

C++ Standard Library: Regular Expressions with `<regex>`

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Regular Expressions

- A **Domain Specific Language** to describe and perform **Pattern Matching** within sequences of characters
- https://en.wikipedia.org/wiki/Regular_expression
- Many use cases, but three major ones
 - *Check if a string matches a given pattern*
 - *Find all substrings of a string that match a pattern*
 - *Replace matching substrings with another string*


<regex>

- C++11 has the <regex> library with classes and functions for using RegExps in code, with
 - `std::regex` class for defining a RegExp
 - `std::regex_match` function(s) for matching entire string
 - `std::regex_search` function(s) for matching any part of string
 - `std::regex_replace` function(s) for replacing matches with another string

std::regex

```
#include <regex>
```

```
int main(int, char**) {  
    std::regex a1numRegex("[A-Z0-9]+");  
  
    return 0;  
}
```



*“Sequence of 1 or more
characters in the ranges
A-Z and 0-9”*

std::regex_match

```
#include <regex>
#include <iostream>
```

```
int main(int, char**) {
    std::regex alnumRegex("[A-Z0-9]+");
    std::string foo("TH1SMATCH3S");
    std::string bar("TH!Sis Bad?");

    std::cout << std::regex_match(foo, alnumRegex) << "\n";
    std::cout << std::regex_match(bar, alnumRegex) << "\n";

    return 0;
}
```

Should print 1 then 0

std::regex_replace

```
#include <regex>
#include <iostream>
```

“Any character not in the ranges A-Z and 0-9”



```
int main(int, char**) {
    std::regex removeRegex("[^A-Z0-9]");
    std::string foo("EATS, SHOOT'S AND LEAVES");

    std::cout << std::regex_replace(foo,
                                    removeRegex,
                                    "")
               << "\n";

    return 0;
}
```

<regex>

- Refer to the cppreference documents for more of using regex:
 - <http://en.cppreference.com/w/cpp/regex>
- Lots more than can be done, including
 - Extraction of matching substrings
 - Different RegExp grammars
- Worth learning about Regular Expressions anyway, as they are used extensively in computing!
- Use <https://regexr.com> to quickly try out regular expressions!

```
1 #include <regex>
2 #include <iostream>
3
4 int main(int, char**) {
5     std::regex punctRegex("[^A-Z0-9]");
6     std::string foo("EATS, SHOOT'S AND LEAVES");
7
8     std::cout << std::regex_replace(foo,
9                                     punctRegex,
10                                     "")
11               << "\n";
12
13     return 0;
14 }
```

Example

<https://github.com/cpp-pg-mpags/mpags-cpp-extra>