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Course Name:	Compiler Construction
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Lab Terminal

Question 6: Write a C# program using Regular Expressions to validate usernames, generate secure passwords, and provide additional features such as batch processing, saving results to a file, and evaluating password strength.

Answer: Screenshot Output

```
Enter usernames (separated by commas): Mubashir_009, ALI@123, charlie123, _Hacker22$, LongUserNameTooLong

Validation Results:
Mubashir_009 - Valid
Letters: 8 (Uppercase: 1, Lowercase: 7), Digits: 3, Underscores: 1
Generated Password: VtT8i#*4#yyt (Strength: Strong)

ALI@123 - Invalid (Username can only contain letters, numbers, and underscores)

charlie123 - Valid
Letters: 7 (Uppercase: 0, Lowercase: 7), Digits: 3, Underscores: 0
Generated Password: VtT8i#*4#yyt (Strength: Strong)

_Hacker22$ - Invalid (Username must start with a letter)

LongUserNameTooLong - Invalid (Username length must be between 5 and 15 characters)

Summary:
Total Usernames: 5
Valid Usernames: 2
Invalid Usernames: 3

Do you want to retry invalid usernames? (y/n): |
```

Explanation:

1. Username "Mubashir_009"

○ Validation:

- Length: 12 characters (valid, between 5 and 15).
- Starts with a letter: 'M' (valid).
- Contains only letters, digits, and underscores (valid).

○ Components:

- Uppercase letters: 1 (M)
- Lowercase letters: 8 (ubashir)
- Digits: 3 (009)
- Underscores: 1 (_)

- **Generated Password:** A strong password like Zx2@Lm3#Fr4\$ would be generated.
- **Password Strength:** Strong (meets criteria for strong password).

2. Username "ALI@123"

- **Validation:**
 - Length: 7 characters (valid, between 5 and 15).
 - Starts with a letter: 'A' (valid).
 - Contains invalid character: '@' (not allowed in usernames).
- **Message:** "Username can only contain letters, numbers, and underscores."
- **Result:** Invalid.

3. Username "charlie123"

- **Validation:**
 - Length: 10 characters (valid, between 5 and 15).
 - Starts with a letter: 'c' (valid).
 - Contains only letters and digits (valid).
- **Components:**
 - Uppercase letters: 0
 - Lowercase letters: 8 (charlie)
 - Digits: 3 (123)
 - Underscores: 0
- **Generated Password:** A strong password like Yx8#Lp2@Tn1\$ generated.
- **Password Strength:** Strong (meets criteria for strong password).

4. Username "_Hacker22\$"

- **Validation:**
 - Length: 10 characters (valid, between 5 and 15).
 - Does not start with a letter, it starts with an underscore (_) (invalid).
- **Message:** "Username must start with a letter."
- **Result:** Invalid.

5. Username "LongUserNameTooLong"

- **Validation:**
 - Length: 21 characters (invalid, exceeds the 15-character limit).
- **Message:** "Username length must be between 5 and 15 characters."
- **Result:** Invalid.

Summary of Results:

- **Valid Usernames:** 1 (Mubashir_009, charlie123).
- **Invalid Usernames:** 4 (ALI@123, _Hacker22\$, LongUserNameTooLong).