- Exercise

In this lesson, we'll execute and analyze the given code.

WE'LL COVER THE FOLLOWING

Try it out

The program how frequently a word is used in a text.This is a typical use-case for an ordered associative container.

- Execute the program
- Analyze the source code

Test.rtf

main.cpp

Test.rtf

```
#include <regex>
#include <algorithm>
#include <cstdlib>
#include <fstream>
#include <iostream>
#include <sstream>
#include <string>
#include <map>
#include <unordered_map>
#include <utility>

using str2Int = std::unordered_map<std::string, size_t>;
using intAndWords = std::pair<std::size_t, std::vector<std::string>>;
using int2Words = std::map<std::size_t, std::vector<std::string>>;

// count the frequency of each word
str2Int wordCount(const std::string& text){
  std::regex wordReg(R"(\w+)");
  std::sregex_iterator wordItBegin(text.begin(), text.end(), wordReg);
```

```
  std::sregex_iterator wordItBegin(text.begin(), text.end(), wordReg);
  const std::sregex_iterator wordItEnd;
  str2Int allWords;
  for (; wordItBegin != wordItEnd;++wordItBegin){
    ++allWords[wordItBegin->str()];
  }
  return allWords;
}

// get to all frequencies the appropriate words
int2Words frequencyOfWords(str2Int& wordCount){
  int2Words freq2Words;
  for ( auto wordIt: wordCount ){
    auto freqWord= wordIt.second;
    if ( freq2Words.find(freqWord) == freq2Words.end() ){
      freq2Words.insert( intAndWords(freqWord, {wordIt.first} ));
    }
    else {
      freq2Words[freqWord].push_back(wordIt.first);
    }
  }
  return freq2Words;
}

int main(int argc,  char* argv[]){

  std::cout << std::endl;

  // get the filename
  std::string myFile = "Test.rtf";

  // open the file
  std::ifstream file(myFile, std::ios::in);
  if (!file){
    std::cerr << "Can't open file "+ myFile + "!" << std::endl;
    exit(EXIT_FAILURE);
  }

  // read the file
  std::stringstream buffer;
  buffer << file.rdbuf();
  std::string text(buffer.str());

  // get the frequency of each word
  auto allWords= wordCount(text);

  std::cout << "The first 20 (key, value)-pairs: " << std::endl;
  auto end= allWords.begin();
  std::advance(end, 20);
  for (auto pair= allWords.begin(); pair != end; ++pair){
    std::cout << "(" << pair->first <<  ": " << pair->second << ")";
  }
  std::cout << "\n\n";

  std::cout << "allWords[Web]: " << allWords["Web"] << std::endl;
  std::cout << "allWords[The]: " << allWords["The"] << "\n\n";

  std::cout << "Number of unique words: ";
  std::cout << allWords.size() << "\n\n";

  size_t sumWords=0;
  for (auto wordIt: allWords) sumWords+= wordIt.second;
  std::cout << "Total number of words: " << sumWords <<"\n\n";
```

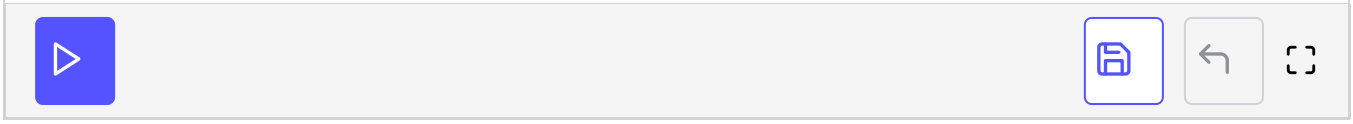
```
  auto allFreq= frequencyOfWords(allWords);

  std::cout << "Number of different frequencies: " << allFreq.size() << "\n\n";

  std::cout << "All frequencies: ";
  for (auto freqIt: allFreq) std::cout << freqIt.first << " ";
  std::cout << "\n\n";

  std::cout << "The most frequently occurring word(s): " << std::endl;
  auto atTheEnd= allFreq.rbegin();
  std::cout << atTheEnd->first << " :";
  for (auto word: atTheEnd->second) std::cout << word << " ";
  std::cout << "\n\n";

  std::cout << "All word which appears more then 1000 times:" << std::endl;
  auto biggerIt= std::find_if(allFreq.begin(), allFreq.end(), [](intAndWords iAndW){return i
  if (biggerIt == allFreq.end()){
    std::cerr << "No word appears more then 1000 times !" << std::endl;
    exit(EXIT_FAILURE);
  }
  else{
    for (auto allFreqIt= biggerIt; allFreqIt != allFreq.end(); ++allFreqIt){
      std::cout << allFreqIt->first << " :";
      for (auto word: allFreqIt->second) std::cout << word << " ";
      std::cout << std::endl;
    }
  }
  std::cout << std::endl;
}
```



In this chapter, we have studied ordered associative containers. In the next chapter, we'll study unordered associative containers in detail.