

# Comp 11 Lectures

Dr. Mike Shah

Tufts University

August 2, 2017

Please do not distribute or host these slides without prior permission.

# Advanced C++

## Comp 11 - Pre-Class warm up

This is a list of the biggest C++ conferences. Most of them also have all of their sessions taped on youtube. Studying these after this course is how to get really, really good at C++!

- CPP Con
- C++ Now
- ACCU
- Meeting C++
- Pacific C++
- [cppcast.com](http://cppcast.com) - An audio podcast – listen to get pumped up at the gym or commuting when to work!

# Lecture



**Figure 1:** Radhia Cousot was the inventor of Abstract Interpretation. She worked and did research with her husband to revolutionize the field of static analysis. That is, what can we understand about programs before we run them.

# Advanced C++

# Advanced Topics in C++

- There is much more to learn in C++.
- These slides will not be on the exam.
- These slides you can revisit as you continue to learn more C++.



# Template Specialization

<http://www.cplusplus.com/doc/tutorial/templates/>

```
1 // class template specialization :
2 template <
3 class mycontainer <char> {
4     char element;
5     public:
6     mycontainer (char arg) {element=arg;}
7     char uppercase ()
8     {
9         if ((element>='a')&&(element<='z'))
10            element+='A'-'a';
11        return element;
12    }
13};
```

Listing 1: Special use case for a temmplate of a certain type

# Smart Pointers

[https://meetingcpp.com/index.php/br/items/  
an-overview-on-smart-pointers.html](https://meetingcpp.com/index.php/br/items/an-overview-on-smart-pointers.html)

[http://umich.edu/~eecs381/handouts/C++11\\_smart\\_ptrs.pdf](http://umich.edu/~eecs381/handouts/C++11_smart_ptrs.pdf)

```
1 #include <iostream>
2 #include <string>
3 #include <memory>
4
5 struct Student{
6     std::string name;
7     ~Student(){ std::cout << "Called automatically!"; }
8 };
9
10 void makeStudent()
11 {
12     std::unique_ptr<Student> p(new Student); // p owns the Thing
13 } // p gets destroyed; destructor deletes the Student
14
15 int main(){
16     makeStudent();
17     return 0;
18 }
```

Listing 2: Smart Pointers

# Threads

https:

[//solarianprogrammer.com/2011/12/16/cpp-11-thread-tutorial/](https://solarianprogrammer.com/2011/12/16/cpp-11-thread-tutorial/)

```
1 #include <iostream>
2 #include <thread>
3 //This function will be called from a thread
4 void call_from_thread() {
5     std::cout << "Hello, World" << std::endl;
6 }
7 int main() {
8     //Launch a thread
9     std::thread t1(call_from_thread);
10    //Join the thread with the main thread
11    t1.join();
12    return 0;
13 }
```

Listing 3: Launching a separate thread of execution

# Libraries

- C++ Library of code to do many many things (Database, parsing, data handling)
- OpenGL - Graphics programming library
- Qt and Wx - GUI programming environments

# In-Class Activity

Course Evaluation and Pointer/Memory tutorial activity

## Activity Discussion

# Review of what we learned

- (At least) Two students
- Tell me each 1 thing you learned or found interesting in lecture.

5-10 minute break



# To the lab!

Lab: <http://www.mshah.io/comp/11/labs/lab15/lab.pdf>

1

---

<sup>1</sup>You should have gotten an e-mail and hopefully setup an account at <https://www.eecs.tufts.edu/~accounts> prior to today. If not—no worries, we'll take care of it during lab!

# Glossary