

INF 111 / CSE 121: Software Tools and Methods

Lecture Notes for Fall Quarter, 2007
Michele Rousseau
Set 1

Today's Lecture

- **Administrative details**
- **Review of Software Engineering**

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Introductions

• Instructor

- Michele Rousseau
- Email: michele@ics.uci.edu
 - Please put INF111 in the Subject
- Office Hours: Tues. 10:30a – 11:30a
 - Or by appointment
- Office: Bren Hall: 5204

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Introductions

• Teaching Assistant

- Rosalva Gallardo
- Email: rgallardo@uci.edu
- Office Hours: Mon. 11a-1p
 - Email if you are planning on dropping by
- Office: DBH: 5051

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Pre-requisite

- **Informatics 43 OR ICS 52 OR CSE90**
 - with a grade of C or better
- **ICS 6D / Mathematics 6D**
- **ICS 6B / Mathematics 6B**
- **Mathematics 6G or 3A**
- **Lower-division writing**

- **Please let me know if you have not satisfied these requirements**

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Class Information

• Website

- www.ics.uci.edu/~michele/INF111/Informatics.html
- Can access from my home page
 - www.ics.uci.edu/~michele
- **EEE (will be set up next week)**

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Course Materials

- **Required textbooks**
 - Van Vliet, Hans
Software Engineering: Principles and Practice.
2nd edition.
 - Brooks, Fredrick
The Mythical Man-Month.
Anniversary edition.
- **Recommended Readings**
 - Will be announced on the website and in lecture

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Course Mechanics (1)

- **Lecture**
 - MWF 10 – 10:50
- **Discussion**
 - 2 Sections – Attend 1
 - Mon – 9 - 9:50 (ICF 103)
 - Mon – 3 - 3:50 (DBH 1500)

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Course Mechanics (2)

- **Labs – 3 Sections**
 - Please attend the one you are registered in
 - 9 – 9:50 (ICF 183)
 - 11 – 11:50 (ICF 183)
 - 12 – 12:50 (ICF 183)

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Discussion is for...

- **Discussing Details about the Assignments**
- **Presenting Tools**
- **Discussing Readings**
- **Reviewing Material**
- **Preparing for Tests**
- **Reviewing Tests & Assignments**

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How to be successful (1)

- **Attend class**
 - Much is covered that is not in the textbook
 - Material is core part of the exams
 - What is said in class supercedes all else
 - Official place for announcements
- **Visit course Web site on a regular basis**
 - Assignments
 - Labs
 - Lecture Slides

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How to be successful (2)

- **Check EEE (will be set up next week)**
- **Attend Discussion Section**
- **Attend Labs**
- **Use Office Hours**
- **Ask Questions**

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Grading

| | |
|-------------|-----|
| Assignments | 41% |
| Labs | 14% |
| Quizzes | 20% |
| Final | 25% |

- Will scale only if necessary

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Assignments (1)

- **3 Assignments**
 - Will have at least 2 weeks to complete each Assignment
- **Format of the assignments**
 - Questions on Effort Estimation
 - Use a software tool to complete a task
 - Reflect on and document your experience

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Assignments (2)

- **Package properly**
 - Every assignment...
 - ...lists your student ID
 - ...lists your name
 - ...has a cover page with class title, Name, student ID and assignment #
 - ...is properly stapled
 - Electronic Submissions through Checkmate
- **Quality over quantity**
- **Express yourself clearly**
 - Be concise

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Assignments (3)

- **A new forum will be created on the Noteboard for each assignment**
 - Post your questions there
 - Ta, other students, and I will post answers, suggestions and additional information
- **Don't wait until the last minute to post (The TA may not be awake or available)**
- **Please turn in on time**
 - Do not wait until the last minute
- **No late assignments**

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Exceptions for being late

- **At the TA/Instructor's discretion**
 - Contact the instructor/TA as soon as possible
- **Valid reasons**
 - Serious illness, accident, family emergency, etc.
- **Not-so-valid reasons**
 - "No ink in my printer", "didn't know it was due today", "my computer crashed", "couldn't find parking", etc.

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Laboratories

- **Can drop one (Apx 8)**
 - Work needs to be completed by the END of the lab session
 - No late labs will be accepted
 - Usually will require work to be done during Lab
 - Sometimes will need to submit a write-up afterwards
 - Electronic submissions through Checkmate
- **PLEASE ATTEND THE SECTION YOU ARE REGISTERED IN**

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Quizzes and Final Exam

- Quizzes will be announced ahead of time (at least 1 class)
- Quizzes will primarily be based on lecture and readings
- The Final will be primarily based on lecture and readings, but may include some elements from discussion and labs

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Grading

- Performed by Grader – overseen by the TA
 - Might be double-checked by Me
 - Disagreements
 - Resolve with TA first, then with the instructor
 - The “points-game” does not work
 - TA and instructor have limited time
 - TAs/Graders are human too
 - Double check before you bring it in
 - Always check your (partial) grades
 - Re-grading
 - Within 1 week, accompanied by a clear explanation of what needs to be reconsidered and why
- Topic 1 Entire Assignment may be considered

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Questions

- When in doubt
 - Ask the TA
 - Ask the Instructor
 - Open door policy
 - Attend Office Hours
 - Noteboard for general questions
 - Email for sensitive questions
 - Questions will generally be answered within 24 hours (except weekends)
 - So don't leave your questions to the day before an assignment is due
- Topic 1 Ask your friends

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Help each other but don't share work (1)

- Please don't Cheat
 - Final grade is an “F”, irrespective of partial grades
 - Assignments, Labs, Quizzes, or Final
 - Letter in your UCI file
 - To avoid being a cheater
 - Always do your work by yourself
 - Do not borrow work
 - Do not lend work
 - Do not put your work on the Web
 - Use good Judgment
 - Your TA is your friend, but your friend is not your TA
- Topic 1 Your friend's help may be cheating

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Help each other but don't share work (2)

- Discussing an assignment is OK, copying the solution is not
 - Asking how to do something is not the same as having them do it for you
 - Anything copied from a book or website needs to be quoted and the source provided
 - ICS Cheating Policy
 - <http://www.ics.uci.edu/ugrad/policies/>
 - UCI Academic Dishonesty Information
 - <http://www.editor.uci.edu/catalogue/appx/appx.2.htm>
- Topic 1

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Add/Drop/Change of Grade Policy

- Adding the Class
 - Before end of the 6th week – Instructor's sig.
 - After 6th week also need Dean's sig.
 - Dropping the Class
 - Before end of the 2nd Week – Instructor's sig.
 - Weeks 3-6 – Instructors sig. (with careful consideration)
 - After 6th week – Dean's Signature
 - Change of Grade
 - Before end of the 2nd Week – Instructor's sig.
 - Weeks 3-6 – Instructors sig. (with careful consideration)
 - After 6th week – Dean's Signature
- Topic 1

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Adding/Dropping/Change of Grade

- Please bring completed Add/Drop Cards
- 2 Cards for the 3 components of the class (Lecture, Discussion and Lab)

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Other Policies

- Please use your UCI account
 - This is for your privacy
 - Needs to be activated if you are a new student
- Questions of general interest will be forwarded to the board
 - if you don't want it forwarded for some reason please state that
- If you need accommodations due to a disability, talk to me

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Miscellaneous

- INF 111 / CSE 121 mimics the real-world
 - Package your assignments/labs properly
 - Use proper language and proper form
- You get out of this class what you put into it
 - Attend discussion section (when it is being held)
 - Follow instructions
 - Read and study the textbook and slides
 - Help is available, do not be afraid to ask questions

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Course Objective

- To teach you basic tools & methods used in software engineering development

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Now to the fun part...

- Brief review of S/W concepts
- Overview of Software Tools and Methods

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What is Software Engineering?

- "A discipline that deals with the building of software systems which are so large that they are built by a team or teams of engineers." [Ghezzi, Jazayeri, Mandrioli]
- A discipline whose aim is the production of fault-free software, delivered on-time and within budget, that satisfies the user's needs. Furthermore, the software must be easy to modify when the user's needs change." [Schach]
- Software engineering is concerned with theories, methods and tools for professional software development [Sommerville]

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What is Software Engineering? (2)

- **Software engineers should adopt a systematic and organised approach to their work and use appropriate tools and techniques depending on the problem to be solved, the development constraints and the resources available**

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Why Software Engineering?

- **Software Crisis – Software is typically**
 - Late
 - Over Budget
 - Wrong product
- **To reduce Costs and increase quality**

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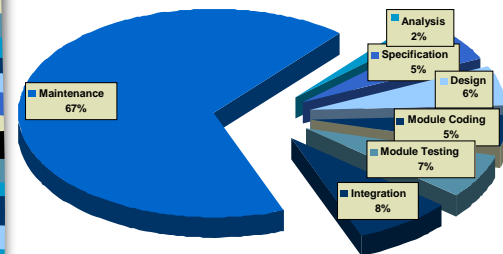
Software Costs

- **Software costs often dominate system costs. The costs of software are often greater than the hardware cost**
- **Software costs more to maintain than it does to develop. For systems with a long life, maintenance costs may be several times development costs**

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High Cost



[Schach]

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Software Engineering is not programming

Small project
You
Build what you want
One product
Few sequential changes
Short-lived
Cheap
Small consequences

Huge project
Teams
Build what they want
Family of products
Many parallel changes
Long-lived
Costly
Large consequences

Programming

Engineering

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What do we mean by HUGE?

- **Thousands of programmers**
- **Millions of lines of code**
- **Daily builds and regression testing**
- **More testers than programmers**
- **Needs to work on many machines**
 - Cross platform
- **Needs to be backwards compatible**

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The five P's of Software Engineering

- **People** - who develop, manage, and run the software
- **Product** - the software itself
- **Project** - the activity of creating the software
- **Process** - the manner in which the project proceeds
- **Professionalism** - the attitude of all involved

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From Programming to Engineering

- **People**
 - Who else would do the work?
 - Range from novice to very experienced
- **Processes**
 - To organize and manage the efforts of individuals
 - Range from informal to very formal
- **Tools**
 - To support the people and the processes
 - Range from simple to very advanced

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People + Processes + Tools ⇒ Product

People

- **The single most important factor in the success/failure of a product**
- **Scarce resource**
 - Quality
 - Suitability
 - Cost
- **Many different kinds of people**
 - Managers
 - Programmers
 - Technical writers
 - Testers

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Processes

- **Essential to achieve a quality product**
- **(Time is a) scarce resource**
 - Quality
 - Suitability
 - Cost
- **Many different kinds of processes**
 - Bug tracking
 - Change approval
 - Quality assurance

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Focus of ICS 52

Tools

- **Needed to support people and processes**
- **Scarce resource**
 - Quality
 - Suitability
 - Cost
- **Many different kinds of tools**
 - Drawing
 - Analysis
 - Project management
 - Source code management

} people support

} process support

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Product

- **Result of applying people, processes, and tools**
- **Consists of many deliverables**
 - Software
 - Documentation
 - User manuals
 - Test cases
 - Design documents
- **Intrinsic qualities**
 - Safety
 - Reliability
 - User friendliness







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People, Processes, Tools, Products

- **Products are always the eventual goal**
 - Selling products creates revenue
 - Selling good products creates lots of revenue
 - Selling bad products creates little revenue
- **People, processes, and tools are retained by organization**
 - Build a reputation through the quality of products
 - Create organizational culture
 - Important to keep the team intact

Topic 1 *People + Processes + Tools ⇒ Product* 43

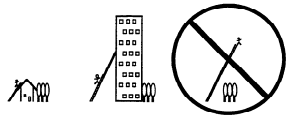
Choose the Right Solution

| | | | |
|--|---|---------|---|
|  | ↔ | Hawaii |  |
|  | ↔ | Tijuana |  |
|  | ↔ | Europe |  |

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Matters of Scale

When orders-of-magnitude improvement are required, new technology may be necessary



- **Choose appropriate technique for problem**
 - elephant gun to kill a fly?
 - fly-swatter to ward off an elephant?

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Most Students have used:

- **Text editors**
- **Maybe some have used IDE**
(Integrated Development Environment like Netbeans)
- **File system to manage projects**
- **Print statement for debugging**

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Problem – Approach Doesn't Scale

- **May work for 1 or 2 students**
- **Doesn't work with..**
 - More people
 - Bigger code
 - Different versions
 - Multiple Platforms

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Announcements

1. **No Discussion on Monday**
2. **Brush up on your Java**
3. **Read Van Vliet Ch1 and 19**
4. **Read Brooks 16**
5. **WELCOME TO CLASS ☺**

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