

Queue Iterator:

```
QueueIter.h
4  template <class QE>
5  class Queue {
6      public:
7
8
9
10
11
12
13
14
15
16  private:
17
18
19
20  };
```

Where does the iterator go?

What additional functions exist with an iterator? / Where do they go?

- 1.
- 2.
- 3.
- 4.

```
stlList.cpp
1  #include <list>
2  #include <string>
3  #include <iostream>
4
5  struct Animal {
6      std::string name, food;
7      bool big;
8      Animal(std::string name = "blob", std::string food = "you", bool
9      big = true) :
10         name(name), food(food), big(big) { /* none */ }
11  }
12
13  int main() {
14      Animal g("giraffe", "leaves", true),
15             p("penguin", "fish", false), b("bear");
16      std::list<Animal> zoo;
17
18      zoo.push_back(g);
19      zoo.push_back(p); // std::list's insertAtEnd
20      zoo.push_back(b);
21
22      for ( std::list<Animal>::iterator it = zoo.begin();
23            it != zoo.end(); it++ ) {
24          std::cout << (*it).name << " " << (*it).food << std::endl;
25      }
26
27      return 0;
28  }
```

Function Objects (“Functors”)

Purpose:

Example:

How is this accomplished?

Doubler.h/.cpp	
4	class Doubler {
5	public:
6	int operator() (int value);
7	};
3	int Doubler::operator() (int value) {
4	return value * 2;
5	}

What does Doubler do?

How do we know Doubler is a functor?

What can functors do that an ordinary function cannot do?

example1.cpp	
1	template<class Value, class Modifier>
2	Value modify(Value value, Modifier modifier) {
3	return modifier(value);
4	}
...	/* ... */
11	Doubler d;
12	Tripler t;
13	int value = 4;
14	modify<int, Doubler>(value, d);
15	modify<int, Tripler>(value, t);

How are functors used?

When is the modifier function valid?

example2.cpp	
1	template<class Iter, class Formatter>
2	void print(Iter first, Iter second, Formatter printer) {
3	while (first != second) {
4	printer(*first);
5	first++;
6	}
7	}

This is a function called _____ whose inputs are two _____ and a _____.

This function appears to:

Trees

CS 225 – Things To Be Doing:

1. Exam #4 starts Monday (“Programming Exam”, MP2)
2. MP3 has been released; up to +7 for submitting by Oct. 2 (11:59pm)
3. lab_quacks due Sunday, Oct. 1 (11:59pm)
4. Daily POTDs