

COMPSCI 105 – SPRING 2018 LECTURE #1 TOPICS (EXPANDED)

The Basics

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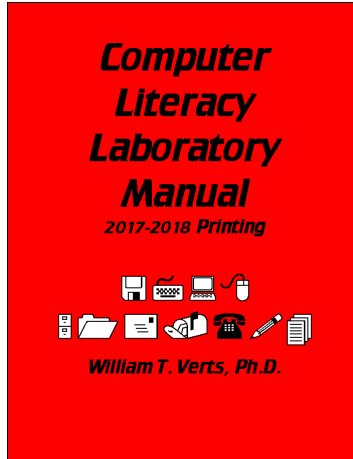
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Required Book #1

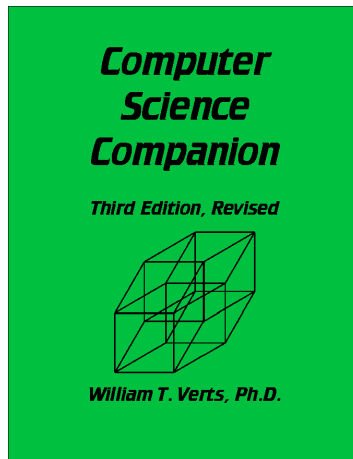
- Computer Literacy Laboratory Manual, 2017-2018 (Red)



- Reference copies of on-line homeworks are also in this book
- Extra-Credit Homework is in this book
- Extra-Credit Term Paper assignment is in this book

Required Book #2

- Computer Science Companion, REVISED 3ND Edition, 2017 (Green)



- Also required for COMPSCI 120, COMPSCI 119, and COMPSCI 145.

Course Grading

- 20% Midterm Exam (Wednesday, March 7TH, 7:00-9:00pm)
- 20% Final Exam (Thursday, May 3RD, 1:00pm-3:00pm)
- 40% Weekly Laboratory Assignments (turned in on paper)
- 15% Homework (electronic submissions only)
- 5% In-Class Quizzes (NO make-ups, but you can miss two of seven)
- Note: Makeup midterm is TBA, after March 7TH, 7:00-9:00pm
- Note: Missing midterm or final exam results in "F" course grade.

Lab Work

- Lab assignments are required work, and are found in the Lab Manual.
- No Lab assignments during the first two weeks of the semester.
- Lab work is due 1 week after assigned (but lab 7 is 2 weeks).
- Lab work is late (-3 points out of 10) the entire week after it is due.
- Lab work is no longer accepted two weeks after it is due.
- Your computer must run Windows Vista, 7, 8, 8.1, or 10, or Mac OS-X.
- Labs 1-8 may use a Mac, but 9-10 MUST use a Windows PC. Lab 7 can be done with Excel 2011 for the Mac, but cannot be done with either Excel 2008 for the Mac or Excel 2010 Starter for the PC.
- You can seek help from any TA assigned to 105.

- Evening labs in Library 1667 (Tu/W, 5:45pm-7:15pm) are optional, and are for students who need extra help or who do not have a Windows PC. These labs are drop-in only, first-come first-served. If nobody shows up during the first 15-20 minutes, the TA is free to leave.
- To work at home you must have: a working Internet connection and Web browser, Microsoft Office 2007, 2010, 2013, 2016, or 365 (Windows PC) or Office 2011, 2016, 365 (Mac), or later version, Acrobat Reader, PuTTY and WinSCP for the PC or Fugu for the Mac, (I'll show how to install the last three programs).
- I recommend that you install Mozilla Firefox or Google Chrome on your machine (either Windows PC or Mac). Microsoft Internet Explorer and Apple Safari are both too limited for what we need.
- Turn in all printed lab work to TA at lab or office, or to me in class.
- Pick up corrected work from your personal file folder in the TA's office LGRT 222 (any TA for any of my classes can get you your work, but you must present an ID to pick it up, and you cannot pick up work for a fellow classmate, even if a roommate or sibling).
- Do your own work! See the UMass policy at:
http://www.umass.edu/dean_students/academic_policy/

Materials Required by First Lab

- Computer Literacy Laboratory Manual, 2017-2018 Edition
- Computer Science Companion REVISED 3RD Edition (it is OK if you happen to have the unrevised 3RD edition, but the newer version has corrected the errors, added new material, and is now in color).
- Flash Drive (in case you need to bring me a file to examine)
- Stapler (you'll lose points for submitting unstapled work)

Course Content

- Mathematics
- Operating Systems
- Internet Tools
- Productivity Tools (Microsoft Office)
- Introduction to Computer Programming
- Miscellaneous Programs and Techniques

Mathematics

- Base Conversions
- Representations of Numbers on a Computer
- Integer, Rational, Real, and Complex Arithmetic on a Computer
- Truth Tables, Gates & Circuits
- Scientific Notation
- Units Conversion (Dimensional Analysis)
- Graphing and Charting
- Numerical Precision & Accuracy
- Interval Arithmetic to address representational problems
- Color Theory and Representations of Color on a Computer
- Representation of Sound on a Computer

Operating Systems

- What is an Operating System?
- Purposes and Capabilities
- Command Line Interfaces vs. Graphical User Interfaces

Unix (& MS-DOS)

- File Naming Conventions
- Hierarchical File Directories
- Command Line computing
- Basic Commands
 - File Maintenance
 - Running Programs

Windows & Macs

- File Maintenance
 - Folders & Shortcuts
 - Locating/Moving/Copying/Deleting Files
 - Compressed Archives
- Launching Programs (many methods)
- Accessories (preinstalled programs)

Internet Tools

- Web Browsing
- Web Page Design (including HTML, CSS, and SVG files)
- Telnet (and encrypted variants)
- FTP (and encrypted variants)
- UNIX Tools (emacs, pine)

Productivity Tools

- Word Processing (Microsoft Word)
- Spreadsheets (Microsoft Excel)
- Databases (Microsoft Access, PC only, no Macs)

Word Processing

- Basic Concepts
 - Word-wrap
 - Margins
 - the Ruler
- Basic Formatting
 - Character (Fonts & Typefaces)
 - Paragraph (Indentation & Justification)
 - Document (Margins & Layout)
- Style Sheets
- Mail Merge
- Options in Saving
 - DOC vs. RTF vs. PDF
 - Saving documents as Web pages

Spreadsheets

- Basic Metaphors
- Spreadsheet Design and Layout
 - Diamond Form
 - Multipage Notebooks
- Writing & Editing Formulae
- Moving & Copying Formulae
 - Relative Addressing
 - Absolute Addressing
 - Mixed Addressing
- Effects of Automatic Recalculation
- The concepts of Formula vs. Value vs. Format
- Using the built-in function library
- Solving Large "What If?" Questions

Databases

- Creating Table Structures
- Appropriate Selection of Data Types
- Entering Data & Automatic Validation
- Simple Queries on Tables
- Report Construction
- Sorting vs. Indexing
- Joins (Queries with 2+ data sources)
 - Inner Joins
 - Outer Joins (Left, Right, Full)
- Relationships
 - 1:1
 - 1:many (or many:1)
 - many:many
- Time needed to perform Queries

Programming

(May be omitted due to time constraints)

- Introduction to Programming Concepts
- Programming Languages (Pascal, JavaScript, Python)
- Stand-alone programs vs. programming for the Web

Questions You'll be able to Answer

- How do I move a file from one type of computer to another?
- What happens to a spreadsheet formula when it is copied?
- When do I use a spreadsheet and when do I use a database?
- How do I use software I don't know?

Forbidden Statements (Passive):

- I'm not very good in Math.
- I don't know much about computers.
- I don't know what to do.

Allowed Statements (Active):

- This is what I've tried, this is what I understand, but this piece I need help with.
- Can you show me how to approach this class of problem?
- Can you show me where I went wrong in this answer?

Some Friendly Advice

- Come to All Classes – you are responsible for everything I say!
- Keep up with the Reading.
- Do your Labs and Homework on time.
- EMail is your Friend (learn to use it well).
- Seek help when you need it, from me or the TAs.
- RTFM! (Read The F***** Manual).

A Few Things I Know...

- Ignorance is curable.
- Learning is Hard Work.
- Not all problems have been solved.
- Not all solutions are on the Internet, and the Web is not the Internet!
- Science is inherently self-correcting over time.
- "Data" are plural, "Datum" is singular – get it right!

Arthur C. Clarke (1917-2008)

- Any Sufficiently Advanced Technology is Indistinguishable from Magic.

History of Computing

- Computers are Older than you Think.
- No, I mean Really Older!
- You can't know where you're going until you know where you've been!
- Lessons from the past can offer many insights into the future.

Oldest Known Computing Devices

- Calendars
 - Stonehenge?
 - Aztec & Mayan
- Abacus or Tally systems (prehistoric, many cultures – Incan, Roman, Chinese, Japanese, Russian, etc.)
- Antikythera Machine (65 b.c.e.)

Early Computing Devices

- John Napier (logs) & William Oughtred (slide rule) (~1600)
- Blaise Pascal's Adder (1626)
- Gottfried Leibniz's Multiplier (1651)
- Joseph Marie Jacquard's Loom (1801)
- Charles Babbage's "Engines" (1835)
 - Lady Augusta Ada of Lovelace's programs
- Herman Hollerith's Tabulator (1890)

20th Century Early Computers

- Card based tabulators (IBM, pre-WWII)
- Mechanical Adders (Burroughs, etc.)
- Konrad Zuse's devices (German, WWII)
- Harvard Mark I (1944)
- ENIAC (Princeton, 1945)
- UNIVAC

1960's & 1970's

- IBM (704, 709, 7090, 360, 370)
- CDC (3300, 6500, 6600, 6700, Cyber)
- DEC (PDP-8, PDP-11/70, VAX)
- Data General
- Cray supercomputers
- Many others, long forgotten

Microcomputer Era

- Pre-1977 (Pet, Kim-1, S-100's, etc.)
- Apple][(1977)
- IBM-PC (MS-DOS, 1981)
- PC "Clones" (1981-present)
- Apple Macintosh (1984-present)
- Rise of Windows (1985-present)

Microsoft Windows (consumer)

- Windows 1.0 (1985 - 1st "attempt")
- Windows 3.0 (1990 - 1st "working")
- Windows 3.1 (1992 - 1st "useful")
- Windows 95 (1995 - 1st "practical")
- Windows 98 (1998 - upgrade to 95)
- Windows ME (2000 - last of the 9X line)

Microsoft Windows (network and consumer)

- Windows NT 3.51
- Windows NT 4.0
- Windows 2000 ("NT 5.0")
- Windows XP (no longer officially supported)
- Windows Vista (diminishing)
- Windows 7 (current)
- Windows 8 and 8.1 (current, but diminishing)
- Windows 10 (current, released in July 2015)