CSE 403: Software Engineering, Winter 2016

courses.cs.washington.edu/courses/cse403/16wi/

Introduction

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outline

Staff, About, Format, Advice, Goals

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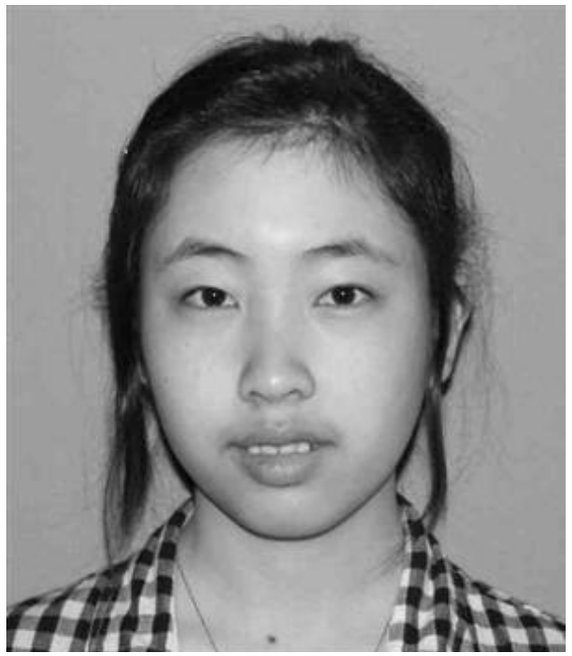
Emina Torlak

(emina)



Yunyi Song

(bessieyy)

Ignacio Cano

(icano)

focus

This course is about *engineering* software.

What is software engineering?

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Software engineering is about people working in teams under constraints to create value for their customers.

What is software engineering?

"The first step toward the management of disease was replacement of demon theories and humours theories by the germ theory. That very step, the beginning of hope, in itself dashed all hopes of magical solutions. It told workers that progress would be made stepwise, at great effort, and that a persistent, unremitting care would have to be paid to a discipline of cleanliness. So it is with software engineering today."

Fred Brooks

Aspects of software engineering

1. Processes, methods, and techniques necessary to turn a concept into a robust deliverable that can evolve over time
2. Working with limited time and resources
3. Satisfying a customer
4. Managing risk
5. Teamwork and communication

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- economics/marketing (selling, niche markets, monopolies)
- communication (managing relations with stakeholders: customers, management, developers, testers, sales)
- law (patents, licenses, copyrights, reverse engineering)
- sociology (modern trends in societies, localization, ethics)
- political science (negotiations; topics at the intersection of law, economics, and global societal trends; public safety)
- psychology (personalities, styles, usability, what is fun)
- art (GUI design, what is appealing to users)

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Necessarily "softer" than other parts of CS; fewer clearly right/wrong answers

Roles of people in software

- **customer / client**: wants software built
- **managers**: make plans, coordinate team
- **developers**: design and write code
- **testers**: perform quality assurance (QA)
- **users**: purchase and use software product

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    - can be fickle and can misunderstand the product

Course format

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- **Group project**: to give you hands-on experience with the material
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    - **Social** challenges given the team effort
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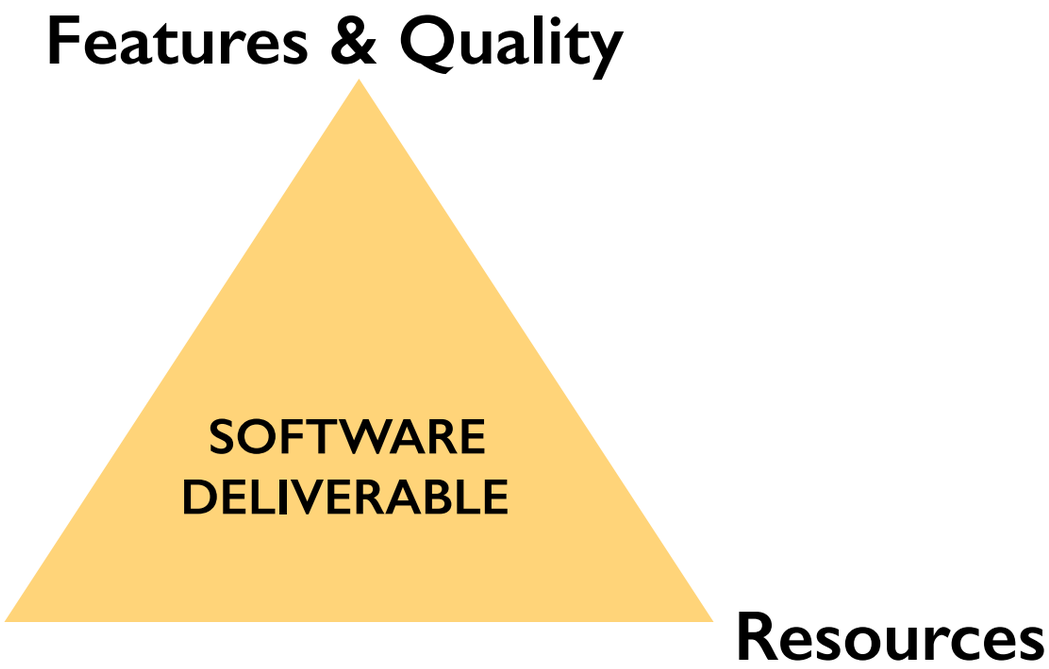

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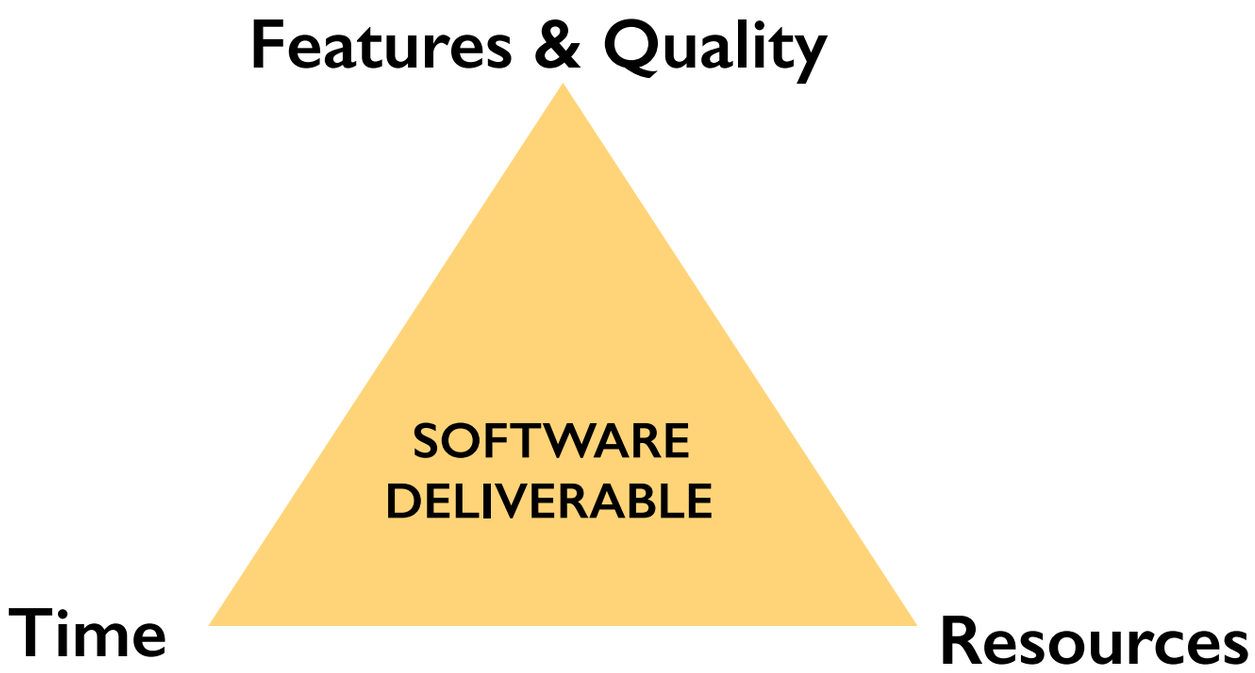
What is a software project?



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"Good, fast, cheap … choose two"

The project

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    - And then vote on which products to "fund"

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    - Reflects modern methodologies for effective development
- A TA will act as your customer
    - A project is successful only if it satisfies its customer

This Thursday and Friday!

Project development stages

- Proposal
- Requirements
- Design
- Implementation
- Testing, validation, verification
- Documentation
- Customer exposure
- Final deliverable

Choose your own tools and frameworks!

We'll hit the ground running …

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    - Vision and novelty
    - Architecture
    - Challenges and risks

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- Prepare a 3-slide, 3-minute product pitch in teams of 2
    - Vision and novelty
    - Architecture
    - Challenges and risks
- Schedule for this week:
    - Pair up **by Tue at noon**
    - Propose by **Wed at 11pm**
    - Pitch your idea on **Thu (section) and Fri (lecture)**
    - Vote by **Fri at 11pm** (rank your choices, self-select teams)

Project culture

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    - We expect you to work to build a real system
    - To be used by real people

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- This is a real project
    - We expect you to work to build a real system
    - To be used by real people
- This is real engineering
    - Take initiative
    - Find and solve problems yourselves
    - Coding is only part of the job
    - Good planning and design, hitting your market, and working well with your team, are all needed for success

Grading and academic integrity

- Grading
  - Project: 65%
  - Reading assignments: 15%
  - Final exam: 20%
- Academic integrity
  - Simple: *do not cheat*!
  - Do individual work by yourself.
  - Do group work with your teammates only.

Lessons from past students

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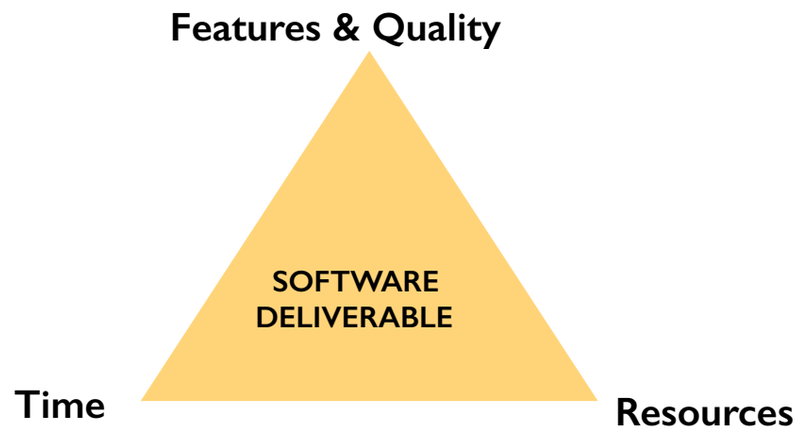
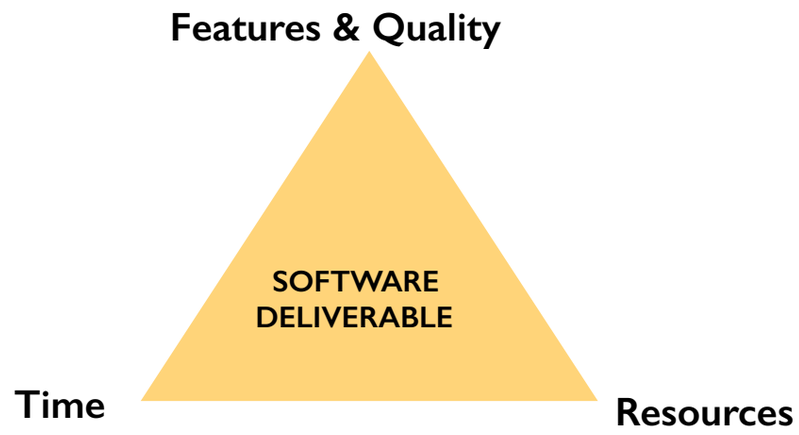
- Team communication and cooperation are all-important
- Working together (physically) was good
- Well-run and consistently scheduled meetings help a project a lot

Scheduling



Scheduling

- We often underestimated tasks. If we had spent more time analyzing each task and breaking it down into more manageable chunks our estimated completion times would have been more accurate.



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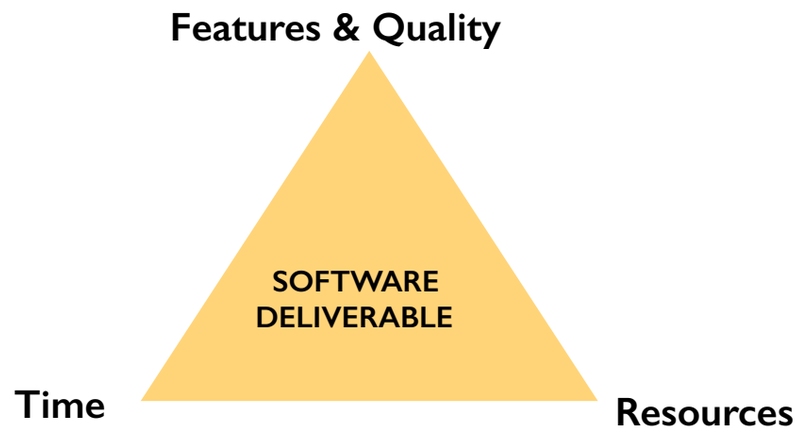

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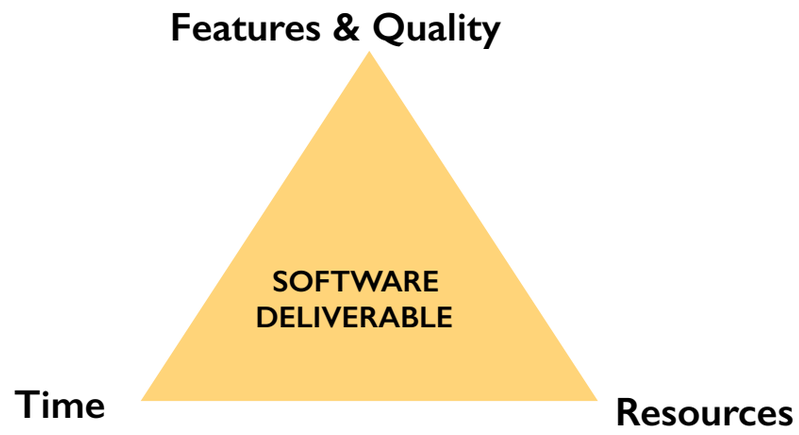

Scheduling

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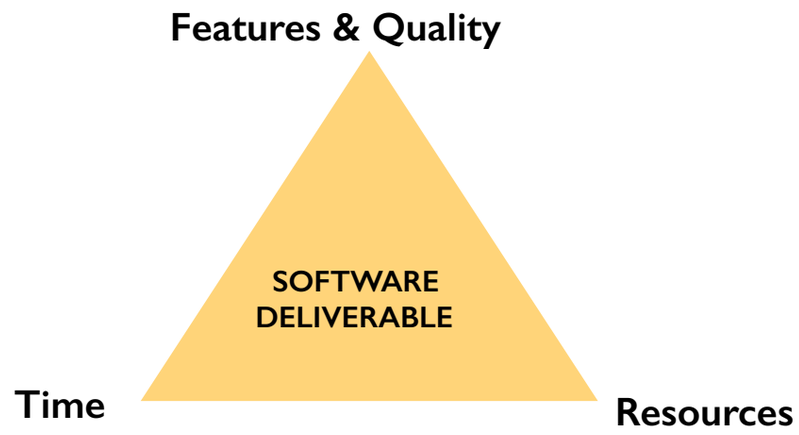
- Get things done early; don't cram at the end
- Remember you can cut features (triple constraint)
- Don't underestimate the difficulty of learning new programming languages, frameworks, and tools



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- We needed a better upfront testing design
- We learned (through some pain) to ensure to do small, frequent updates and commits. Failing to do this results in merges that can be a nightmare.

goals

This sounds like a lot of work! Why take this course?

What’s in it for you?

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- See how software is produced, from idea to ship to maintenance
- Get exposure to software development practices in use today
- Get experience collaborating in a team toward a common goal
- Be able to articulate and understand technical ideas

Unique aspects of CSE 403

- Cross-disciplinary nature of the subject
- Larger teams
- Propose and work on your own ideas
- Course staff in the "coach" role
- Mistakes along the way are encouraged, not penalized
- Few clearly right/wrong answers
- Plans always change
- Content: software design, testing, project management, etc.

Isn't this just like an internship?

- It's not in that internships are
  - Focused on one role in the team (often dev. or test)
  - Requirements, arch, high-level design may be set
  - Less opportunity for reflection
  - Less generalization (such as from reading papers)
  - Mentor may be more focused on results than process and developing you as an engineer
- Internships are complementary to CSE 403
- People who have had internships learn different things in CSE 403, but no less

CSE403

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