

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?

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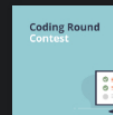
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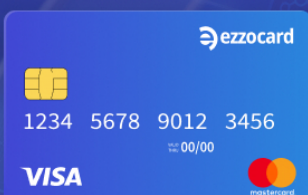
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times. `{min,max}` means that the preceding character is repeated at least min & at most max times.

- **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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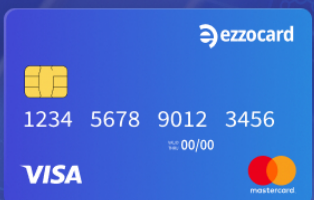


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Example : `[a-zA-z]` will match any character from a to z or A to Z.

- **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|is|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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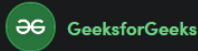
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