n^2)$	2	0

Deductions					
<div>!</div>	Letters Only	Flat	$-n$	28	- 28

## The Password Meter

Test Your Password		Minimum Requirements	
Password:	<input type="text" value="G7lvR0#kPg2\$T9"/>	<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><div>100%</div></div>		
Complexity:	Very Strong		

Additions		Type	Rate	Count	Bonus
+	Number of Characters	Flat	$+(n^4)$	14	+ 56
+	Uppercase Letters	Cond/Incr	$+\left(\frac{len-n}{2}\right)^2$	4	+ 20
+	Lowercase Letters	Cond/Incr	$+\left(\frac{len-n}{2}\right)^2$	3	+ 22
+	Numbers	Cond	$+(n^4)$	4	+ 16
+	Symbols	Flat	$+(n^6)$	3	+ 18
+	Middle Numbers or Symbols	Flat	$+(n^2)$	6	+ 12
+	Requirements	Flat	$+(n^2)$	5	+ 10

Deductions					
✓	Letters Only	Flat	$-n$	0	0