Grep Pattern Matching with Special Characters (Regular Expression)

Grep supports **regular expressions (regex)** for powerful text searching. These include **wildcards, character classes, repetitions, and anchors**.

🔷 Wildcards and Basic Matching

Symbol	Meaning	Example
.	Matches **any** single character	grep "h.t" file.txt → Matches hat, hit, hot, etc.
*	Matches **zero or more** of the preceding character	grep "ho*t" file.txt → Matches ht, hot, hoot, hooot
[]	Matches **any single** character inside brackets	grep "h[ao]t" file.txt → Matches hat or hot
[^]	Matches **any character except** those inside brackets	grep "h[^ao]t" file.txt → Matches hbt, hct, but **not** hator hot

🔷 Anchors (Match Position)

Symbol	Meaning	Example
^	Matches **start** of a line	grep "^Hello" file.txt → Finds lines that start with "Hello"
$	Matches **end** of a line	grep "end$" file.txt → Finds lines that end with "end"

🔷 Repetitions and Quantifiers

Symbol	Meaning	Example
?	Matches **zero or one** occurrence	grep -E "colou?r" file.txt → Matches color or colour
{n}	Matches **exactly** n occurrences	grep -E "o{2}" file.txt → Matches "oo" but not "o"
{n,}	Matches n or **more** occurrences	grep -E "o{2,}" file.txt → Matches "oo", "ooo", etc.
{n,m}	Matches **between** n and moccurrences	grep -E "o{2,4}" file.txt → Matches "oo", "ooo", "oooo" but not "o"

🔷 Grouping and Alternation

Symbol	Meaning	Example
()	Groups expressions	`grep -E "(hello
`	`	OR (alternation)

🔷 Escape Special Characters

```
If I need to search for special characters like . or *, I must to escape them
with \ like this:


grep "\." file.txt  # Finds actual dots (.) in text


grep "\*" file.txt  # Finds asterisks (*)
```

🔷Practical Examples

🔶 Find all words that start with "a" and end with "e"

```
grep -E "^a.*e$" words.txt
^a → Starts with "a"
.* → Any characters in between
e$ → Ends with "e"
```

🔶 Find dates in YYYY-MM-DD format

```
grep -E "[0-9]{4}-[0-9]{2}-[0-9]{2}" file.txt
```

🔶 Extract all email addresses

```
grep -E "[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,}" file.txt
```