```
(11db) frame variable --no-args
(bool) valid_position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) insert_ptr = 0x0000600000208000
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) prev_ptr = 0x0000600000201160
(Node < std::basic\_string < char, std::char\_traits < char>, std::allocator < char> > *) target\_ptr = nullptr < char> > (null target) target = nullptr < char < ch
(11db) frame variable valid position
(bool) valid_position = true
(11db) frame variable *insert_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *insert_ptr = {
     entry = "bananas"
     next node = nullptr
(11db) frame variable *prev_ptr
(Node<std::basic string<char, std::char traits<char>, std::allocator<char> > ) *prev ptr = {
     entry = "apples"
     next\_node = 0x0000600000208000
(11db) next
- Hook 1 (expr -- position)
(int) $18 = 2
- Hook 2 (frame variable)
(int) position = 2
(const \ std::basic\_string < char, \ std::char\_traits < char>, \ std::allocator < char> > \&) \ new\_entry = "bananas": \{ (const \ std::basic\_string < char) = 
      __r_ = {
           std::\_1::\_compressed\_pair\_elem < std::\_1::basic\_string < char, std::\_1::char\_traits < char>, std::\_1::allocator < char> >::\_rep, 0, false> = \{ (a.c., basic\_string < char) < (basic\_string < char) <
                  __value_ = {
                         = {
                              __1 = (__cap_ = 8314047751845405198, __size_ = 8590207744, __data_ = "X\U0000001d\b")
                              _{-}s = {
                                     = (__size_ = '\x0e', __lx = '\x0e')
                                    __data_ = "bananas"
                             }
                              _{-}r = {
                                    \_words = ([0] = 8314047751845405198, [1] = 8590207744, [2] = 4434759776)
                      }
                 }
          }
     }
(bool) valid_position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) insert_ptr = 0x0000600000208000
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) prev_ptr = 0x0000600000201160
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
            frame #0: 0x00000010000277c lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::insert(
this=0x0000600000000010,\ position=2,\ new\_entry="bananas")\ at \ LinkedList.hpp:89:13
        86
                                                                       }
        87
        88
                                                                        m_length++;
-> 89
                                                                        std::cout << "\n-- THE NEW ENTRY " << new_entry << " AT POSITION ";
                                                                         std::cout << position << " HAS BEEN BE INSERTED INTO THE LIST." << std::endl;
        90
        91
        92
                                               } else {
Target 0: (lab05) stopped.
(lldb) next
- Hook 1 (expr -- position)
(int) $19 = 2
- Hook 2 (frame variable)
(int) position = 2
(const std::basic_string<char, std::char_traits<char>, std::allocator<char> > &) new_entry = "bananas": {
     _{r_{-}} = {
```

```
std::\_1::\_compressed\_pair\_elem < std::\_1::basic\_string < char, std::\_1::char\_traits < char>, std::\_1::allocator < char> >::\_rep, 0, false> = \{ (a.c., basic\_string < char) < (basic\_string < char) <
          __value_ = {
              = {
                __1 = (__cap_ = 8314047751845405198, __size_ = 8590207744, __data_ = "X\U0000001d\b")
                _{-}s = {
                    = (__size_ = '\x0e', __lx = '\x0e')
                   __data_ = "bananas"
                }
                _{-}r = {
                   __words = ([0] = 8314047751845405198, [1] = 8590207744, [2] = 4434759776)
            }
        }
     }
  }
}
(bool) valid position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) insert_ptr = 0x0000600000208000
(Node < std::basic\_string < char, std::char\_traits < char>, std::allocator < char> > *) prev\_ptr = 0x0000600000201160
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
      frame #0: 0x0000001000027aa lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::insert(
this=0x0000600000008010, position=2, new_entry="bananas") at LinkedList.hpp:90:16
    87
    88
                                      m length++;
                                      std::cout << "\n-- THE NEW ENTRY " << new_entry << " AT POSITION ";
    89
 -> 90
                                      std::cout << position << " HAS BEEN BE INSERTED INTO THE LIST." << std::endl;
     91
     92
                         } else {
                                       std::cout << "\n-- THE NEW ENTRY " << new_entry << " AT POSITION ";
Target 0: (lab05) stopped.
(lldb) next
-- THE NEW ENTRY bananas AT POSITION 2 HAS BEEN BE INSERTED INTO THE LIST.
- Hook 1 (expr -- position)
(int) $20 = 2
- Hook 2 (frame variable)
(int) position = 2
(const std::basic_string<char, std::char_traits<char>, std::allocator<char> > &) new_entry = "bananas": {
      std:: 1:: compressed pair elem<std:: 1::basic string<char, std:: 1::char traits<char>, std:: 1::allocator<char> >:: rep, 0, false> = {
         __value_ = {
              = {
                _{l} = (_{cap} = 8314047751845405198, __size_ = 8590207744, __data_ = "X\U00000001d\b")
                    = (__size_ = '\x0e', __lx = '\x0e')
                   __data_ = "bananas"
                }
                _{r} = {
                   __words = ([0] = 8314047751845405198, [1] = 8590207744, [2] = 4434759776)
            }
      }
   }
(bool) valid position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) insert_ptr = 0x0000600000208000
(Node < std::basic\_string < char, std::char\_traits < char>, std::allocator < char> > *) prev\_ptr = 0x0000600000201160
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
      frame #0: 0x0000001000027d0 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::insert(
this=0x0000600000008010, position=2, new_entry="bananas") at LinkedList.hpp:92:2
    89
                                      std::cout << "\n-- THE NEW ENTRY " << new_entry << " AT POSITION ";
     90
                                       std::cout << position << " HAS BEEN BE INSERTED INTO THE LIST." << std::endl;
     91
```

```
-> 92
              <u>}</u> else {
                       std::cout << "\n-- THE NEW ENTRY " << new_entry << " AT POSITION ";
  93
                      std::cout << position << " FAILED TO BE INSERTED INTO THE LIST.\n" << std::endl;
  94
  95
                       throw (std::runtime_error("invalid position\n"));
Target 0: (lab05) stopped.
(11db) list
  96
  97
  98
               return (valid_position);
  99 }
  100
  101 /// use the try catch block
  102 /// <code>Oparam</code> position the specific location within the linked list to remove the node
(lldb) frame variable --no-args
(bool) valid_position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) insert_ptr = 0x0000600000208000
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) prev_ptr = 0x0000600000201160
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
(11db) frame variable *insert_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> >) *insert_ptr = {
 entry = "bananas"
 next_node = nullptr
(11db) frame variable *prev_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *prev_ptr = {
 entry = "apples"
 next_node = 0x0000600000208000
(11db) frame variable *target_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *target_ptr = <parent is NULL>
(11db) frame variable target_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
(11db) next
- Hook 1 (expr -- position)
(int) $21 = 2
- Hook 2 (frame variable)
(int) position = 2
(const std::basic string<char, std::char traits<char>, std::allocator<char> > &) new entry = "bananas": {
   std::_1::_compressed_pair_elem<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> >::__rep, 0, false> = {
     value = {
        = {
         __l = (__cap_ = 8314047751845405198, __size_ = 8590207744, __data_ = "X\U0000001d\b")
         _{s} = {
            = (__size_ = '\x0e', __lx = '\x0e')
           __data_ = "bananas"
         _{-}r = {
           __words = ([0] = 8314047751845405198, [1] = 8590207744, [2] = 4434759776)
       }
     }
 }
(bool) valid_position = true
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000100002887 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::insert(
this=0x0000600000008010, position=2, new_entry="bananas") at LinkedList.hpp:98:10
  95
                       throw (std::runtime_error("invalid position\n"));
  96
  97
-> 98
               return (valid_position);
  99
      }
  100
  101 /// use the try catch block
```

```
Target 0: (lab05) stopped.
(11db) next
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x00006000000000010
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
Process 50269 stonned
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000216f lab05`main at main.cpp:14:16
             try {
  11
  12
                        groceries -> insert(1, "apples");
  13
                        std::cout << groceries -> getLength() << std::endl;</pre>
                        groceries -> insert(2, "bananas");
<del>-></del> 14
                        std::cout << groceries -> getLength() << std::endl;</pre>
  16
                        groceries -> insert(3, "sweet potatoes");
  17
                        std::cout << groceries -> getLength() << std::endl;</pre>
Target 0: (lab05) stopped.
(lldb) next
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x000060000000000010
(std::exception \&) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000217d lab05`main at main.cpp:15:16
                       groceries -> insert(1, "apples");
                       std::cout << groceries -> getLength() << std::endl;</pre>
  14
                      groceries -> insert(2, "bananas");
-> 15
                       std::cout << groceries -> getLength() << std::endl;</pre>
                        groceries -> insert(3, "sweet potatoes");
  16
  17
                        std::cout << groceries -> getLength() << std::endl;</pre>
                        groceries -> insert(4, "argula");
Target 0: (lab05) stopped.
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> >> *) groceries = 0x0000600000000000010
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
(11db) frame variable groceries -> headptr
error: unknown or ambiguous option
(11db) frame variable *groceries
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *groceries = {
  headptr = 0 \times 0000600000201160
  m_{length} = 2
(11db) frame variable *groceries -> headptr
error: unknown or ambiguous option
(11db) frame variable *groceries->headptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *groceries->headptr = {
 entry = "apples"
  next_node = 0x0000600000208000
}
(11db) next
-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST.
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> >> *) groceries = 0x0000600000000000010
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
```

```
frame #0: 0x00000001000021cc lab05`main at main.cpp:16:3
  13
                     std::cout << groceries -> getLength() << std::endl;</pre>
  14
                     groceries -> insert(2, "bananas");
  15
                      std::cout << groceries -> getLength() << std::endl;</pre>
                      groceries -> insert(3, "sweet potatoes");
-> 16
  17
                     std::cout << groceries -> getLength() << std::endl;</pre>
                      groceries -> insert(4, "argula");
  19
                      std::cout << groceries -> getLength() << std::endl;</pre>
Target 0: (lab05) stopped.
(11db) next
-- THE NEW ENTRY sweet potatoes AT POSITION 3 HAS BEEN BE INSERTED INTO THE LIST.
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000220f lab05`main at main.cpp:17:16
                     groceries -> insert(2, "bananas");
  15
                     std::cout << groceries -> getLength() << std::endl;</pre>
                     groceries -> insert(3, "sweet potatoes");
  16
<del>-></del> 17
                      std::cout << groceries -> getLength() << std::endl;</pre>
                      groceries -> insert(4, "argula");
  18
                     std::cout << groceries -> getLength() << std::endl;</pre>
  20
              } catch (std::exception &e) {
Target 0: (lab05) stopped.
(11db) next
-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST.
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x00006000000000010
(std::exception \&) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000225e lab05`main at main.cpp:18:3
  15
                     std::cout << groceries -> getLength() << std::endl;</pre>
  16
                     groceries -> insert(3, "sweet potatoes");
  17
                     std::cout << groceries -> getLength() << std::endl;</pre>
-> 18
                      groceries -> insert(4, "argula");
  19
                      std::cout << groceries -> getLength() << std::endl;</pre>
              } catch (std::exception &e) {
  21
                     std::cout << e.what() << std::endl;
Target 0: (lab05) stopped.
-- THE NEW ENTRY argula AT POSITION 4 HAS BEEN BE INSERTED INTO THE LIST.
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000022a1 lab05`main at main.cpp:19:16
                      groceries -> insert(3, "sweet potatoes");
  17
                      std::cout << groceries -> getLength() << std::endl;</pre>
  18
                      groceries -> insert(4, "argula");
-> 19
                      std::cout << groceries -> getLength() << std::endl;</pre>
  20
             } catch (std::exception &e) {
```

```
std::cout << e.what() << std::endl;</pre>
  21
             3
  22
Target 0: (lab05) stopped.
(11db) next
-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST.
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x00006000000000010
(std::exception &) e = 0x0000000000000000
(std::exception \&) e = 0x0000000108551010 {}
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000022f0 lab05`main at main.cpp:20:2
  17
                    std::cout << groceries -> getLength() << std::endl;</pre>
  18
                    groceries -> insert(4, "argula");
  19
                    std::cout << groceries -> getLength() << std::endl;</pre>
-> 20
            } catch (std::exception &e) {
  21
                    std::cout << e.what() << std::endl;
  22
  23
Target 0: (lab05) stopped.
(11db) step next
error: invalid thread index 'next'.
(11db) next
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(std::exception &) e = 0x0000000000000000
(std::exception \&) e = 0x0000000108551010 {}
(int) length = 0
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000023f1 lab05`main at main.cpp:25:16
  22
            }
  23
  24
            try {
-> 25
                    int length = groceries -> getLength();
  26
  27
                    std::cout << "\ngrocery list: " << std::endl;</pre>
  28
                    for (int i = 1; i \le length; i++) {
Target 0: (lab05) stopped.
(11db) tread step-over
error: 'tread' is not a valid command.
(11db) thread step-in
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000028ee lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::getLeng
50
  51 template <typename T>
  52 int LinkedList<T>::getLength() const {
-> 53
             std::cout << "\n-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST." << std::endl;
  54
             return(m_length);
  55 }
Target 0: (lab05) stopped.
(11db) next
-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST.
```

```
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000010000290d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::getLeng
51 template <typename T>
  52 int LinkedList<T>::getLength() const {
             std::cout << "\n-- RETURNING THE AMOUNT OF NODE OBJECTS IN THE LIST." << std::endl;
  53
-> 54
            return(m_length);
  55 }
  56
     /// try catch block for calling this is required
  57
Target 0: (lab05) stopped.
(lldb) next
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x00006000000000010
(std::exception \&) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
(int) length = 0
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000023fa lab05`main at main.cpp:25:29
  22
  23
  24
           trv {
-> 25
                   int length = groceries -> getLength();
  26
  27
                   std::cout << "\ngrocery list: " << std::endl;</pre>
                   for (int i = 1; i \le length; i++) {
  28
Target 0: (lab05) stopped.
(11db) frame variable
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
(int) length = 0
(11db) step
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
(int) length = 4
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
  frame #0: 0x0000000100002413 lab05`main at main.cpp:27:13
  24
           try {
  25
                   int length = groceries -> getLength():
  26
-> 27
                   for (int i = 1; i \le length; i++) {
  28
                          std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
  30
                   }
Target 0: (lab05) stopped.
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x0000600000000000010
(std::exception &) e = 0x0000000000000000
(std::exception \&) e = 0x0000000108551010 {}
(int) length = 4
(11db) step
```

grocery list:

```
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(std::exception \&) e = 0x0000000000000000
(std::exception &) e = 0x0000000108551010 {}
(int) length = 4
(int) i = 0
Process 50269 stonned
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000010000244d lab05`main at main.cpp:28:12
                      int length = groceries -> getLength();
  25
  26
                      std::cout << "\ngrocery list: " << std::endl;</pre>
  27
                      for (int i = 1; i <= length; i++) {
-> 28
  29
                              std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
  30
                      }
  31
Target 0: (lab05) stopped.
(11db) step
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) groceries = 0x000060000000000010
(std::exception \&) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
(int) length = 4
(int) i = 1
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100002469 lab05`main at main.cpp:29:17
  26
  27
                       std::cout << "\ngrocery list: " << std::endl;</pre>
   28
                       for (int i = 1; i \le length; i++) {
                              std::cout << \underline{i} << ". " << groceries -> getEntry(i) << std::endl;
-> 29
  30
  31
               } catch (std::exception &e) {
  32
Target 0: (lab05) stopped.
(11db) step
- Hook 1 (expr -- position)
(int) $22 = 1
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000000000010
(int) position = 1
(bool) valid_position = false
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100002a58 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::getEntr
y(this=0x0000600000008010, position=1) at LinkedList.hpp:152:34
  149
               std::cout << "\n-- AN ENTRY FROM THE NODE AT POSITION " << position << " HAS BEEN REQUESTED TO BE RETURNED." << std::endl;
  150 //
  151
-> 152
               bool valid_position = (position \geq= 1) && (position <= m_length);
  153
  154
               if (valid_position) {
  155
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
(int) $23 = 1
- Hook 2 (frame variable)
```

```
(int) position = 1
(bool) valid_position = true
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0 \times 0000000100002a7d \ lab 05`Linked List < std::\_1::basic\_string < char, \ std::\_1::char\_traits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char>,
152
                                     bool valid_position = (position >= 1) && (position <= m_length);</pre>
      153
 -> 154
                                if (valid_position) {
      155
      156
                                                       Node<T>* newNode = nullptr:
      157
                                                       newNode = new Node<T>();
Target 0: (lab05) stopped.
(lldb) thread step-in
- Hook 1 (expr -- position)
(int) $24 = 1
- Hook 2 (frame variable)
(int) position = 1
(bool) valid position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) newNode = 0x00007ff8562966f0
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0 \times 0000000100002a87 \ lab 05 `Linked List < std::\_1:: basic\_string < char, \ std::\_1:: char\_traits < char>, \ std::\_1:: allocator < char> > :: get Entraits < char>, \ std::\_1:: allocator < char> > : get Entraits < char>, \ std::\_1:: allocator < char> > : get Entraits < char>, \ std::\_1:: allocator < char> > : get Entraits < char>, \ std::\_1:: allocator 
y(this=0x0000600000008010, position=1) at LinkedList.hpp:156:12
      153
      154
                                if (valid_position) {
      155
-> 156
                                                      Node<T>* newNode = nullptr;
      157
                                                      newNode = new Node<T>();
                                                       newNode = getNodeAt(position);
       158
      159
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
(int) $25 = 1
- Hook 2 (frame variable)
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000000010
(int) position = 1
(bool) valid_position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) newNode = nullptr
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
          frame #0: 0x0000000100002a94 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::getEntr
154
                                 if (valid_position) {
       155
      156
                                                       Node<T>* newNode = nullntr:
 -> 157
                                                       newNode = new Node<T>();
      158
                                                       newNode = getNodeAt(position);
      159
      160
                                                      return (newNode -> getEntry());
Target 0: (lab05) stopped.
(lldb) thread step-in
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
```

```
frame #0: 0x000000100003980 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::Node(this=0x0)
00060000020c000) at Node.hpp:6:17
  3
      #include <iostream>
  4
  5
      template <typename T>
     Node<T>::Node() {
-> 6
  7
                    std::cout << "\n--- Node() \n--- AN EMPTY NODE HAS BEEN CREATED [0" << entry << " -> nullptr]" << std::endl;
  8
      }
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x000060000020c000
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000039d0 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::Node(this=0x0)
00060000020c000) at Node.h:12:2
  9
             Node<T>* next_node;
  10
  11 public:
-> 12 <u>Node();</u>
  13
             Node(const T& new_entry);
  14
             Node(const T& new_entry, Node<T>* new_next_node);
             T getEntry() const;
  15
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039d5 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::Node(this=0x0
00060000020c000) at Node.hpp:8:1
  5 template <typename T>
  6
      Node<T>::Node() {
  7
                    std::cout << "\n--- Node() \n--- AN EMPTY NODE HAS BEEN CREATED [0" << entry << " -> nullptr]" << std::endl;
-> 8
  9
  10 template <typename T>
  11 Node<T>::Node(const T& new_entry) {
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
- Hook 2 (frame variable)
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003985 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::Node(this=0x0)
00060000020c000) at Node.hpp:8:1
  5
      template <typename T>
      Node<T>::Node() {
  6
            // std::cout << "\n---- Node() \n---- AN EMPTY NODE HAS BEEN CREATED [0" << entry << " -> nullptr]" << std::endl;
  7
<u>-> 8 }</u>
  9
  10 template <tvpename T>
  11 Node<T>::Node(const T& new_entry) {
Target 0: (lab05) stopped.
(11db) thread step-in
- Hook 1 (expr -- position)
(int) $26 = 1
```

```
- Hook 2 (frame variable)
(int) position = 1
(bool) valid_position = true
(Node < std::basic\_string < char, \ std::char\_traits < char>, \ std::allocator < char> \ > *) \ newNode = nullptr
Process 50269 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
       frame \ \#0: \ 0 \times 0000000100002 aaf \ lab 05`Linked List < std::\_1::basic\_string < char, \ std::\_1::char\_traits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < char> > ::get Entraits < char>, \ std::\_1::allocator < 
154
                        if (valid position) {
     156
                                         Node<T>* newNode = nullptr;
-> 157
                                        newNode = new Node<T>();
     158
                                         newNode = getNodeAt(position);
     159
                                        return (newNode -> getEntry());
     160
Target 0: (lab05) stopped.
(11db) quit
Quitting LLDB will kill one or more processes. Do you really want to proceed: [Y/n] Y
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make clean
rm *.o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make
g++ -g -std=c++11 -Wall -c main.cpp
main.cpp:40:2: error: expected '(' for function-style cast or type construction
             std::cout << std::endl;
1 error generated.
make: *** [main.o] Error 1
owner@morgan ~/D/1/E/EECS268-Lab05 (main) [2]> make
q++ -q -std=c++11 -Wall -c main.cpp
main.cpp:38:26: error: expected '(' for function-style cast or type construction
              ~LinkedList<std::string>;
1 error generated.
make: *** [main.o] Error 1
owner@morgan ~/D/1/E/EECS268-Lab05 (main) [2]> make
g++ -g -std=c++11 -Wall -c main.cpp
main.cpp:38:3: error: use of class template 'LinkedList' requires template arguments
             ~LinkedList();
 ./LinkedList.h:7:7: note: template is declared here
class LinkedList {
1 error generated.
make: *** [main.o] Error 1
owner@morgan ~/D/1/E/EECS268-Lab05 (main) [2]> make
g++ -g -std=c++11 -Wall -c main.cpp
main.cpp:38:15: error: reference to destructor must be called; did you mean to call it with no arguments?
             groceries -> ~LinkedList<std::string>;
1 error generated.
make: *** [main.o] Error 1
owner@morgan ~/D/1/E/EECS268-Lab05 (main) [2]> make
g++ -g -std=c++11 -Wall -c main.cpp
g++ -g -std=c++11 -Wall main.o -o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make clena
make: *** No rule to make target `clena'. Stop.
owner@morgan ~/D/1/E/EECS268-Lab05 (main) [2]> make
make: `lab05' is up to date.
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> ./lab05
2
3
4
grocery list:
1. apples
2. bananas
3. sweet potatoes
4. argula
```

```
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make clean
rm *.o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make
g++ -g -std=c++11 -Wall -c main.cpp
g++ -g -std=c++11 -Wall main.o -o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> ./lab05
2
3
4
grocery list:
1. apples
2. bananas
3. sweet potatoes
4. argula
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make clean
rm *.o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make
g++ -g -std=c++11 -Wall -c main.cpp
g++ -g -std=c++11 -Wall main.o -o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> 11db ./lab05
(lldb) target create "./lab05"
 \texttt{Current executable set to '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86\_64). } \\
Process 50970 launched: '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86_64)
3
4
grocery list:
1. apples
2. bananas
3. sweet potatoes
4. argula
Process 50970 exited with status = 0 (0x00000000)
(lldb) b main.cpp:7
Breakpoint 1: where = lab05`main + 23 at main.cpp:9:14, address = 0x000000100001f27
(11db) run
Process 50978 launched: '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86_64)
* thread #1, queue = 'com.apple.main-thread', stop reason = breakpoint 1.1
   frame #0: 0x0000000100001f27 lab05`main at main.cpp:9:14
   6
      int main() {
  7
   8
                LinkedList<std::string>* groceries;
-> 9
                groceries = new LinkedList<std::string>();
  10
  11
  12
                try {
Target 0: (lab05) stopped.
(11db) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x0000000100001f58 lab05`main at main.cpp:13:3
  10
  11
  12
                try {
                        groceries -> insert(1, "apples");
-> 13
  14
                        std::cout << groceries -> getLength() << std::endl;</pre>
   15
                        groceries -> insert(2, "bananas");
                        std::cout << groceries -> getLength() << std::endl;</pre>
  16
Target 0: (lab05) stopped.
(11db) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x0000000100001f9b lab05`main at main.cpp:14:16
  11
  12
                try {
                        groceries -> insert(1, "apples");
  13
```

```
-> 14
                         std::cout << groceries -> getLength() << std::endl;</pre>
  15
                         groceries -> insert(2, "bananas");
                         std::cout << groceries -> getLength() << std::endl;</pre>
  16
  17
                         groceries -> insert(3, "sweet potatoes");
Target 0: (lab05) stopped.
(11db) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x0000000100001fea lab05`main at main.cpp:15:3
                trv {
                         groceries -> insert(1, "apples");
  13
   14
                         std::cout << groceries -> getLength() << std::endl;</pre>
-> 15
                         groceries -> insert(2, "bananas");
                         std::cout << groceries -> getLength() << std::endl;</pre>
  16
                         groceries -> insert(3, "sweet potatoes");
  17
                         std::cout << groceries -> getLength() << std::endl;</pre>
  18
Target 0: (lab05) stopped.
(11db) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x000000010000202d lab05`main at main.cpp:16:16
                        groceries -> insert(1, "apples");
                        std::cout << groceries -> getLength() << std::endl;</pre>
  15
                        groceries -> insert(2, "bananas");
-> 16
                         std::cout << groceries -> getLength() << std::endl;</pre>
   17
                         groceries -> insert(3, "sweet potatoes");
                         std::cout << groceries -> getLength() << std::endl;</pre>
  18
                         groceries -> insert(4, "argula");
Target 0: (lab05) stopped.
(lldb) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x000000010000207c lab05`main at main.cpp:17:3
   14
                        std::cout << groceries -> getLength() << std::endl;</pre>
                        groceries -> insert(2, "bananas");
  15
   16
                         std::cout << groceries -> getLength() << std::endl;</pre>
                         groceries -> insert(3, "sweet potatoes");
-> 17
                         std::cout << groceries -> getLength() << std::endl;</pre>
  18
   19
                         groceries -> insert(4, "argula");
  20
                         std::cout << groceries -> getLength() << std::endl;</pre>
Target 0: (lab05) stopped.
(lldb) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x00000001000020bf lab05`main at main.cpp:18:16
                        groceries -> insert(2, "bananas");
  15
  16
                         std::cout << groceries -> getLength() << std::endl;</pre>
  17
                         groceries -> insert(3, "sweet potatoes");
-> 18
                         std::cout << groceries -> getLength() << std::endl;</pre>
  19
                         groceries -> insert(4, "argula");
  20
                         std::cout << groceries -> getLength() << std::endl;</pre>
                } catch (std::exception &e) {
  21
Target 0: (lab05) stopped.
(lldb) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x000000010000210e lab05`main at main.cpp:19:3
                        std::cout << groceries -> getLength() << std::endl;</pre>
                         groceries -> insert(3, "sweet potatoes");
  17
                        std::cout << groceries -> getLength() << std::endl;</pre>
  18
-> 19
                         groceries -> insert(4, "argula");
   20
                         std::cout << groceries -> getLength() << std::endl;</pre>
   21
                } catch (std::exception &e) {
  22
                         std::cout << e.what() << std::endl;</pre>
Target 0: (lab05) stopped.
(11db) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x0000000100002151 lab05`main at main.cpp:20:16
                         groceries -> insert(3, "sweet potatoes");
   17
```

```
std::cout << groceries -> getLength() << std::endl;</pre>
  19
                        groceries -> insert(4, "argula");
-> 20
                        std::cout << groceries -> getLength() << std::endl;</pre>
  21
               } catch (std::exception &e) {
  22
                        std::cout << e.what() << std::endl;</pre>
  23
               }
Target 0: (lab05) stopped.
(lldb) next
Process 50978 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000021a0 lab05`main at main.cpp:21:2
  18
                       std::cout << groceries -> getLength() << std::endl;</pre>
                        groceries -> insert(4, "argula");
  19
  20
                        std::cout << groceries -> getLength() << std::endl;</pre>
-> 21
               } catch (std::exception &e) {
  22
                        std::cout << e.what() << std::endl:
   23
  24
Target 0: (lab05) stopped.
(11db) quit
Quitting LLDB will kill one or more processes. Do you really want to proceed: [Y/n] Y
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make clean
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> make
g++ -g -std=c++11 -Wall -c main.cpp
g++ -g -std=c++11 -Wall main.o -o lab05
owner@morgan ~/D/1/E/EECS268-Lab05 (main)> 11db ./lab05
(11db) target create "./lab05"
Current executable set to '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86_64).
(11db) run
Process 51024 launched: '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86_64)
arocerv list:
1. apples
2. bananas
3. sweet potatoes
4. argula
Process 51024 exited with status = 0 (0x00000000)
(11db) b main.cpp:22
Breakpoint 1: where = lab05`main + 597 at main.cpp:22:16, address = 0x0000001000022a5
(11db) run
Process 51036 launched: '/Users/owner/Desktop/lab05/EECS268-Lab05/EECS268-Lab05/lab05' (x86_64)
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = breakpoint 1.1
   frame #0: 0x00000001000022a5 lab05`main at main.cpp:22:16
  19
              }
  20
  21
               try {
-> 22
                        int length = groceries -> getLength();
                        std::cout << "\ngrocery list: " << std::endl;</pre>
  24
                        for (int i = 1; i \le length; i++) {
  25
Target 0: (lab05) stopped.
(lldb) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000022c7 lab05`main at main.cpp:24:13
  21
              try {
  22
                        int length = groceries -> getLength();
  23
-> 24
                        std::cout << "\ngrocery list: " << std::endl;</pre>
   25
                        for (int i = 1; i \le length; i++) {
                                std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
   26
   27
Target 0: (lab05) stopped.
(11db) next
grocery list:
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x0000000100002301 lab05`main at main.cpp:25:12
```

```
int length = groceries -> getLength();
   22
   23
                        std::cout << "\ngrocery list: " << std::endl;</pre>
   24
-> 25
                        for (int \underline{i} = 1; i \leftarrow length; i++) {
                               std::cout << i << "." << groceries -> getEntry(i) << std::endl;
  26
   27
   28
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x0000000100000231d lab05`main at main.cpp:26:17
   23
                       std::cout << "\ngrocery list: " << std::endl;</pre>
  24
   25
                       for (int i = 1; i \le length; i++) {
-> 26
                               std::cout << \underline{i} << "." << groceries -> getEntry(i) << std::endl;
  27
                       }
  29
               } catch (std::exception &e) {
Target 0: (lab05) stopped.
(lldb) frame variable
(std::exception &) e = 0x0000000000000000
(std::exception &) e = 0x000000108551010 {}
(int) length = 4
(int) i = 1
(11db) frame variable *groceries
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > >) *groceries = {
  headptr = 0 \times 0000600000204020
  m_length = 4
}
(lldb) next
1. apples
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000023c1 lab05`main at main.cpp:25:33
                       int length = groceries -> getLength();
   22
   23
                        std::cout << "\ngrocery list: " << std::endl;</pre>
  24
-> 25
                        for (int i = 1; i \le length; i++) {
   26
                               std::cout << i << "." << groceries -> getEntry(i) << std::endl;
  27
  28
Target 0: (lab05) stopped.
(lldb) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000231d lab05`main at main.cpp:26:17
  24
                        std::cout << "\ngrocery list: " << std::endl;</pre>
                        for (int i = 1; i \le length; i++) {
  25
                               std::cout << \underline{i} << "." << groceries -> getEntry(i) << std::endl;
-> 26
                       }
  27
   28
   29
               } catch (std::exception &e) {
Target 0: (lab05) stopped.
(11db) next
2. bananas
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x00000001000023c1 lab05`main at main.cpp:25:33
   22
                       int length = groceries -> getLength();
  23
   24
                       std::cout << "\ngrocery list: " << std::endl;</pre>
-> 25
                       for (int i = 1; i \le length; i + + +) {
   26
                               std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
   27
                       }
  28
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x000000010000231d lab05`main at main.cpp:26:17
```

```
23
                         std::cout << "\ngrocery list: " << std::endl;</pre>
   24
                         for (int i = 1; i \le length; i++) {
   25
-> 26
                                 std::cout << \underline{i} << ". " << groceries \rightarrow getEntry(i) << std::endl;
   27
   28
   29
                } catch (std::exception &e) {
Target 0: (lab05) stopped.
(11db) next
3. sweet potatoes
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x00000001000023c1 lab05`main at main.cpp:25:33
                        int length = groceries -> getLength();
   22
   23
                         std::cout << "\ngrocery list: " << std::endl;</pre>
   24
                         for (int i = 1; i \le length; i++) {
-> 25
                                 std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
   26
   27
                         }
   28
Target 0: (lab05) stopped.
(lldb) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x000000010000231d lab05`main at main.cpp:26:17
   24
                         std::cout << "\ngrocery list: " << std::endl;</pre>
                         for (int i = 1; i \le length; i++) {
   25
-> 26
                                 std::cout << \underline{i} << "." << groceries -> getEntry(i) << std::endl;
   27
                         }
   28
                } catch (std::exception &e) {
   29
Target 0: (lab05) stopped.
(11db) next
4. argula
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x00000001000023c1 lab05`main at main.cpp:25:33
   22
                         int length = groceries -> getLength();
   24
                         std::cout << "\ngrocery list: " << std::endl;</pre>
-> 25
                         for (int i = 1; i \leftarrow length; i++) {
   26
                                 std::cout << i << ". " << groceries -> getEntry(i) << std::endl;</pre>
   27
   28
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x00000001000024ac lab05`main at main.cpp:29:2
                                 std::cout << i << ". " << groceries -> getEntry(i) << std::endl;
   26
   27
   28
-> 29
                } catch (std::exception &e) {
   30
                         std::cerr << e.what() << std::endl;</pre>
   31
   32
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x0000000100002485 lab05 main at main.cpp:33:2
                         std::cerr << e.what() << std::endl;</pre>
   31
   32
 -> 33
                groceries -> ~LinkedList<std::string>();
   34
   35
                std::cout << std::endl;
                return (0);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
```

```
frame #0: 0x000000100002940 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Linked
112 }
  113
  114 template <typename T>
-> 115 LinkedList<T>::~LinkedList(){
              clear();
  117 }
  118
Target 0: (lab05) stopped.
(11dh) thread sten-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003840 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::~Linked
113
  114 template <typename T>
  115 LinkedList<T>::~LinkedList(){
-> 116
              clear();
  117 }
  118
  119
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100003878 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:94:10
  92
      template <typename T>
  93
      void LinkedList<T>::clear() {
-> 94
              while (!isEmpty()) {
                     remove(1);
  95
  96
  97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000038bc lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::isEmpty
(this=0x00006000000008010) const at LinkedList.hpp:31:15
  28
  29
      template <typename T>
  30
      bool LinkedList<T>::isEmpty() const {
-> 31
             if (m_length == 0) {
                     return(true);
  32
  33
              }
  34
             return(false):
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000038cf lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
if (m_length == 0) {
  31
  32
                     return(true);
  33
-> 34
              return(false);
  35
      }
  36
  37
      template <typename T>
Target 0: (lab05) stopped.
(11db) thread step-in
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000038d3 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
32
                     return(true);
  33
  34
              return(false);
-> 35
      }
  36
  37
      template <typename T>
```

```
38  int LinkedList<T>::getLength() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0 \times 000000010000387d \ lab 05 `Linked List < std::\_1:: basic\_string < char, \ std::\_1:: char\_traits < char>, \ std::\_1:: allocator < char> > :: clear(traits < char) < char> < char> > :: clear(traits < char) < char> > :: clear(traits < char) < char> < char) < char < char < char < char) < char < cha
his=0x00006000000008010) at LinkedList.hpp:94:9
    91
     92
            template <typename T>
    93
            void LinkedList<T>::clear() {
-> 94
                         while (!isEmptv()) {
     95
                                      remove(1);
     96
    97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003890 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:95:3
     92
           template <typename T>
            void LinkedList<T>::clear() {
    93
    94
                        while (!isEmpty()) {
-> 95
                                      remove(1);
                         }
    96
     97
            }
    98
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1. queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000001000038f9 lab05`LinkedList<std::_1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:70:34
    67 template <typename T>
     68 bool LinkedList<T>::remove(int position) {
     69
                         bool valid_position = (position \geq = 1) && (position <= m_length);
-> 70
    71
                          if (valid position) {
    72
                                      Node<T>* prev ptr = nullptr;
                                      Node<T>* target_ptr = nullptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0\times000000010000391e \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::remove(
68 bool LinkedList<T>::remove(int position) {
    69
     70
                         bool valid_position = (position >= 1) && (position <= m_length);</pre>
-> 71
                         if (valid_position) {
    72
                                      Node<T>* prev ptr = nullptr;
                                      Node<T>* target_ptr = nullptr;
    74
                                      if (position == 1) {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003928 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:72:12
    69
     70
                          bool valid_position = (position >= 1) && (position <= m_length);</pre>
                         if (valid_position) {
    71
-> 72
                                      Node<T>* prev_ptr = nullptr;
    73
                                      Node<T>* target_ptr = nullptr;
     74
                                      if (position == 1) {
                                                    target_ptr = headptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x000000100003930 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:73:12
    70
                         bool valid_position = (position >= 1) && (position <= m_length);</pre>
```

```
if (valid_position) {
   71
  72
                       Node<T>* prev_ptr = nullptr;
                       Node<T>* target_ptr = nullptr;
-> 73
  74
                       if (position == 1) {
  75
                               target_ptr = headptr;
  76
                               headptr = headptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003938 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:74:16
              if (valid_position) {
  72
                      Node<T>* prev_ptr = nullptr;
   73
                       Node<T>* target_ptr = nullptr;
-> 74
                       if (position == 1) {
  75
                               target ptr = headptr:
                               headptr = headptr -> getNext();
  77
                       } else {
Target 0: (lab05) stopped.
(11db) frame variable
(int) position = 1
(bool) valid_position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > > *) prev_ptr = nullptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> >> *) target_ptr = nullptr
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003946 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:75:17
   72
                       Node<T>* prev_ptr = nullptr;
  73
                       Node<T>* target_ptr = nullptr;
  74
                       if (position == 1) {
-> 75
                               target_ptr = headptr;
  76
                              headptr = headptr -> getNext();
  77
                       } else {
   78
                               prev_ptr = getNodeAt(position - 1);
Target 0: (lab05) stopped.
(11db) frame variable target_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame \ \#0: \ 0\times000000010000394d \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::remove(
this=0x00006000000000000010, position=1) at LinkedList.hpp:76:14
  73
                       Node<T>* target_ptr = nullptr;
  74
                       if (position == 1) {
   75
                               target_ptr = headptr;
-> 76
                               headptr = \underline{headptr} \rightarrow getNext();
                       } else {
  77
                               prev_ptr = getNodeAt(position - 1);
  79
                               target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) frame variable target ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = 0x0000600000204020
(11db) frame variable *target ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *target_ptr = {
 entry = "apples"
 next\_node = 0x0000600000204040
(11db) frame variable target_ptr
Available completions:
       this
       position
       valid_position
       prev_ptr
       target ptr
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
    frame #0: 0x000000010000395f lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:77:3
```

```
if (position == 1) {
   74
  75
                               target_ptr = headptr;
   76
                               headptr = headptr -> getNext();
-> 77
                       <u>}</u> else {
  78
                               prev_ptr = getNodeAt(position - 1);
  79
                               target_ptr = prev_ptr -> getNext();
  80
                               prev_ptr -> setNext(target_ptr -> getNext());
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame #0: 0x0000001000039a5 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x000060000000000010, position=1) at LinkedList.hpp:82:3
                               target_ptr = prev_ptr -> getNext();
  80
                               prev_ptr -> setNext(target_ptr -> getNext());
  81
                       target_ptr -> setNext(nullptr);
-> 82
                       delete target_ptr;
  84
                       target_ptr = nullptr;
  85
                       m length--;
Target 0: (lab05) stopped.
(11db) next
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step over
   frame \ \#0: \ 0\times00000001000039ae \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::remove(
prev_ptr -> setNext(target_ptr -> getNext());
  81
                       }
  82
                       target_ptr -> setNext(nullptr);
-> 83
                       delete target_ptr;
  84
                       target_ptr = nullptr;
   85
                       m_length--;
               } else {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003a70 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::~Node(this=0x
0000600000204020) at Node.h:5:7
       #define Node_h
  3
  4
       template <typename T>
-> 5
       class Node {
   6
  7
       private:
               T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003a90 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::~Node(this=0x
0000600000204020) at Node.h:5:7
  2
       #define Node_h
  3
  4
       template <typename T>
-> 5
       class <u>Node</u> {
  6
  8
               T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003a75 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204020) at Node.h:5:7
  2
       #define Node_h
  3
  4
       template <typename T>
       class <u>Node</u> {
  6
  7
       private:
  8
              T entry;
Target 0: (lab05) stopped.
```

```
(11db) thread step-in
Process 51036 stopped
* thread #1. gueue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039c9 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:83:3
  80
                               prev ptr -> setNext(target ptr -> getNext());
   81
                       }
  82
                       target ptr -> setNext(nullptr);
-> 83
                       delete target ptr;
  84
                        target_ptr = nullptr;
  85
                       m lenath--:
  86
               } else {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame \ \#0: \ 0 \times 00000001000039d6 \ lab 05 `Linked List < std::\_1::basic\_string < char, \ std::\_1::char\_traits < char>, \ std::\_1::allocator < char> > ::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:84:14
  81
                       }
   82
                        target ptr -> setNext(nullptr);
   83
                        delete target_ptr;
-> 84
                        target_ptr = nullptr;
  85
                       m lenath--:
               } else {
   86
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  87
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000039de lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:85:11
                        target_ptr -> setNext(nullptr);
  83
                       delete target_ptr;
  84
                       target ptr = nullptr:
-> 85
                       m_length_--;
  86
               } else {
  87
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000001000039e7 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:86:2
  83
                       delete target ptr;
   84
                        target ptr = nullptr;
  85
                       m_length--;
               <u>}</u> else {
-> 86
   87
                        throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
               }
               return (valid_position);
  89
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003a42 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
86
               } else {
  87
                       throw (std::runtime error("position is invalid, and thus the node requested to be removed does not exist.")):
   88
-> 89
                return (valid_position);
       }
  90
   91
  92
      template <typename T>
Target 0: (lab05) stopped.
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000000000010
(int) position = 1
(bool) valid_position = true
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000010000389a lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
```

```
91
          92
                         template <typename T>
          93
                          void LinkedList<T>::clear() {
 -> 94
                                                    while (!isEmpty()) {
          95
                                                                               remove(1);
          96
         97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
             frame \ \#0: \ 0 \times 0000000100003878 \ lab 05 `LinkedList < std::\_1::basic\_string < char, \ std::\_1::char\_traits < char >, \ std::\_1::allocator < char > > ::clear(traits < char) < char > ::clear(traits < char) < 
his=0x00006000000008010) at LinkedList.hpp:94:10
          91
          92
                        template <typename T>
          93 void LinkedList<T>::clear() {
  -> 94
                                                    while (!isEmpty()) {
          95
                                                                               remove(1);
          96
          97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
            frame #0: 0x0000001000038bc lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::isEmpty
28
                         template <typename T>
          30 bool LinkedList<T>::isEmpty() const {
 -> 31
                                                   if (m_length == 0) {
          32
                                                                              return(true);
          33
                                                   return(false);
         34
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
             frame \ \#0: \ 0x0000001000038cf \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::sEmpty \ frame 
 31
                                                    if (m_length == 0) {
          32
                                                                              return(true):
          33
                                                    }
  -> 34
                                                    return(false);
         35 }
          36
          37 template <typename T>
Target 0: (lab05) stopped.
  (11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
             frame \ \#0: \ 0 \times 00000001000038d3 \ lab 05 `Linked List < std::\_1::basic\_string < char, \ std::\_1::char\_traits < char>, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char) < char, \ std::\_1::allocator < char> > ::is Empty < char, \ std::\_1::allocator < char) < char, \ std::\_1::allocator < ch
 32
                                                                              return(true):
          33
         34
                                                    return(false);
 -> 35 <u>}</u>
          37
                        template <tvpename T>
                        int LinkedList<T>::getLength() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
              frame #0: 0x000000010000387d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
91
          92 template <typename T>
          93 void LinkedList<T>::clear() {
 -> 94
                                                   while (!isEmpty()) {
          95
                                                                               remove(1);
          96
          97 }
```

```
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame \ \#0: \ 0 \times 0000000100003890 \ lab 05 `Linked List < std::\_1:: basic\_string < char, \ std::\_1:: char\_traits < char>, \ std::\_1:: allocator < char> > :: clear(traits < char), \ description = (traits < char), \ description = 
his=0x00006000000008010) at LinkedList.hpp:95:3
              template <typename T>
      93 void LinkedList<T>::clear() {
                                while (!isEmpty()) {
      94
-> 95
                                                  remove(1);
      96
      97 }
      98
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame #0: 0x0000001000038f9 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:70:34
               template <typename T>
      67
                bool LinkedList<T>::remove(int position) {
      69
-> 70
                                 bool valid_position = (position >= 1) && (position <= m_length);</pre>
     71
                                 if (valid_position) {
     72
                                                 Node<T>* prev_ptr = nullptr;
                                                  Node<T>* target_ptr = nullptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame #0: 0x000000010000391e lab05`LinkedList<std::_1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
68 bool LinkedList<T>::remove(int position) {
      69
      70
                                 bool valid_position = (position >= 1) && (position <= m_length);</pre>
-> 71
                                if (valid_position) {
      72
                                                  Node<T>* prev ptr = nullptr;
      73
                                                  Node<T>* target_ptr = nullptr;
     74
                                                  if (position == 1) {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame #0: 0x0000000100003928 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
69
      70
                                 bool valid_position = (position >= 1) && (position <= m_length);</pre>
     71
                                 if (valid_position) {
-> 72
                                                  Node<T>* prev_ptr = nullptr;
     73
                                                  Node<T>* target_ptr = nullptr;
      74
                                                  if (position == 1) {
                                                                   target_ptr = headptr;
Target 0: (lab05) stopped.
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000008010
(int) position = 1
(bool) valid position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) prev_ptr = nullptr
(Node < std::basic\_string < char, std::char\_traits < char>, std::allocator < char> > *) target\_ptr = nullptr < char> > (null target) target = nullptr < char < ch
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000008010
(int) position = 1
(bool) valid position = true
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > > *) prev_ptr = nullptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) target_ptr = nullptr
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame #0: 0x000000100003930 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:73:12
     70
                                 bool valid_position = (position >= 1) && (position <= m_length);</pre>
      71
                                 if (valid_position) {
      72
                                                  Node<T>* prev_ptr = nullptr;
```

```
-> 73
                        Node<T>* target_ptr = nullptr;
  74
                        if (position == 1) {
   75
                                target ptr = headptr;
   76
                                headptr = headptr -> getNext();
Target 0: (lab05) stopped.
(lldb) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000100003938 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:74:16
  71
                if (valid_position) {
   72
                       Node<T>* prev_ptr = nullptr;
  73
                        Node<T>* target_ptr = nullptr;
-> 74
                        if (position == 1) {
   75
                                target_ptr = headptr;
   76
                                headptr = headptr -> getNext();
  77
                       } else {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000100003946 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:75:17
                       Node<T>* prev_ptr = nullptr;
   73
                        Node<T>* target_ptr = nullptr;
   74
                        if (position == 1) {
-> 75
                                target_ptr = headptr;
                                headptr = headptr -> getNext();
   76
   77
                       } else {
  78
                                prev_ptr = getNodeAt(position - 1);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000010000394d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:76:14
  73
                       Node<T>* target ptr = nullptr;
   74
                        if (position == 1) {
  75
                                target_ptr = headptr;
-> 76
                                headptr = headptr -> getNext();
   77
                        } else {
   78
                                prev_ptr = getNodeAt(position - 1);
   79
                                target ptr = prev ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100002abc lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::getNext(this=
0x0000600000204040) const at Node.hpp:38:9
  35
       template <typename T>
   36
  37
       Node<T>* Node<T>::getNext() const {
-> 38
               return(next_node);
  39 }
Target 0: (lab05) stopped.
(11db) frame variable
(const Node<std::basic string<char, std::char traits<char>, std::allocator<char> > *) this = 0x0000600000204040
(11db) frame variable --no-args
(11db) frame variable next node
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> >> *) next_node = 0x0000600000204060
(11db) frame variable *next_node
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *next_node = {
  entry = "sweet potatoes"
  next\_node = 0x0000600000204080
}
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000100003955 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:76:25
  73
                        Node<T>* target_ptr = nullptr;
   74
                        if (position == 1) {
   75
                                target_ptr = headptr;
```

```
-> 76
                              headptr = headptr -> getNext();
  77
                      } else {
  78
                              prev_ptr = getNodeAt(position - 1);
  79
                              target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000010000395f lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:77:3
  74
                      if (position == 1) {
  75
                              target_ptr = headptr;
  76
                              headptr = headptr -> getNext();
-> 77
                      } else {
   78
                              prev_ptr = getNodeAt(position - 1);
  79
                              target_ptr = prev_ptr -> getNext();
  80
                              prev_ptr -> setNext(target_ptr -> getNext());
Target 0: (lab05) stopped.
(lldb) frame variable *headptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *headptr = {
 entry = "sweet potatoes"
 next\_node = 0x0000600000204080
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039a5 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
target_ptr = prev_ptr -> getNext();
  80
                              prev_ptr -> setNext(target_ptr -> getNext());
  81
                      }
                      target_ptr -> setNext(nullptr);
-> 82
  83
                       delete target_ptr;
  84
                      target ptr = nullptr:
                      m_length--;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000029b0 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> >>::setNext(this=
25
  26
       template <typename T>
  27
       void Node<T>::setNext(Node<T>* new_next_node) {
-> 28
               next_node = new_next_node;
  29
  30
  31 template <typename T>
Target 0: (lab05) stopped.
(lldb) frame variable
(Node<std::basic\_string<char, std::char\_traits<char>, std::allocator<char> > *) this = 0x0000600000204040
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) new_next_node = nullptr
(11db) frame variable next_node
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) next_node = 0x0000600000204060
(lldb) frame variable *next node
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > >) *next_node = {
 entry = "sweet potatoes"
 next_node = 0x0000600000204080
}
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000029b8 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> >>::setNext(this=
0x0000600000204040, new_next_node=0x000000000000000) at Node.hpp:29:1
  26
       template <typename T>
   27
       void Node<T>::setNext(Node<T>* new_next_node) {
  28
               next_node = new_next_node;
-> 29
       }
  31
      template <typename T>
  32
      T Node<T>::getEntry() const {
Target 0: (lab05) stopped.
(11db) frame variable *next_node
```

```
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > >) *next_node = <parent is NULL>
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0x0000001000039ae \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:83:10
      80
                                                                            prev_ptr -> setNext(target_ptr -> getNext());
       81
      82
                                                          target_ptr -> setNext(nullptr);
 -> 83
                                                         delete target_ptr;
      84
                                                         target_ptr = nullptr;
       85
                                                          m_length--;
                                   } else {
      86
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0x000000100003a70 \ lab05`Node<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::~Node(this=0x) \ frame \ fram
0000600000204040) at Node.h:5:7
      2
                  #define Node_h
      3
                template <typename T>
 -> 5
               class <u>Node</u> {
      6
      7
                  private:
      8
                                     T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame #0: 0x000000100003a90 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::~Node(this=0x
0000600000204040) at Node.h:5:7
      2 #define Node_h
      3
      4
              template <typename T>
-> 5
                 class Node {
      7
                  private:
                                     T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0x000000100003a75 \ lab05`Node<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > >::~Node(this=0x) \ frame \ fram
0000600000204040) at Node.h:5:7
      2
                 #define Node_h
      3
                  template <typename T>
-> 5
                  class <u>Node</u> {
      6
                  private:
      8
                                     T entry;
Target 0: (lab05) stopped.
 (11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
         frame \ \#0: \ 0x0000001000039c9 \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:83:3
      80
                                                                            prev_ptr -> setNext(target_ptr -> getNext());
       81
                                                          target_ptr -> setNext(nullptr);
      82
 -> 83
                                                          delete target ptr;
       84
                                                          target_ptr = nullptr;
       85
                                                         m_length--;
                                      } else {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
        frame #0: 0x00000001000039d6 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:84:14
       81
                                                         }
```

```
82
                      target_ptr -> setNext(nullptr);
  83
                      delete target_ptr;
-> 84
                      target ptr = nullptr;
  85
                      m_length--;
  86
               } else {
  87
                      throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
Target 0: (lab05) stopped.
(11db) frame variable *target ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *target_ptr = {
 entry = Summary Unavailable
 next node = nullptr
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039de lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:85:11
                      target_ptr -> setNext(nullptr);
  83
                      delete target_ptr;
  84
                      target ptr = nullptr;
 > 85
                      m_length<u>--</u>;
              } else {
  86
  87
                      throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
               }
  88
Target 0: (lab05) stopped.
(11db) frame variable *target_ptr
(11db) thread step-in
Process 51036 stopped
* thread #1. queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000039e7 lab05`LinkedList<std::_1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000000010, position=1) at LinkedList.hpp:86:2
  83
                      delete target ptr:
   84
                      target_ptr = nullptr;
  85
                      m_length--;
              <u>}</u> else {
-> 86
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  87
               }
  88
               return (valid_position);
Target 0: (lab05) stopped.
(11db) frame variable *target_ptr
(Node<std::basic_string<char, std::char_traits<char>, std::allocator<char> > ) *target_ptr = <parent is NULL>
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100003a42 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > ::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:89:10
  86
              } else {
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  87
              }
  88
-> 89
               return (valid_position);
  90
       }
  92 template <typename T>
Target 0: (lab05) stopped.
(11db) frame variables
invalid command 'frame variables'.
(11db) frame variable
(LinkedList<std::basic_string<char, std::char_traits<char>, std::allocator<char> > *) this = 0x00006000000000010
(int) position = 1
(bool) valid_position = true
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000010000389a lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
91
  92
      template <typename T>
  93 void LinkedList<T>::clear() {
               while (!isEmpty()) {
-> 94
  95
                      remove(1);
```

```
96
  97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100003878 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
91
   92
       template <typename T>
  93
      void LinkedList<T>::clear() {
              while (!isEmpty()) {
  95
                      remove(1);
  96
  97
      }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000038bc lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
(this=0x00006000000008010) const at LinkedList.hpp:31:15
  28
  29
      template <typename T>
  30 bool LinkedList<T>::isEmpty() const {
-> 31
              if (m_length == 0) {
  32
                     return(true);
   33
              }
              return(false):
  34
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000038cf lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
if (m_length == 0) {
  32
                     return(true);
  33
-> 34
              return(false);
  35
      }
  36
  37
      template <typename T>
Target 0: (lab05) stopped.
(11db) thread step-in
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000038d3 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > ::isEmpty
32
                     return(true);
   33
  34
              return(false);
-> 35
      }
  36
  37
      template <typename T>
  38 int LinkedList<T>::getLength() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000010000387d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
91
   92
      template <typename T>
   93
      void LinkedList<T>::clear() {
-> 94
              while (!isEmpty()) {
  95
                      remove(1):
   96
  97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100003890 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:95:3
```

```
92 template <typename T>
    93 void LinkedList<T>::clear() {
                         while (!isEmptv()) {
    94
-> 95
                                      remove(1);
    96
    97
           }
    98
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000001000038f9 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:70:34
    67 template <typename T>
    68
           bool LinkedList<T>::remove(int position) {
    69
                         bool valid_position = (position \geq = 1) && (position <= m_length);
-> 70
    71
                         if (valid_position) {
    72
                                      Node<T>* prev_ptr = nullptr;
    73
                                      Node<T>* target ptr = nullptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0\times000000010000391e \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::remove(
68 bool LinkedList<T>::remove(int position) {
    69
                         bool valid_position = (position >= 1) && (position <= m_length);</pre>
-> 71
                         if (valid_position) {
    72
                                      Node<T>* prev_ptr = nullptr;
                                      Node<T>* target_ptr = nullptr;
    74
                                      if (position == 1) {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003928 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x000060000000000010, position=1) at LinkedList.hpp:72:12
    69
    70
                         bool valid_position = (position >= 1) && (position <= m_length);</pre>
    71
                         if (valid_position) {
-> 72
                                      Node<T>* prev_ptr = nullptr;
    73
                                      Node<T>* target_ptr = nullptr;
                                      if (position == 1) {
    74
    75
                                                   target ptr = headptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0\times0000000100003930 \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::remove(the control of the co
this=0x0000600000008010, position=1) at LinkedList.hpp:73:12
    70
                         bool valid_position = (position >= 1) && (position <= m_length);</pre>
    71
                         if (valid position) {
    72
                                      Node<T>* prev_ptr = nullptr;
-> 73
                                      Node<T>* <u>target_ptr</u> = nullptr;
    74
                                      if (position == 1) {
    75
                                                   target_ptr = headptr;
                                                   headptr = headptr -> getNext();
    76
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003938 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
71
                         if (valid_position) {
    72
                                      Node<T>* prev_ptr = nullptr;
                                      Node<T>* target_ptr = nullptr;
    73
-> 74
                                      if (position == 1) {
    75
                                                   target_ptr = headptr;
    76
                                                   headptr = headptr -> getNext();
    77
                                      } else {
Target 0: (lab05) stopped.
```

```
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003946 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x000060000000000010, position=1) at LinkedList.hpp:75:17
  72
                       Node<T>* prev_ptr = nullptr;
   73
                       Node<T>* target_ptr = nullptr;
  74
                       if (position == 1) {
-> 75
                                target ptr = headptr;
  76
                                headptr = headptr -> getNext();
   77
                       } else {
  78
                                prev_ptr = getNodeAt(position - 1);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame \ \#0: \ 0x00000010000394d \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:76:14
  73
                       Node<T>* target_ptr = nullptr;
   74
                       if (position == 1) {
   75
                                target_ptr = headptr;
-> 76
                                headptr = \underline{headptr} \rightarrow getNext();
  77
                       } else {
                               prev_ptr = getNodeAt(position - 1);
   78
  79
                                target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100002abc lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::getNext(this=
0x0000600000204060) const at Node.hpp:38:9
   35
  36
       template <typename T>
  37
       Node<T>* Node<T>::getNext() const {
-> 38
               return(next_node);
  39 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003955 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:76:25
  73
                       Node<T>* target_ptr = nullptr;
   74
                        if (position == 1) {
  75
                                target ptr = headptr;
-> 76
                               headptr = headptr -> getNext();
  77
                       } else {
  78
                                prev_ptr = getNodeAt(position - 1);
                                target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x000000010000395f lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
74
                       if (position == 1) {
   75
                                target ptr = headptr;
   76
                                headptr = headptr -> getNext();
-> 77
                       } else {
   78
                                prev_ptr = getNodeAt(position - 1);
   79
                                target_ptr = prev_ptr -> getNext();
  80
                                prev ptr -> setNext(target ptr -> getNext());
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000039a5 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:82:3
   79
                               target_ptr = prev_ptr -> getNext();
   80
                                prev_ptr -> setNext(target_ptr -> getNext());
  81
                       }
-> 82
                       target_ptr -> setNext(nullptr);
  83
                        delete target_ptr;
```

```
84
                       target_ptr = nullptr;
  85
                       m_length--;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000029b0 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::setNext(this=
0x0000600000204060, new_next_node=0x000000000000000) at Node.hpp:28:14
   25
  26
       template <typename T>
  27
       void Node<T>::setNext(Node<T>* new next node) {
-> 28
               next_node = new_next_node;
  29 }
  30
  31
      template <typename T>
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000029b8 lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::setNext(this=
0x0000600000204060, new_next_node=0x0000000000000000) at Node.hpp:29:1
  26 template <typename T>
  27
      void Node<T>::setNext(Node<T>* new_next_node) {
  28
               next_node = new_next_node;
-> 29 <u>}</u>
  30
   31
       template <typename T>
  32  T Node<T>::getEntry() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000039ae lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:83:10
                               prev_ptr -> setNext(target_ptr -> getNext());
  81
                       }
  82
                       target ptr -> setNext(nullptr);
-> 83
                       delete target_ptr;
  84
                        target_ptr = nullptr;
  85
                       m_length--;
  86
               } else {
Target 0: (lab05) stopped.
(11db) thread step-in
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003a70 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204060) at Node.h:5:7
  2
      #define Node h
  3
  4
       template <typename T>
-> 5
       class Node {
  6
       private:
  7
  8
               T entry:
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003a90 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204060) at Node.h:5:7
  2
       #define Node_h
  3
       template <typename T>
<del>-></del> 5
       class <u>Node</u> {
  6
   7
       private:
  8
               T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003a75 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204060) at Node.h:5:7
```

```
2
       #define Node h
  3
  4
       template <typename T>
-> 5
       class Node {
  6
  7
       private:
  8
               T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039c9 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x000060000000000010, position=1) at LinkedList.hpp:83:3
                              prev_ptr -> setNext(target_ptr -> getNext());
  80
  81
  82
                      target_ptr -> setNext(nullptr);
-> 83
                       delete target_ptr;
  84
                       target_ptr = nullptr;
  85
                      m length--;
               } else {
  86
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039d6 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
81
                      target_ptr -> setNext(nullptr);
  82
  83
                      delete target_ptr;
-> 84
                       target_ptr = nullptr;
  85
                      m length--;
  86
  87
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039de lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x000060000000000010, position=1) at LinkedList.hpp:85:11
  82
                      target_ptr -> setNext(nullptr);
  83
                      delete target_ptr;
  84
                      target_ptr = nullptr;
-> 85
                      m length--:
  86
               } else {
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  87
  88
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039e7 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
83
                      delete target_ptr;
  84
                      target ptr = nullptr:
  85
                      m_length--;
-> 86
               <u>}</u> else {
  87
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
               return (valid position):
  89
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000000100003a42 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> >>::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:89:10
  86
               } else {
  87
                       throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
-> 89
               return (valid_position);
  90
      }
  91
  92
      template <typename T>
Target 0: (lab05) stopped.
```

```
(11db) thread step-in
Process 51036 stopped
* thread #1. gueue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000010000389a lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:94:2
     91
     92
            template <typename T>
            void LinkedList<T>::clear() {
    93
-> 94
                          while (!isEmpty()) {
    95
                                        remove(1);
    96
    97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0\times0000000100003878 \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > :::clear(traits<char), \ std::\_1::allocator<char> > ::clear(traits<char), \ std::\_1::allocator<char> > ::clear(traits<char), \ std::\_1::allocator<char> > ::clear(traits<char), \ std::\_1::allocator<char) > ::clear(traits<ch
his=0x00006000000008010) at LinkedList.hpp:94:10
    91
     92
            template <typename T>
             void LinkedList<T>::clear() {
     93
-> 94
                          while (!isEmpty()) {
     95
                                        remove(1);
     96
    97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000001000038bc lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
28
    29
             template <typename T>
    30
            bool LinkedList<T>::isEmptv() const {
-> 31
                          if (m_{length} == 0) {
    32
                                       return(true);
    33
                          }
    34
                          return(false);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000001000038cf lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::isEmpty
(this=0x0000600000008010) const at LinkedList.hpp:34:2
                          if (m length == 0) {
    31
    32
                                        return(true);
    33
                          }
                          return(false);
-> 34
    35
            }
    36
    37
           template <typename T>
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000001000038d3 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
32
                                        return(true);
    33
                          }
    34
                          return(false);
-> 35
            }
    36
    37
           template <typename T>
    38 int LinkedList<T>::getLength() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000010000387d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:94:9
    91
     92
            template <typename T>
    93
           void LinkedList<T>::clear() {
```

```
-> 94
                          while (!isEmpty()) {
    95
                                       remove(1);
    96
    97
           }
Target 0: (lab05) stopped.
(lldb) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003890 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:95:3
    92 template <typename T>
     93 void LinkedList<T>::clear() {
    94
                         while (!isEmpty()) {
                                       remove(1);
-> 95
     96
    97
           }
    98
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0 \times 00000001000038f9 \ lab 05 `Linked List < std::\_1:: basic\_string < char, \ std::\_1:: char\_traits < char>, \ std::\_1:: allocator < char> > :: remove ( list < char) < list < char) < list < char < char) < char < char < char) < 
this=0x0000600000000000010, position=1) at LinkedList.hpp:70:34
     67 template <typename T>
     68 bool LinkedList<T>::remove(int position) {
    69
-> 70
                          bool valid_position = (position \geq = 1) && (position <= m_length);
                          if (valid_position) {
    71
                                       Node<T>* prev_ptr = nullptr;
    73
                                       Node<T>* target_ptr = nullptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x000000010000391e lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:71:6
    68 bool LinkedList<T>::remove(int position) {
     69
                          bool valid_position = (position >= 1) && (position <= m_length);
    70
-> 71
                          if (valid_position) {
    72
                                       Node<T>* prev_ptr = nullptr;
    73
                                       Node<T>* target_ptr = nullptr;
    74
                                       if (position == 1) {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x000000100003928 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:72:12
     70
                          bool valid_position = (position >= 1) && (position <= m_length);</pre>
     71
                          if (valid_position) {
-> 72
                                        Node<T>* prev_ptr = nullptr;
     73
                                        Node<T>* target ptr = nullptr:
     74
                                        if (position == 1) {
    75
                                                     target_ptr = headptr;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003930 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:73:12
                          bool valid_position = (position >= 1) && (position <= m_length);</pre>
     71
                          if (valid_position) {
     72
                                       Node<T>* prev_ptr = nullptr;
 -> 73
                                        Node<T>* target_ptr = nullptr;
    74
                                        if (position == 1) {
     75
                                                     target ptr = headptr;
                                                     headptr = headptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
```

```
frame #0: 0x0000000100003938 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:74:16
              if (valid position) {
  71
  72
                      Node<T>* prev_ptr = nullptr;
                      Node<T>* target_ptr = nullptr;
  73
-> 74
                      if (position == 1) {
                              target_ptr = headptr;
  75
  76
                              headptr = headptr -> getNext();
  77
                      } else {
Target 0: (lab05) stopped.
(11dh) thread sten-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003946 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
72
                      Node<T>* prev_ptr = nullptr;
                      Node<T>* target_ptr = nullptr;
  73
  74
                      if (position == 1) {
-> 75
                              target_ptr = headptr;
  76
                              headptr = headptr -> getNext();
  77
                              prev_ptr = getNodeAt(position - 1);
  78
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000010000394d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
Node<T>* target_ptr = nullptr;
  74
                      if (position == 1) {
  75
                              target_ptr = headptr:
> 76
                              headptr = headptr -> getNext();
  77
                      } else {
  78
                              prev_ptr = getNodeAt(position - 1);
  79
                              target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100002abc lab05`Node<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> >>::getNext(this=
0x0000600000204080) const at Node.hpp:38:9
  35
  36
       template <tvpename T>
  37
       Node<T>* Node<T>::getNext() const {
-> 38
              return(next_node);
  39 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003955 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:76:25
  73
                      Node<T>* target_ptr = nullptr;
  74
                      if (position == 1) {
  75
                              target_ptr = headptr;
-> 76
                              headptr = headptr -> getNext();
  77
                      } else {
                              prev_ptr = getNodeAt(position - 1);
  78
  79
                              target_ptr = prev_ptr -> getNext();
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000010000395f lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000008010, position=1) at LinkedList.hpp:77:3
  74
                      if (position == 1) {
  75
                              target_ptr = headptr;
                              headptr = headptr -> getNext();
  76
-> 77
                      } else {
  78
                              prev_ptr = getNodeAt(position - 1);
  79
                              target ptr = prev ptr -> getNext();
  80
                              prev_ptr -> setNext(target_ptr -> getNext());
Target 0: (lab05) stopped.
```

```
(11db) thread step-in
Process 51036 stopped
* thread #1. gueue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000001000039a5 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
79
                                                  target ptr = prev ptr -> getNext();
    80
                                                  prev_ptr -> setNext(target_ptr -> getNext());
    81
                                     }
-> 82
                                     target_ptr -> setNext(nullptr);
    83
                                      delete target_ptr;
    84
                                     target_ptr = nullptr:
                                     m_length--;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      25
    26
            template <typename T>
    27
            void Node<T>::setNext(Node<T>* new_next_node) {
-> 28
                         next_node = new_next_node;
    29
           }
    30
    31 template <typename T>
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x00000001000029b8 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::setNext(this=
0x0000600000204080, new_next_node=0x0000000000000000) at Node.hpp:29:1
    26
           template <typename T>
    27
            void Node<T>::setNext(Node<T>* new_next_node) {
    28
                         next node = new next node:
-> 29 <u>}</u>
    30
    31
           template <typename T>
           T Node<T>::getEntry() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000001000039ae lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:83:10
    80
                                                  prev_ptr -> setNext(target_ptr -> getNext());
    81
    82
                                      target_ptr -> setNext(nullptr);
-> 83
                                     delete target_ptr;
    84
                                      target_ptr = nullptr;
    85
                                     m_length--;
                        } else {
    86
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0x000000100003a70 \ lab05`Node<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > >::~Node(this=0x) \ frame \ fram
0000600000204080) at Node.h:5:7
    2
            #define Node_h
    3
    4
           template <typename T>
-> 5
            class Node {
    6
           private:
    8
                         T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x0000000100003a90 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204080) at Node.h:5:7
    2
           #define Node_h
    3
            template <typename T>
```

```
<del>-></del> 5
       class Node {
  6
  7
       private:
  8
               T entry;
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x0000000100003a75 lab05`Node<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::~Node(this=0x
0000600000204080) at Node.h:5:7
  2
       #define Node h
  4
       template <typename T>
-> 5
       class Node {
  6
  7
       private:
  8
               T entry:
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039c9 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:83:3
                                prev_ptr -> setNext(target_ptr -> getNext());
  81
                       }
  82
                        target ptr -> setNext(nullptr);
-> 83
                        delete target_ptr;
                        target_ptr = nullptr;
  84
                        m_length--;
  86
                } else {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039d6 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:84:14
  81
   82
                        target_ptr -> setNext(nullptr);
  83
                        delete target_ptr;
-> 84
                        target_ptr = nullptr;
  85
                        m_length--;
   86
                } else {
  87
                        throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000039de lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:85:11
  82
                        target_ptr -> setNext(nullptr);
  83
                        delete target_ptr;
                        target_ptr = nullptr;
-> 85
                        m_length_{--};
  86
                } else {
   87
                        throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
    frame #0: 0x00000001000039e7 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x00006000000008010, position=1) at LinkedList.hpp:86:2
  83
                       delete target_ptr;
   84
                        target_ptr = nullptr;
  85
                       m_length--;
-> 86
               <u>}</u> else {
  87
                        throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
                return (valid_position);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
```

```
frame #0: 0x000000100003a42 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::remove(
this=0x0000600000000000010, position=1) at LinkedList.hpp:89:10
  86
              } else {
  87
                     throw (std::runtime_error("position is invalid, and thus the node requested to be removed does not exist."));
  88
-> 89
              return (valid_position);
  90
      }
  91
  92
      template <typename T>
Target 0: (lab05) stopped.
(11db) frame variable m_length
(int) m_{length} = 0
(11db) frame variable m_length
(int) m length = 0
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000010000389a lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:94:2
  91
       template <typename T>
  92
      void LinkedList<T>::clear() {
  93
             while (!isEmpty()) {
-> 94
  95
                     remove(1);
  96
  97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000100003878 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::clear(t
91
  92 template <typename T>
  93 void LinkedList<T>::clear() {
-> 94
            while (!isEmpty()) {
  95
                     remove(1);
  96
  97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000038bc lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
28
  29 template <typename T>
  30 bool LinkedList<T>::isEmpty() const {
-> 31
              if (m_length <u>==</u> 0) {
  32
                     return(true);
              }
  33
  34
              return(false);
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000038c6 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
29 template <typename T>
  30 bool LinkedList<T>::isEmpty() const {
  31
              if (m_length == 0) {
                     return(true);
-> 32
  33
              }
  34
              return(false);
  35 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x0000001000038d3 lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::isEmpty
32
                     return(true);
  33
              }
```

```
return(false);
     34
-> 35
            }
     36
             template <typename T>
     37
     38
            int LinkedList<T>::getLength() const {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
       frame #0: 0x000000010000387d lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:94:9
     92
            template <typename T>
     93 void LinkedList<T>::clear() {
-> 94
                           while (!isEmpty()) {
     95
                                         remove(1);
                           }
     96
     97 }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
       frame #0: 0x00000010000389f lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::clear(t
his=0x00006000000008010) at LinkedList.hpp:97:1
     94
                         while (!isEmpty()) {
     95
                                         remove(1);
     96
<del>-></del> 97
             }
     99 template <typename T>
     100 T LinkedList<T>::getEntry(int position) {
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame #0: 0x000000100003845 lab05`LinkedList<std::_1::basic_string<char, std::_1::char_traits<char>, std::_1::allocator<char> > >::~Linked
114 template <typename T>
     115 LinkedList<T>::~LinkedList(){
-> 116
                           clear();
     117 }
     118
     119
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
       frame #0: 0x00000010000384a lab05`LinkedList<std::__1::basic_string<char, std::__1::char_traits<char>, std::__1::allocator<char> > ::~Linked
114 template <typename T>
     115 LinkedList<T>::~LinkedList(){
     116
                           clear();
 -> 117 <u>}</u>
     118
     119
     120
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
      frame \ \#0: \ 0x000000100002945 \ lab05`LinkedList<std::\_1::basic\_string<char, \ std::\_1::char\_traits<char>, \ std::\_1::allocator<char> > ::~LinkedList<std>::_1::basic\_string<char, \ std::_1::char\_traits<char>, \ std::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std>::_1::allocator<char> > ::~LinkedList<std ::_1::allocator<char> < ::_1::allocator<char> > ::_1::allocator<
114 template <typename T>
     115 LinkedList<T>::~LinkedList(){
     116
                           clear();
 -> 117 <u>}</u>
     118
     119
     120
Target 0: (lab05) stopped.
 (11db) thread step-in
Process 51036 stopped
```

```
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000010000248e lab05`main at main.cpp:33:15
   30
                       std::cerr << e.what() << std::endl:
   31
  32
-> 33
              groceries -> ~LinkedList<std::string>();
   34
  35
               std::cout << std::endl;
               return (0);
  36
Target 0: (lab05) stopped.
(11dh) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x000000010000249c lab05`main at main.cpp:35:12
               groceries -> ~LinkedList<std::string>();
  33
  34
-> 35
              std::cout << std::endl;
  36
               return (0);
   37
       }
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000001000024a3 lab05`main at main.cpp:36:2
             groceries -> ~LinkedList<std::string>();
   33
   35
              std::cout << std::endl;
-> 36
             return (0);
   37 }
  38
  39
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = step in
   frame #0: 0x00000002000194fe dyld`start + 462
dyld`start:
-> 0x2000194fe <+462>: movl %eax, %r14d
    0x200019501 <+465>: movq 0x8(%rbx), %rax
    0x200019505 <+469>: movl 0x34(%rax), %edi
    0x200019508 <+472>: xorl %esi, %esi
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = instruction step into
   frame #0: 0x0000000200019501 dyld`start + 465
dyld`start:
\rightarrow 0x200019501 <+465>: movg 0x8(%rbx), %rax
   0x200019505 <+469>: movl 0x34(%rax), %edi
   0x200019508 <+472>: xorl %esi, %esi
   0x20001950a <+474>: callq 0x200045a26
                                                        ; dyld3::MachOFile::isSimulatorPlatform(dyld3::Platform, dyld3::Platform*)
Target 0: (lab05) stopped.
(11db) thread step-in
Process 51036 stopped
* thread #1, queue = 'com.apple.main-thread', stop reason = instruction step into
   frame #0: 0x0000000200019505 dyld`start + 469
dyld`start:
-> 0x200019505 <+469>: movl 0x34(%rax), %edi
    0x200019508 <+472>: xorl %esi, %esi
    0x20001950a <+474>: callq 0x200045a26
                                                        ; dyld3::MachOFile::isSimulatorPlatform(dyld3::Platform, dyld3::Platform*)
    0x20001950f <+479>: testb %al, %al
Target 0: (lab05) stopped.
Quitting LLDB will kill one or more processes. Do you really want to proceed: [Y/n] Y
owner@morgan ~/D/1/E/EECS268-Lab05 (main)>
```