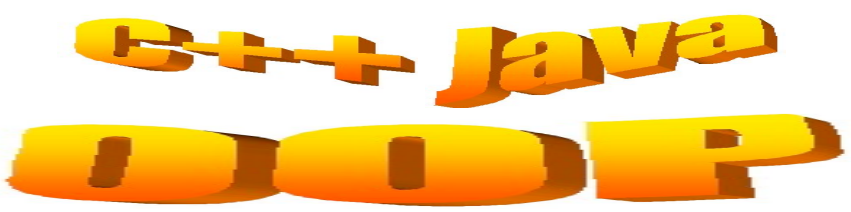


<b>Syllabus</b> <b>Books</b> <b>Homework</b>	<h1 style="text-align: center; color: yellow;">Advanced Computer Programming</h1> <p style="text-align: center;"><b>Prof. Lyle N. Long</b></p> <p style="text-align: center;"><b>AERSP 424</b>  <b>Fall Semester, 2009</b></p> <p style="text-align: center;"><b>9:05 - 9:55, MWF</b>  <b>316 HHD East</b></p>
<b>Background</b> <b>Introduction</b> <b>Linux</b> <b>Coding</b> <b>OOP</b> <b>C++</b> <b>Java</b> <b>UML</b> <b>Parallel</b> <b>Conclusions</b> <b>Appendix</b>	
<b>Aerospace</b> <b>CSci Minor</b> <b>IST_Aero</b> <b>Minor</b>	
<b>11726</b> <b>Hits</b>	

**Please be on time for class,  
it is very disruptive to have people coming in late each day**

**Note: The detailed course notes are only available to students in the course.**

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# LECTURE MATERIAL FOR COURSE

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- **Background Information** (1 Lecture)
  - [First Day Info](#)
  - [Syllabus](#)
  - [Miscellaneous Computer Info](#)
  - [Penn State Computer Systems HELP](#)
  - [Penn State Computing Organizations](#)
  - Required Reading:
    - [Prof. Long's CrossTalk Journal paper](#)
  
- **Introduction** (2 Lectures)
  - [50 Years of Computing](#)
  - [Moore's Law](#)
  - [Brief History of High Performance Computing](#)
  - [The Future of Computing](#)
  - [History of Programming Languages \(poster\)](#)
  - [Very Funny Song about Lisp and Other Programming Languages](#) (from [Here](#))
  - Required Reading:
    - [Evolutionary Trends of Programming Languages](#)
    - [Language Considerations](#)
    - [SEPR and Programming Language Selection](#)
  - Additional Information:
    - [50 years of Army Computing](#)
    - [DARPA report](#)
    - [High Confidence Aviation Software Workshop \(2006\)](#)
    - [SlashDot: Lots of Good E News !](#)
  
- **Linux and Unix** ( 3 Lectures )
  - [Review and history of Unix and Linux](#)
  - [Basic Unix commands and Editors](#)
  - [Get an account on the PSU unix/linux machines](#)
  - Required Reading:
    - Chap. 1 and 3 of [Welsh's Linux book](#)  
(This is an old version of the book, you should really consider buying the latest version: [Running Linux](#))
  - Additional Linux info and links:
    - [Networking](#)
    - [Building a Beowulf](#)
    - [Beowulf.org](#)
    - [How to build a Beowulf](#)

- [Essential System Administration](#)
  - [FREE Linux software distributions](#)
  - [Linux documentation site](#)
  - [Linux Organization](#)
  - [Linux Hardware Compatibility](#)
  - [Penn State Linux Users Group](#)
  - [Old Version of "Running Linux" Book](#) , by Welsh
  - ["Running Linux" Book](#) , 5th Edition, by Welsh et al
  - [O'Reilly Books On-Line \(especially "Running Linux"\)](#) (scroll down to Safari)
- **Software Engineering** ( 1 Lecture )
  - [Introduction](#)
  - Required Reading:
    - Read Chap. 1 and 2 of [A Gentle Introduction to Software Engineering](#)
    - [Worst Software Bugs in History](#), By S. Garfinkel, Wired Magazine, Nov. 8, 2005
  - Other info:
    - For more info, you could take this course: [AERSP 440](#)
    - [The Role of Software in Spacecraft Accidents](#), By N. Leveson, MIT
    - IEEE Computer Society [Certified Software Development Professional \(CSDP\)](#) (software engineer)
    - ["Software Engineering," by Ian Sommerville](#)
    - ["Code Complete," by Steve McConnell](#)
    - ["The Mythical Man Month." by Fred Brooks](#)
    - ["Facts and Fallacies of Software Engineering," by Robert L. Glass](#)
    - [Software Engineering Institute, Carnegie-Mellon](#)
- **Introduction Code Development Tools** ( 3 Lectures )
  - [Brief Notes and Demos on Developing Code on Linux and Unix](#)
  - [Brief Notes on Integrated Development Environments \(IDE\)](#)
- **Introduction to OOP** ( 2 Lectures )
  - [Video of Discussions on OOP and SmallTalk](#) with [Dan Ingalls](#) and questions from [David Ungar](#), with mentions of [Alan Kay](#)
  - [Quick Tour of Java and OOP](#)
  - Additional information:
    - Some History and other OOP languages besides C++ and Java: [SketchPad \(1963\)](#) [Simula \(1967\)](#) , [Smalltalk \(1980\)](#), [C++ \(1983\)](#) , [Eiffel \(1985?\)](#), [SELF \(1986\)](#) , [Java \(1995\)](#) , ...
    - Some other people: [Stroustrup](#), [Gosling](#), [Stallman](#) , ...
- **C++** ( 16 Lectures )
  - [Computer and Compiler Help](#)
  - Books and websites:
    - [Yang's book](#) , [Yang's webpage](#) , [Errata for book](#) , and [Sample source codes \(local copies\)](#)
    - [Thinking in C++ \(free on-line C++ book\)](#) , ([click here for local copy](#) )

- Reference Sites: [cplusplus.com](http://cplusplus.com) , [cppReference.com](http://cppreference.com) , [gcc](http://gcc.gnu.org) , [Stroustrup](http://en.cppreference.com/iso-std) , [ISO Comm.](http://en.cppreference.com/iso-std) , [Draft Std.](http://en.cppreference.com/iso-std) , and [Books](http://en.cppreference.com/iso-std)
  - [C++ Basics](#) ( Codes: [minimal](#) , [hello](#) , [input](#) , [pre1](#) , [oper1](#) , [function1](#) , [array2](#) , and [array1](#) )
  - [C++ Control Structures](#) ( Codes: [two.cpp](#) , [binary.cpp](#) , [sizeof.cpp](#) , and [string2.cpp](#) )
  - Read chap. 1 & 2 of Yang's book
  - **[MidTerm Exam No. 1, \\*\\*\\*\\*\\* Oct. 9 \\*\\*\\*\\*\\*](#)** , in class, covers all material above, reading, and homework (1 period)
  - [Pointers \(part 1\)](#) ( Codes: [1](#) , [1](#) , [2](#) , [3](#) , [4](#) , [4a](#) , [5](#) , and [6](#) )
  - [Pointers \(part 2\)](#) ( Codes: [2darray.cpp](#) , [3darray.cpp](#) , [Listing610.cpp](#) , )
  - [Structures, Classes, and Objects \(part 1\)](#) ( Codes: [Yang 5.5](#) , [fctn ptr](#) , [MD method](#) , [MD3.cpp](#) )
  - [Structures, Classes, and Objects \(part 2\)](#) ( Codes: [Effort](#) , [MD6](#) , [Gauss](#) , [gauss4](#) , [gauss2](#) , [gauss3](#) )
  - [Structures, Classes, and Objects \(part 3\)](#) ( Codes: [mammals](#) , [objects](#) )
  - [Operator Overloading](#) ( Codes: [1](#) , [2](#) , [3](#) , [4](#) , [gnu Complex class](#) )
  - [Input / Output](#) , ( [more info](#) ) Codes: [fileIO](#) , [input \(discussed above\)](#) , ...
  - [Templates](#) (Codes: [template1.cpp](#) , [VC++ algorithm file](#) , [RS6K gcc algo base.h file](#) , [RS6K algorithm file](#) )
  - [Mixed code, Timing code, etc.](#) (Codes: [Timing code](#) )
  - Required Reading:
    - Chap. 1 - 8 of Yang's book
    - [C++ Ten Commandments](#)
    - [C++ vs. Java](#)
    - [CrossTalk, Letter to Editor](#)
  - Additional Material:
    - [Sample C++ Codes used in Course](#)
    - [Other C++ Links](#)
- **[MidTerm Exam No. 2](#)** , approx. Nov. 5 (1 period)
- **Java** ( 11 Lectures )
  - [Click here to see what software and hardware is available and needed](#)
  - [Java Applications](#) ( [List of Demo Applications](#) )
  - [Chapman Packages](#) : [io](#) , [graphics](#) , [Math](#) , and [Examples](#) ( [Zip of Class Files](#) )
  - [Java Applets](#) ( [List of Demo Applets](#) )
  - [Control Structures and Arrays](#) ( [gauss3.f](#) , [Gauss.java](#) )
  - [Methods](#)
  - [Object-Oriented Programming, Part 1](#) ( [Timer](#) , [ArrayTest \(applic.\)](#) , [ArrayTest \(applet\)](#) , [ArrayTest.html](#) , and [Gauss2](#) )
  - [Object-Oriented Programming, Part 2](#) ( [Mammal](#) )
  - [Exception Handling](#) ( [Examples](#) )
  - [Threads](#) ( [Examples](#) )
  - [Graphics, Java2D, and Java3D](#) ( [Examples](#) )

- [Graphical User Interfaces](#) ( [FirstGUI](#) , [CalculatorGUI2](#) , [BlackJack](#) , [Deitel](#) , and [Chapman](#) )
- Required Reading:
  - Chap. 1 thru 13 of Chapman's Java Book (Chap. 1-6 are very similar to C++)
    - [The Website for 2nd Edition of book is here.](#)
    - Code from Chapman's Book: [Book Examples](#) , [Packages](#) ( [First Edition Files](#) )
- Books and other extra material:
  - [Guy Steele Talk](#)
  - [Links to Other Java Sites](#) ( and [java.sun.com](#) and [Glossary](#) and [API Docs](#) and [Java Certification](#) )
  - [Free Java On-Line Book \(3rd Edition\)](#) and [source code](#) ( author's site: [Bruce Eckel \(with 4th Edition\)](#) )
  - [HTML](#) , [XML](#) , and [SGML](#)
  - [JAVA Plugin](#)
  - [Java goes Open Source](#)
  - [Networking with Java](#)
  - [Files and Streams](#)
  - [Remote Method Invocation](#)
  - [JavaOne Conference](#)
  - [Java Grande](#) (no longer active)
  - [Real Time Java](#) ( [Specs: RTSJ](#) )
- **Parallel Computing** (6 Lectures)
  - [Intro to Parallel Computers](#)
  - Performance: [Serial](#) ( [SPEC 2000](#) ) and [Parallel](#)
  - [Batch Queuing Systems](#) (also try "man qsub")
  - MPI
    - [Message Passing Interface \(MPI\)](#)
    - [Jacobi method](#) ( [Jacobi MPI code](#) )
    - [Sample MPI codes](#)
  - OpenMP
    - [openmp slides \(van der Pas\)](#)
    - [openmp concept slides \(van der Pas\)](#)
    - [openmp slides \(Saied\)](#)
    - [openmp.org](#)
    - [openmp slides](#)
  - More information:
    - For more info, you could take these courses: CmpSc 450 or NucE 530 or CSE 557
    - [Eclipse for Parallel Programming](#)
    - [Self Scheduling Serial Jobs using Parallel Computers](#) by Long and Brentner
    - [H. Simon paper , 1995](#)
    - [Parallel Computer Summary](#)
    - [U.S. Government Report on High-End Computing](#)
    - [MPICH \(free MPI libraries\)](#)
    - [MPI Book by Snir et al](#)

- [Using Linux Clusters at the Army \(ARL\)](#)
- [Horst Simon Seminar on Supercomputing](#) and [Slides are here](#)
- [Conclusions, Discussion, and Questions](#) ( read on your own )
- [MidTerm Exam No. 3](#), Dec. 11 (1 period)
- [Appendix](#)
- **Reminder: There will not be a final exam**

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Maintained by: [Prof. L. N. Long, 233 Hammond Bldg, 865-1172](#)

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