

Exercises week 6

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Exercise 42

*Learn to extract lines using generic algorithms into a container holding **string** objects, although `operator>>()` extracts strings*

main.cc

```
1 #include <iostream>
2 #include <iterator>
3 #include <string>
4 #include <vector>
5 #include <algorithm>
6
7 using namespace std;
8
9 class Derived: public string
10 {};
11
12 istream &operator>>(istream &istr, Derived &str)
13 {
14     return getline(istr, str);
15 }
16
17 int main()
18 {
19     vector<string> vs;
20
```

```
21 |     copy(istream_iterator<Derived>(cin), istream_iterator<Derived>(),
22 |          back_inserter(vs));
23 | }
```

Exercise 43

Learn to use promotion with generic algorithms and predefined function objects when manipulating basic data types.

main.cc

```
1 #include <iostream>
2 #include <algorithm>
3 #include <functional>
4
5 using namespace std;
6
7 int main(int argc, char **argv)
8 {
9     sort(argv + 1, argv + argc, greater<string>());
10    copy(argv + 1, argv + argc, ostream_iterator<string>(cout));
11    cout << '\n';
12
13    sort(argv + 1, argv + argc, less<string>());
14    copy(argv + 1, argv + argc, ostream_iterator<string>(cout));
15    cout << '\n';
16 }
```

Exercise 44

Learn to recognize a situation where lambda functions may be used

vstring/vstring.h

```
1  #ifndef EX44_VSTRING_H
2  #define EX44_VSTRING_H
3
4  #include <vector>
5  #include <string>
6  #include <map>
7  #include <istream>
8
9  class Vstring: public std::vector<std::string>
10 {
11 public:
12     typedef std::map<char, size_t> Charmap;
13
14     explicit Vstring(std::istream &in);
15
16     size_t count(Charmap &cmap, bool (*accept)(char, Charmap &));
17
18 private:
19     static size_t countChar(std::string const &str, Charmap &cmap, bool (*accept)(char, Charmap &));
20 };
21
22 #endif
```

vstring/vstring.ih

```
1  #include "vstring.h"
2
3  using namespace std;
```

vstring/count.cc

```
1  #include "vstring.ih"
```

```

2 |
3 | size_t Vstring::count(Charmap &cmap, bool (*accept)(char, Charmap &))
4 | {
5 |     size_t count = 0;
6 |     for_each(
7 |         begin(), end(),
8 |         [&, accept](string &str)
9 |         {
10 |             count += countChar(str, cmap, accept);
11 |         }
12 |     );
13 |     return count;
14 | }

```

vstring/countchar.cc

```

1 | #include "vstring.ih"
2 |
3 | size_t Vstring::countChar(string const &str, Charmap &cmap, bool (*accept)(char
4 | {
5 |     return count_if(
6 |         str.begin(), str.end(),
7 |         [&, accept](char ch)
8 |         {
9 |             return accept(ch, cmap);
10 |        }
11 |    );
12 | }

```

main.ih

```

1 | #include <iostream>
2 | #include <fstream>
3 | #include "vstring/vstring.h"
4 |
5 | using namespace std;
6 |
7 | void display(Vstring::Charmap &cmap);
8 | bool vowels(char c, Vstring::Charmap &cmap);

```

display.cc

```
1 #include "main.ih"
2
3 void display(Vstring::Charmap &cmap)
4 {
5     for_each(
6         cmap.begin(), cmap.end(),
7         [](auto const &value)
8         {
9             cout << value.first << ": " << value.second << '\n';
10        }
11    );
12 }
```

vowels.cc

```
1 #include "main.ih"
2
3 bool vowels(char c, Vstring::Charmap &cmap)
4 {
5     if (string("aeiuoAEIUO").find(c) != string::npos)
6     {
7         ++cmap[c];
8         return true;
9     }
10    return false;
11 }
```

main.cc

```
1 #include "main.ih"
2
3 int main()
4 {
5     ifstream is("text.txt");
6     Vstring vstring(is);
7     Vstring::Charmap vmap;
8
9     cout << "Vowels: " << vstring.count(vmap, vowels) << '\n';
```

```
10 |  
11     display(vmap);  
12 | }
```

Exercise 45

Exercise 46

Exercise 47

Exercise 48