

Computer Science 1704

Intro to Data Structures & Soft Eng

CS 1704

Introduction to Data Structures and Software Engineering

"There are two ways of constructing a software design: One way is to make it so simple that there are obviously no deficiencies, and the other way is to make it so complicated that there are no obvious deficiencies. The first method is far more difficult."

-C.A.R. Hoare

Virginia Tech

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CS 1704 Instructors:

Instructor: N Dwight Barnette
 Email: barnette@vt.edu
 Office: 624 McBryde Hall
 Office Hours: <http://barnette.cs.vt.edu>

	Mon	Tue	Wed	Thu	Fri
8:00	Class Prep		Class Prep		Class Prep
9:00		CS 1044		CS 1044	
10:00	CS 1704	CS 1044	CS 1704	CS 1044	CS 1704
11:00	OFFICE	R e s e a r c h	OFFICE	R e s e a r c h	OFFICE
12:00					
1:00	CS 1704		CS 1704		CS 1704
2:00	OFFICE		OFFICE		OFFICE
3:00	OFFICE		OFFICE		C l a s s
4:00					P r e p

Course Website: <http://courses.cs.vt.edu/~cs1704/>

Course Description

Credits: 3

Prerequisites: CS 1044

CS Majors must have completed the prerequisite with a grade of C or higher (C- is not acceptable). Students are also expected to have attained proficiency in the C++ programming language. There will be absolutely **NO** exceptions to these requirements.

Purpose:

The purpose of this course is to provide a means for students to learn how to design and develop medium-large programming systems involving multiple modules using basic data structures and software engineering techniques.

Texts:

Required:



The Complete C / C++ Training Course, H.M. Deitel & P.J. Deitel, Prentice Hall, ©2001. **Contains:**

C / C++ How to Program, Deitel & Deitel, Prentice Hall, ©2001

MS Visual C++ 6 Introductory Edition

C++ Multimedia Cyber Classroom, Deitel & Deitel, Pren. Hall, ©2001

Recommended:



CS 1704 Course Notes, Fall 2001 Edition, N D Barnette & W D McQuain, © 2001. Available from A-1 Copies in University Mall.

Other Useful References:



Programming in C++, 2nd Ed., N. Dale, C. Weems & M. Headington, Jones and Bartlett Pub., © 2000

The C++ Programming Language, 3rd Ed., B. Stroustrup, Addison-Wesley Publishing Co., © 1997

The C Programming Language, B.W. Kernighan & D. M. Ritchie, Prentice Hall, © 1978

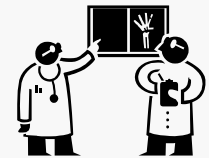
Data Abstraction and Problem Solving in C++: Walls and Mirrors, 2nd Ed., by Carrano, Helman and Veroff, Addison Wesley, © 1998

Software Engineering Concepts, R. Fairley, McGraw Hill, © 1985

Software Engineering A Practitioner's Approach, R.S. Pressman, McGraw Hill, © 1987

The Art of Software Testing, G.J. Myers, John Wiley & Sons, © 1979

Evaluation and Grading:



Point Distribution

Final grades will be based on the number of points achieved over the following :

Item	Weight	Tentative Dates
Project Testing and SE		
Phase 0 SARS	5%	Monday, Jan. 28
Phase 1 CARS	10%	Monday, Feb. 15
Phase 2 DARS	15%	Monday, Mar. 15
Phase 3 LARS	15%	Monday, Apr. 12
Homework/Quizzes	10%	TBA
Test 1	10%	Feb. 18
Test 2	10%	Apr 8
Final Exam	25%	May 3, 4:25–6:25 (CTE)

Grade Scale:



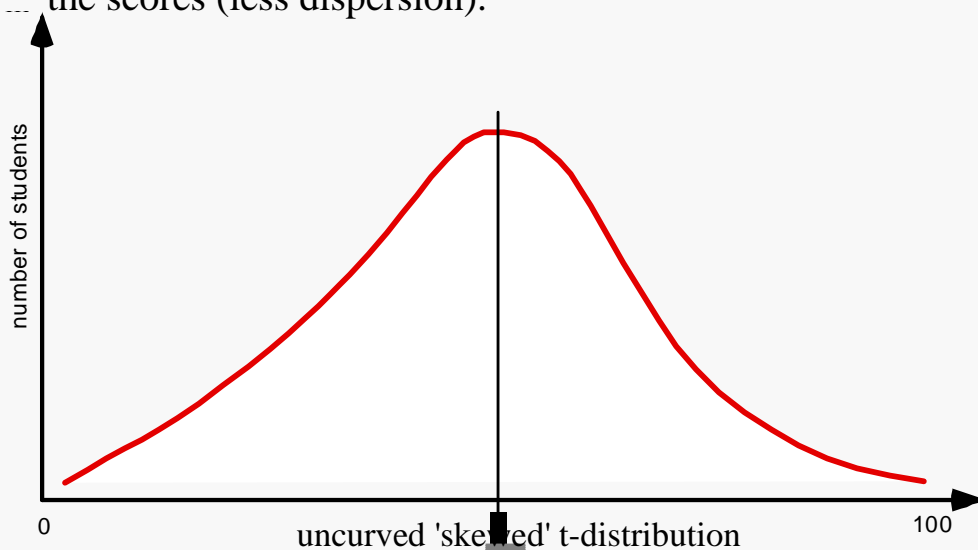
The usual 10-point scale will apply (subject to any curve). A final average of 90% will guarantee an A-, 80% will guarantee a B-, and so forth.

Curve

A grade curve may or may not be employed in this course. The application of a curve is dependent upon class performance on tests and homework. The decision to utilize a curve rests entirely with the course instructor. If a curve is applied, the Krider Curve will be used; see the course Website for details.

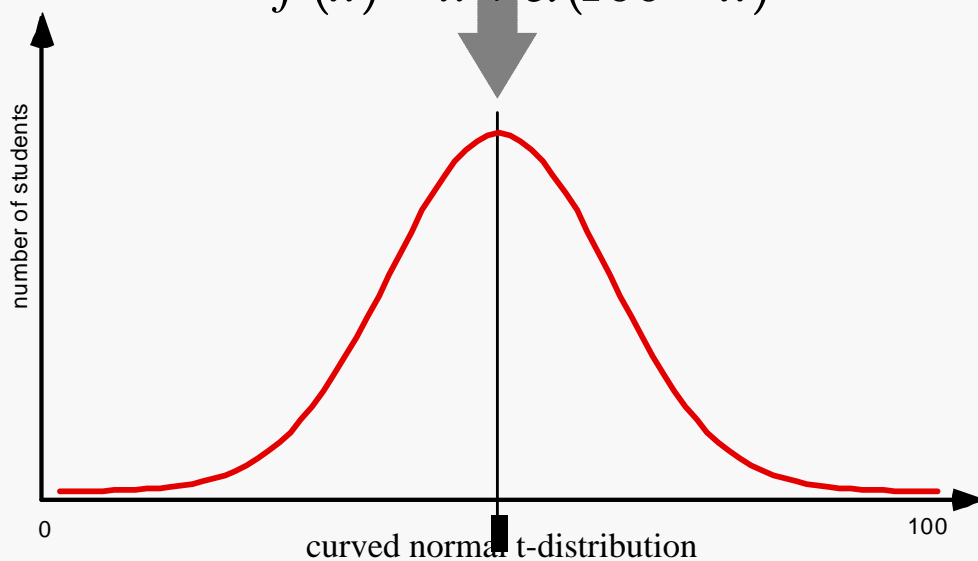
■ Krider Curve

- The Krider Curve was developed by Dr. Daniel W. Krider, Prof. of Mathematics, Concord College, Athens, WV. The curve coerces grades into forming a distribution which more closely resembles a Normal Distribution. This is a partial solution to the problem of class grades tending to be skewed toward the lower values. The Krider Curve forces symmetrical clustering about the mean (property of central tendency) and smaller variance within the scores (less dispersion).



Krider Curve

$$f(x) = x + \alpha(100 - x)$$



■ Application

– Variables:

■ Given the following:

x	\Leftrightarrow	student's grade
y	\Leftrightarrow	student's curved grade
α	\Leftrightarrow	curve percentage

- The Krider formula, $f(x) = x + \alpha(100 - x)$, is applied to each individual student grade.

– For example, if $\alpha = 1/3$ then

$$y = x + 1/3 (100 - x)$$

- This is equivalent to averaging two X values with one grade of a 100. The lower scores receive a larger curve than the upper scores. An appropriate action when one considers that poorer students require more help. The curve ensures that a student will never surpass another student who scores higher.

■ Alpha Derivation

- Alpha can be set to achieve a desired class mean.
 - Given the following

\bar{x}	\Leftrightarrow	class mean
μ	\Leftrightarrow	desired mean
n	\Leftrightarrow	class size

- The formula for deriving alpha's value for a desired mean:

$$\mu = \bar{x} + \alpha \left[\frac{\sum_{i=1}^n (100 - x_i)}{n} \right]$$

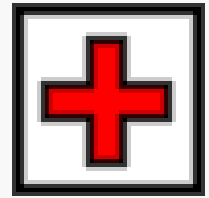
$$\mu = \bar{x} + \alpha \left[\frac{100n}{n} - \frac{\sum_{i=1}^n x_i}{n} \right]$$

$$\mu = \bar{x} + \alpha(100 - \bar{x})$$

$$\alpha = \frac{(\mu - \bar{x})}{(100 - \bar{x})}$$

Sources for Help/Questions etc.

- CS 1704 Classmates:
 - CS 1704 Web board & USENET news group
- CS 1704 TAs
- CS 1704 Instructor



Microsoft C++ Help

CS 1704 Web Discussion Board

- † Connect directions will posted online
- † CS 1704 classmates, TAs & others will respond to questions.



CS 1704 USENET Newsgroup (news.vt.edu)

- † Connect to: **vatech.class.cs1704**
- † CS 1704 TAs & others will respond to questions.
- † Other Newsgroups: csugrad.pc-clone, csugrad.programming.c, comp.lang.c, comp.lang.visual
- † A panel of "experts" will respond to questions.

Lecture Instruction

Lectures will consist of presentations, applications, problems and solutions interspersed with classroom discussion.



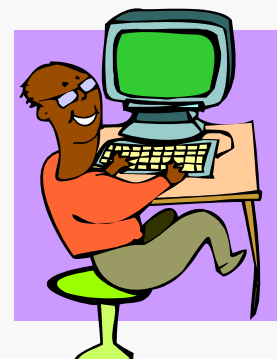
Test Environments

- All programming assignments submitted are required to compile under either Microsoft Visual C++, version 6.0 or the GNU g++ compiler installed on the FreeBSD machines in McB 118.
- Programs may be tested under either Windows 2K/NT or FreeBSD.
- It is the student's responsibility to ensure that his/her programs execute correctly in the appropriate environment.
- Points will be deducted for programs not meeting this requirement.
- TAs do not have time to go to dorms, etc. to grade programs on specific systems.



Program Demonstrations

- Demonstrations will take place in the McBryde CS Dept. Computer Lab for some assignments.
- Students may not bring their systems to the labs to execute their programs upon.



Backups

- **Students are responsible for making backup copies of all their work in this course.** Loss of work due to hard drive failure is **NOT** an acceptable excuse. Backup copies of files on the same hard drive are not backup copies. Backup copies of files on second hard drives are also risky. Backup copies should be maintained on two separate distinct storage mediums, (e.g., hard drives and floppies).
- Backup copies should be maintained until after the end of the term and students have received their course grade. (The Army lives by triplicate for a reason.)
- Remember: Computer systems are mechanical devices. Systems fail. Plan for it. It is inevitable!



**Departmental Policy on
KOOFERS, OLD PROGRAMS, CHEATING, AND
COMPUTER USE**

*Warning: All students in all Computer Science
classes are responsible for reading and understanding
the content of this document.*

1. **KOOFERS.** The issue surrounding what students call Koofers actually breaks down into three distinct subissues: obtaining and using lists of questions without answers, obtaining and using answers to questions for study only, and handing in answers which were obtained from previous terms. (Note: question lists that are drawn up by students are also permitted; these guidelines apply to question lists drawn up by the instructor.)
 - a. **QUESTION LISTS.** Any list of questions and other handouts that the instructor hands out in class may be used. Question lists such as previous exam forms may be used provided that the instructor voluntarily gave them to students at some point. Any use of question lists that were obtained without the instructor's knowledge constitutes cheating. This includes use of exam forms which students removed from an examination room without the instructor's permission. Student must never assume that they are free to carry away copies of an examination, unless they have been explicitly told that they can.
 - b. **ANSWERS FOR STUDYING.** Graded examination papers or past term homeworks or assignments that were voluntarily returned by the instructor may be used in studying for tests, provided that they are not available at the time of the examination. (This rule applies to closed book examinations. Guidelines for open book examinations will be set by the instructor when the examination is handed out.) Using, or providing for use, graded answers that were not voluntarily returned by the instructor is cheating.
 - c. **HANDING IN ANSWERS.** Handing in anything which counts for a grade and which is not the product of your effort is cheating. Obviously what you study will affect what you write; however, any direct use of koofers in preparing material for a grade is cheating, whether or not the original wording is maintained. From the time you have read the questions you are to answer, no koofers shall be consulted until your work has been handed in. Handing in a copy of someone's homework from a previous term is cheating. Copying a key that was handed out in a previous term is cheating. Reading someone else's homework or an answer key from the current term or any previous term before preparing your own answers (or after an initial draft but before completing the work to be handed in) and using someone else's answer to questions you have been asked is cheating. Copying someone else's answers onto an examination paper without accurately identifying the source is

cheating, regardless of whether you are copying from someone else in the same class, from an exam from a previous term, or from any other source, and regardless whether the exam is in class or take home, open or closed book. The only legitimate use of answers obtained in previous terms is in studying before a test, when the questions on the test have not been handed out and answers are not being prepared. The permission to study in no case extends to copying answers and handing them in as your own. Changing wording but retaining the essence of the answer constitutes copying for the purpose of this rule. If you hand it in as yours, you must have worked it out yourself.

2. **OLD PROGRAMS.** The rules are the same as in 1c above. Students are free to use programs they wrote themselves in the past and programs (including utilities and library functions) provided or authorized by the instructor. *Any use of programs except those the instructor has authorized in preparing any program assignment to be handed in for a grade constitutes cheating.*
3. **CHEATING.** Any instance of copying the language, structure, ideas, and/or thought of another and passing it off as your own constitutes plagiarism. You may of course use sources explicitly provided for the course in question, but even then you must be careful not to claim the textbook author's words, ideas, or algorithms as your own. Having a tutor do your homework for you in the process of tutoring you constitutes purchasing work for hire, as well as any more direct form of payment for product, and so constitutes cheating. Other forms of cheating include giving or receiving any unauthorized aid, assistance, or unfair advantage on any form of academic work. Note that those providing unauthorized assistance are as guilty as those receiving it.

Unless explicitly otherwise stated, all work to be handed in by any student must be exclusively the work of the student whose name it bears. Students may not work together on homework unless it is explicitly stated that they may. Students may not consult with one another on any programming project unless it is explicitly stated that they may. Students may not debug each other's code, tell each other how to get around problems, or provide each other with fragments of code no matter how small, unless it is explicitly stated that they may. Students are allowed to help one another with questions pertaining solely to system use and hardware issues, provided that the solutions to those questions do not constitute the point of the exercise.

Any case of plagiarism, falsification, tampering with records, purchasing work for hire, or any other form of cheating of which the instructor or graduate assistants of a course become aware and can document will be reported to the Honor Board. The original work in question will be held by the instructor as evidence. ***THERE WILL BE NO WARNINGS, AND NO EXCUSES WILL BE ACCEPTED.***

Students who become aware of cheating have a responsibility to report it. *Reporting is not optional.* Under the Virginia Tech Honor System (Section VII, article 1), "It is the duty of all members of the academic community to report

alleged violations promptly. Alleged violations must be reported in writing..." (Taken from the 1988-89 Pylon, page 86; for further information on the honor code, see the Pylon, pages 81-91.) Students may report cheating in C.S. courses in either of two ways. (a) They can report the case to the Honor Board directly and in writing. (b) They can report the case to the instructor. Whichever they choose, such students must provide specifics of names and evidence. Telling the instructor "You know, a lot of people are cheating on this assignment" is not reporting the case to the instructor.

These guidelines constitute the official policy on cheating of the Department of Computer Science. Unless the instructor explicitly states otherwise, the rules contained herein are in force for all work in all Computer Science courses.

4. USE OF DEPARTMENT COMPUTERS

The following policy supplements the departmental policy on student use of computer accounts, as presented in the Virginia Tech Student Handbook, Pylon. The policy presented there concerning accounts on university mainframes remains in full force.

Undergraduates in computer science courses may be given access to Computer Science Department computer facilities. Use of such facilities is a loaned university resource, and as such is covered by several sections of the University Policies on Student Life, including the sections on Theft of State Funds. (See the section entitled, "Statement of Individual Responsibilities," in the Virginia Tech Student Handbook, Pylon.) Access to departmental computer systems is provided for the express purpose of completing assignments for computer science courses, as outlined by the instructor. On rare occasions, access may also be provided for specifically authorized research, with or without course credit. Any other use whatsoever of any departmental computer is a violation of departmental policy. Acceptance and usage of any account on any departmental computer constitutes tacit acceptance of this policy. CS departmental policy stands in addition to the University's "Computer and Communication Systems Use" policy as stated in the University Policies for Student Life.

Exception to this policy: Computer Science majors and a restricted group of CS minors will use **CSUGRAD** accounts for electronic mail and projects as defined by system administrators (see CSUGRAD handbook).

Unauthorized activities specifically prohibited include, but are not limited to, the following:

1. Attempting to penetrate system security for any reason, including (but not limited to) guessing/stealing user or system passwords, deliberately crashing or attempting to crash the system, attempting to override the system's accounting or security routines, and having files intended to or actually causing systems to behave atypically. In particular, knowingly infecting any system with a virus,

worm, time bomb, trap door, Trojan horse, or any other kind of invasive program, is a serious violation.

2. On multiuser systems, preventing class master account or operating system access to any file or directory.
3. Playing games on any departmental system or maintaining game-related files on any lab computers.
4. Providing access to unauthorized users.
5. Using departmental computers to do assignments for courses outside computer science. Students are permitted to print papers for other courses after preparing them on their own machines; however, all preparation (word processing, etc.) must take place on non-CS-lab machines, unless express permission has been given.
6. Using a computer to transmit or store language which is obscene, vulgar, or abusive.
7. Maintaining any files on departmental equipment (as opposed to student-owned floppy diskettes) unless given specific permission by the instructor or supervising professor.
8. Downloading, copying, or retransmitting copyrighted software.

The above violations will be referred to Judicial Affairs, Office of Student Affairs. In addition, the State of Virginia may choose to bring criminal charges for serious violations which constitute infringements of state or federal law.

THE HONOR CODE WILL BE STRICTLY ENFORCED IN ALL COMPUTER SCIENCE COURSES. ALL ASSIGNMENTS SUBMITTED SHALL BE CONSIDERED GRADED WORK, UNLESS OTHERWISE STATED. ALL ASPECTS OF YOUR COURSE WORK ARE COVERED BY THE HONOR SYSTEM. HONESTY IN YOUR ACADEMIC WORK WILL DEVELOP INTO PROFESSIONAL INTEGRITY. THE FACULTY AND STUDENTS OF VIRGINIA TECH WILL NOT TOLERATE ANY FORM OF ACADEMIC DISHONESTY.

If any student needs special accommodations because of a disability, please contact the instructor during the first week of classes.

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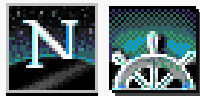
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