Shell Scripting: Metacharacters

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Metacharacters

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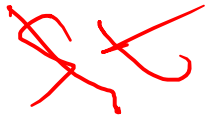
- A metacharacter is a character ***that has a special meaning during pattern processing.***
- We use metacharacters in ***regular expressions*** to define the search criteria and any text manipulations.

✓All characters enclosed between single quotation marks are considered quoted and are interpreted literally by the shell.

✓The special meaning of metacharacters is retained if not quoted.

Metacharacters



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Metacharacters
✓pipe (|), ✓ampersand (&), ✓semicolon (;), ✓less-than sign (<), ✓greater-than sign (>), ✓left parenthesis (), ✓right parenthesis ()),

Metacharacters
✓dollar sign ($), ✓backquote (`), ✓backslash (\), ✓right quote (‘), ✓double quotation marks (''), ✓newline character \n, ✓space character , and tab character \t.

Types of Metacharacters

- ✓ ***Search string*** metacharacters
- ✓ ***Replacement string*** metacharacters.

Search string Metacharacters

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Metacharacter	Action
^	***Beginning*** of line
$	***End*** of line
|	Or Not applicable to basic regular expressions.
[abc]	Match any character enclosed in the brackets
[^abc]	Match any character not enclosed in the brackets
[a-z]	Match the range of characters specified by the hyphen

Search string Metacharacters (classes)

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[:*cclass*:]

- Use the character list that is specified by *cclass*:**alnum** = Uppercase and lowercase alphabetic characters and numbers: [A-Za-z0-9]
- **alpha** = Uppercase and lowercase alphabetic characters: [A-Za-z]
- **blank** = Whitespace and tab characters
- **cntrl** = Control characters
- **digit** = Numbers: [0-9]
- **lower** = Lowercase alphabetic characters: [a-z]
- **print** = Printable characters (the **graph** class plus whitespace)
- **punct** = Punctuation marks: !"#$%&'()*+,-./:;<=>?@[\\]^_`{|}~
- **graph** = Visible characters (the **alnum** class plus the **punct** class)

Search string Metacharacters (classes)

- **space** = Whitespace characters: tab, newline, carriage-return, form-feed, and vertical-tab
- **upper** = Uppercase alphabetic characters: [A-Z]
- **xdigit** = Hexadecimal characters: [0-9a-fA-F]
- ***These classes are valid for single-byte character sets.***

[=*cname*=]	• Substitute the character name that is specified by *cname* with the corresponding character code.

Search string Metacharacters

.	Match any single character.
( )	Group the regular expression within the parentheses.
?	Match zero or one of the preceding expression. Not applicable to basic regular expressions.
*	Match zero, one, or many of the preceding expression.
+	Match one or many of the preceding expression.Not applicable to basic regular expressions.
\	Use the literal meaning of the metacharacter. For basic regular expressions, treat the next character as a metacharacter.

Replacement string metacharacters

Metacharacter	Action
&	• Reference the entire matched text for string substitution. • **For example**, the statement execute function regex_replace('abcdefg', '[af]', '.&.') replaces 'a' with '.a.' and 'f' with '.f.' to return: '.a.bcde.f.g'.

Replacement string metacharacters

\n	• Reference the subgroup *n* within the matched text, where *n* is an integer 0-9. • \0 and & have identical actions. • \1 - \9 substitute the corresponding subgroup.

Replacement string metacharacters

\	Use the literal meaning of the metacharacter, **for example**, \& escapes the Ampersand symbol and \\ escapes the backslash. For basic regular expressions, treat the next character as a metacharacter.

Metacharacters

- Most commonly used: *
- Search the current directory for file names in which any strings occurs in the position of *

```
% echo *  # same effect as
% ls *
```

- To protect metacharacters from being interpreted: enclose them in single quotes.

```
% echo '***'
***
```

Metacharacters (cont.)

- Or to put a backslash \ in front of each character:

```
% echo \*\*\*
***
```

- Double quotes can also be used to protect metacharacters, but …
- The shell will interpret **$**, **** and `…` inside the double quotes.
- So don't use double quotes unless you intend some processing of the quoted string (to be discussed later).

Quotes

- Quotes do not have to surround the whole argument.

```
% echo x'*'y    # same as echo 'x*y'
x*y
```

- What's the difference between

```
% ls  x*y
% ls 'x*y'
```

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Thanks

Q & A