

How to write Regular Expressions?

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A regular expression (sometimes called a rational expression) is a sequence of characters that define a search pattern, mainly for use in pattern matching with strings, or string matching, i.e. "find and replace"-like operations. (Wikipedia).

Regular expressions are a generalized way to match patterns with sequences of characters. It is used in every programming language like C++, Java and Python.

What is a regular expression and what makes it so important?

Regex are used in *Google analytics* in URL matching in supporting search and replace in most popular editors like Sublime, Notepad++, Brackets, Google Docs and Microsoft word.

Example : Regular expression for an email address :
`^([a-zA-Z0-9_\\-\\.]+)@([a-zA-Z0-9_\\-\\.]+)\\.([a-zA-Z]{2,5})\$`
`^([a-zA-Z0-9_\\-\\.]+)@([a-zA-Z0-9_\\-\\.]+)\\.([a-zA-Z]{2,5})\$`

The above regular expression can be used for checking if a given set of characters is an email address or not.

How to write regular expression?

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• Repeaters : * , + and { } :

These symbols act as repeaters and tell the computer that the preceding character is to be used for more than just one time.

• The asterisk symbol (*):

It tells the computer to match the preceding character (or set of characters) for 0 or more times (upto infinite).

Example : The regular expression ab*c will give ac, abc, abbc, abbcc...ans so on

• The Plus symbol (+):

It tells the computer to repeat the preceding character (or set of characters) for atleast one or more times(upto infinite).

Example : The regular expression ab+c will give abc, abbc, abbc, ... and so on.

• The curly braces {...}:

It tells the computer to repeat the preceding character (or set of characters) for as many times as the value inside this bracket.

Example : {2} means that the preceding character is to be repeated 2 times, {min,} means the preceding character is matches min or more times, {min,max} means that the preceding character is repeated at

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times. `{min,max}` means that the preceding character is repeated at least min & at most max times.

- **Wildcard – (.)**

The dot symbol can take place of any other symbol, that is why it is called the wildcard character.

Example :

The Regular expression `.*` will tell the computer that any character can be used any number of times.

- **Optional character – (?)**

This symbol tells the computer that the preceding character may or may not be present in the string to be matched.

Example :

We may write the format for document file as – “`docx?`”
The ‘?’ tells the computer that x may or may not be present in the name of file format.

- **The caret (^) symbol:** *Setting position for match* .tells the computer that the match must start at the beginning of the string or line.

Example : `^\d{3}` will match with patterns like “901” in “901-333-”.

- **The dollar (\$) symbol**

It tells the computer that the match must occur at the end of the string or before `\n` at the end of the line or string.

Example : `-\d{3}\$` will match with patterns like “-333” in “-901-333”.

- **Character Classes**

A character class matches any one of a set of characters. It is used to match the most basic element of a language like a letter, a digit, space, a symbol etc.

`/s` : matches any whitespace characters such as space and tab

`/S` : matches any non-whitespace characters

`/d` : matches any digit character

`/D` : matches any non-digit characters

`/w` : matches any word character (basically alpha-numeric)

`/W` : matches any non-word character

`/b` : matches any word boundary (this would include spaces, dashes, commas, semi-colons, etc)

[set_of_characters] – Matches any single character in `set_of_characters`. By default, the match is case-sensitive.

Example : `[abc]` will match characters a,b and c in any string.

[^set_of_characters] – *Negation*: Matches any single character that is not in `set_of_characters`. By default, the match is case sensitive.

Example : `[^abc]` will match any character except a,b,c .

[first-last] – *Character range*: Matches any single character in the range from first to last.

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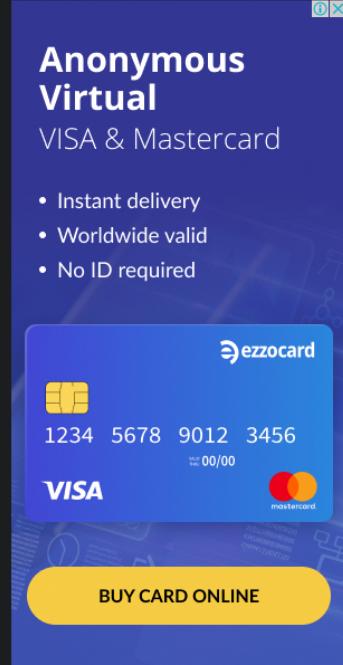
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Example : [a-zA-Z] will match any character from a to z or A to Z.

- **The Escape Symbol:**

If you want to match for the actual '+', '.' etc characters, add a backslash(\) before that character. This will tell the computer to treat the following character as a search character and consider it for matching pattern.

Example : \d+[\\+-x*]\\d+ will match patterns like "2+2" and "3*9" in "(2+2) * 3*9".

- **Grouping Characters ()**

A set of different symbols of a regular expression can be grouped together to act as a single unit and behave as a block, for this, you need to wrap the regular expression in the parenthesis().

Example : ([A-Z]\\w+) contains two different elements of the regular expression combined together. This expression will match any pattern containing uppercase letter followed by any character.

- **Vertical Bar (|) :**

Matches any one element separated by the vertical bar (|) character.

Example : th(e|i)s|at) will match words - the, this and that.

- **\number:**

Backreference: allows a previously matched sub-expression (expression captured or enclosed within circular brackets) to be identified subsequently in the same regular expression. \\n means that group enclosed within the n-th bracket will be repeated at current position.

Example : ([a-z])\\1 will match "ee" in Geek because the character at second position is same as character at position 1 of the match.

- **Comment:(?# comment) -**

Inline comment: The comment ends at the first closing parenthesis.

Example : \\bA(?#This is an inline comment)\\w+\\b

[to end of line] : X-mode comment. The comment starts at an unescaped # and continues to the end of the line.

Example : (?x)\\bA\\w+\\b#Matches words starting with A

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