

```
1: // $Id: iterstack.h,v 1.5 2014-05-30 13:47:32-07 - - $
2:
3: //
4: // The class std::stack does not provide an iterator, which is
5: // needed for this class. So, like std::stack, class iterstack
6: // is implemented on top of a container.
7: //
8: // We use private inheritance because we want to restrict
9: // operations only to those few that are approved. All functions
10: // are merely inherited from the container, with only ones needed
11: // being exported as public.
12: //
13: // No implementation file is needed because all functions are
14: // inherited, and the convenience functions that are added are
15: // trivial, and so can be inline.
16: //
17: // Any underlying container which supports the necessary operations
18: // could be used, such as vector, list, or deque.
19: //
20:
21: #ifndef __ITERSTACK_H__
22: #define __ITERSTACK_H__
23:
24: #include <vector>
25: using namespace std;
26:
27: template <typename value_type>
28: class iterstack: private vector<value_type> {
29:     private:
30:         using vector<value_type>::crbegin;
31:         using vector<value_type>::crend;
32:         using vector<value_type>::push_back;
33:         using vector<value_type>::pop_back;
34:         using vector<value_type>::back;
35:         using const_iterator = typename
36:             vector<value_type>::const_reverse_iterator;
37:     public:
38:         using vector<value_type>::clear;
39:         using vector<value_type>::empty;
40:         using vector<value_type>::size;
41:         const_iterator begin() { return crbegin(); }
42:         const_iterator end() { return crend(); }
43:         void push (const value_type& value) { push_back (value); }
44:         void pop() { pop_back(); }
45:         const value_type& top() const { return back(); }
46: };
47:
48: #endif
49:
```

```
1: // $Id: teststack.cpp,v 1.13 2016-06-13 13:44:55-07 - - $
2:
3: #include <iostream>
4: #include <string>
5: #include <vector>
6: using namespace std;
7:
8: #include "iterstack.h"
9:
10: int main (int argc, char** argv) {
11:     vector<string> args (&argv[1], &argv[argc]);
12:
13:     iterstack<string> stk;
14:     for (const auto& arg: args) {
15:         cout << "Pushing: " << arg << endl;
16:         stk.push (arg);
17:     }
18:     for (const auto& elt: stk) cout << "Iteration: " << elt << endl;
19:
20:     while (not stk.empty()) {
21:         cout << "Popping: " << stk.top() << endl;
22:         stk.pop();
23:     }
24:     return 0;
25: }
26:
27: /*
28: //TEST// valgrind --leak-check=full --show-reachable=yes \
29: //TEST//      --log-file=teststack.out.grind \
30: //TEST//      teststack foo bar baz qux quux >teststack.out 2>&1
31: //TEST// mkpspdf teststack.ps iterstack.h teststack.cpp* teststack.out*
32: */
33:
```

```
g++ -std=c++11 -c teststack.cpp -o teststack.o -lm
```

```
1: Pushing: foo
2: Pushing: bar
3: Pushing: baz
4: Pushing: qux
5: Pushing: quux
6: Iteration: quux
7: Iteration: qux
8: Iteration: baz
9: Iteration: bar
10: Iteration: foo
11: Popping: quux
12: Popping: qux
13: Popping: baz
14: Popping: bar
15: Popping: foo
```

```
1: ==9283== Memcheck, a memory error detector
2: ==9283== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
3: ==9283== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright i
nfo
4: ==9283== Command: teststack foo bar baz qux quux
5: ==9283== Parent PID: 9282
6: ==9283==
7: ==9283==
8: ==9283== HEAP SUMMARY:
9: ==9283==      in use at exit: 0 bytes in 0 blocks
10: ==9283==    total heap usage: 10 allocs, 10 frees, 301 bytes allocated
11: ==9283==
12: ==9283== All heap blocks were freed -- no leaks are possible
13: ==9283==
14: ==9283== For counts of detected and suppressed errors, rerun with: -v
15: ==9283== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```