CS3520
Programming in C++

Ken Baclawski
Fall 2016

Welcome

- Introductions
- Professor

  Ken Baclawski <k.baclawski@neu.edu>
- Teaching Assistant

  Rene Adaimi <adaimi.r@husky.neu.edu>
- Talk with your classmates

  Start forming teams (1 – 4 students in a team)

What is C++?

C++ is a general-purpose programming language. It has imperative, object-oriented and generic programming features, while also providing facilities for low-level memory manipulation.

It was designed with a bias toward system programming and embedded, resource-constrained and large systems, with performance, efficiency and flexibility of use as its design highlights. However, it has been used in virtually every Computer Science application domain. It is currently the second most widely used object-oriented programming language.

C++ was developed by Bjarne Stroustrup in 1983. The current standard for C++ is C++14. However, C++14 is only a minor extension of C++11, so we will be using C++11.

Source: Wikipedia article on C++

Outline

- Prerequisites
- Course Description
- Textbook
- Grading
- Class Schedule
- Assignments
- Team Project
- Office Hours
- Academic Honesty

Prerequisites

- Previous experience with C++ *not* required
- Programming experience *is* required
  - Control Structures (for, while, if, switch)
  - Classes
  - Methods
  - Arrays
  - Hashing
  - Sorting
  - Graph Searching

Course Description

Examines how to program in C++ in a robust and safe manner. Reviews basics, including scoping, typing, and primitive data structures. Discusses data types (primitive, array, structure, class, string); addressing/parameter mechanisms (value, pointer, reference); stacks; queues; linked lists; binary trees; hash tables; and the design of classes and class inheritance, emphasizing single inheritance. Considers the instantiation of objects, the trade-offs of stack vs. heap allocation, and the design of constructors and destructors. Emphasizes the need for a strategy for dynamic memory management. Addresses function and operator overloading; templates, the Standard Template Library (STL), and the STL components (containers, generic algorithms, iterators, adaptors, allocators, function objects); streams; exception handling; and system calls for processes and threads.

Textbook

Accelerated C++ Practical Programming by Example

by Andrew Koenig and Barbara E. Moo

Addison Wesley, 2000

ISBN: 0-901-70353-X

There will be a reading assignment for each class.

There will be additional material on topics missing from the textbook, such as threads, graphics, lambda expressions, type inference, and testing

Course Organization and Grading

- 10 Programming Assignments (40%)
- Team Project (20%)
- Mid-Term Exam (15%) 18 October 2016 1.5 hours
- Final Exam (25%) during exam week 2 hours
  - The Mid-Term and Final exams will be an open-book/open-notes exams.
  - Laptops are permitted at the exams with prior approval.
- Submit deliverables to Blackboard.
  - The due time is 11:59pm, the default for Blackboard.
- The grade will be reduced for the following:
  - Late assignment (1 point out of 100 for each hour)
  - Late Mid-Term Exam (1 point out of 100 for each minute)
  - Late Final Exam (1 point out of 100 for each minute)
- Extensions
  - Individual extensions are never given (except certain medical reasons)
  - Class extensions will be given for good reasons that are discussed in class

Grading Scale

Numerical Grade	Letter Grade
93.333-100	A
90-93.332	A-
86.667-89.999	B+
83.333-86.666	B
80-83.332	B-
76.667-79.999	C+
73.333-76.666	C
70-73.333	C-
66.667-69.999	D+
63.333-66.666	D
60-63.332	D--

Class Schedule

- Reading assignment and web links for each class
- Mostly classes will consist of going over example programs related to the assignments.
- See the posted syllabus for the details.

Assignments

- Weekly assignments due on Thursdays
- One program per assignment
- Example input and expected output
- Evaluated using different input and expected output
- Documentation is required (doxygen)
- Coding style requirements will be checked
- Memory management will later be checked (valgrind)
- Unit tests will later be required (boost)

Team Project

- Teams consist of 1-4 students
- Students can leave a team but not join one
  - If a student leaves, the project scope will be reduced.
- Requirements
  - Specified format
  - Size criteria
- Design
  - UML class diagram
  - Size criteria
- Implementation
- Presentation
  - Specified format
  - Grading criteria
- Report
  - Specified format
  - Grading criteria
- Some teams will give their presentations in class
  - Voluntary

Office Hours

- Tuesday 3:30-4:30PM
- Friday Noon-1:00PM
  - or by appointment
- 342 WVH
- Starting 9 September 2016
- Ending 6 December 2016.
- No office hours or classes 11 and 25 November 2016.
- The TA will have an office hour

Piazza

- Discussions will be on Piazza
- Please use proper etiquette
  - Each posting on a single question
  - Followups should be on the same topic
- Announcements for the course
  - New materials
  - Useful tools
  - Extensions

Academic Honesty and Integrity

- Separate presentation

Graphics Demo

- The last item today is a small graphics demo of dots elastically bouncing off each other.