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

```cpp
#include <regex>

int main(int, char**) {
  std::regex alnumRegex("[A-Z0-9]+");

  return 0;
}
```

"Sequence of 1 or more characters in the ranges A-Z and 0-9"

std::regex_match

```cpp
#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

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

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;
}
```

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

`<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!

Example

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