Queue Iterator:

```cpp
template <class QE>
class Queue {
public:
    class QueueIterator : 
        public std::iterator<std::bidirectional_iterator_tag, T> {
        public:
            QueueIterator(unsigned index);
            QueueIterator& operator++();
            bool operator==(const QueueIterator &other);
            bool operator!=(const QueueIterator &other);
            QE& operator*();
            QE* operator->();
        private:
            int location_;
    }

private:
    QE* arr_; unsigned capacity_, count_, entry_, exit_;
};
```

Does an instance of a `QueueIterator` have access to the `Queue arr_`?

Two big takeaways:

1.

2.

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Trees!

“The most important non-linear data structure in computer science.”
- David Knuth, The Art of Programming, Vol. 1

A tree is:

- What’s the longest “word” you can make using the vertex labels in the tree (repeats allowed)?
- Find an edge that is not on the longest path in the tree. Give that edge a reasonable name.
- One of the vertices is called the root of the tree. Which one?
- Make a “word” containing the names of the vertices that have a parent but no sibling.
- How many parents does each vertex have?
- Which vertex has the fewest children?
- Which vertex has the most ancestors?
- Which vertex has the most descendants?
- List all the vertices is b’s left subtree.
- List all the leaves in the tree.
Definition: Binary Tree

A binary tree $T$ is either:

**Tree Property: Tree Height**

**Tree Property: Full**

**Tree Property: Perfect**

**Tree Property: Complete**

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CS 225 – Things To Be Doing:

1. Exam #4 currently ongoing (“Programming Exam”, MP2)
2. MP3 is starting Week 2; up to +7 for submitting by Oct. 2 (11:59pm)
3. lab_trees released on Wednesday
4. Daily POTDs