Software Engineering

- Application of systematic, disciplined, quantifiable approach to software development, operation and maintenance of software. (*IEEE-Std.*)
- The term *software engineering* was used occasionally in the late 1950s. It was popularized as a response to the software crisis during the 1968 NATO Software Engineering Conference (held in Garmisch, Germany) by its chairman F.L. Bauer, and has been in widespread use since.

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Why do we need SE?

- Increased demands for software with:
  - high quality
  - high complexity
  - delivered promptly
  - low price
- Frequent failures:
  - Space shuttle
  - Nike
  - Denver airport

Charette, R.N. (2005) Why Software Fails, IEEE Spectrum, September 2005

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Challenges to SE

- Different types of software:
  - criticality
  - # users
  - # developers
  - # platforms
  - risk
  - cost
- There will be changes
  - degrading performance
  - maintenance account for 70% of life cycle cost
- Everyone want the latest technology
- Different types of knowledge:
  - Understanding customers
  - Understanding users
  - Managing projects and people
  - Communication
  - Staffing
  - Design at many levels
  - Programming tools
  - Components
  - Testing
  - Quality assurance
  - Business
  - Risk management
  - Technology assessment
  - .....

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My view

Make processes, but also components, tools, people,... fit nicely together

Always ask what you need and what you can get.
The rest is like finishing a jigsaw-puzzle.
(The Boeing 777-200 has about 1400 data processing units and 5 million lines of code.)

This course will present you some basic SE-elements mostly suited for 10^1-10^2 people projects.

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Learning from experience

- Dilbert: Work, work, work...., try to forget.
- Low key: Written reflections, daily assessment, weekly measurement (hours, lines of code)
- OK: Write experience reports
- Good: Formulate a model, make predictions (set goals), explain results

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Simple example

	Guess (weeks)	Actual (weeks)
Requirements and planning	4	4
Design and coding	8	10
Testing	4	4
Writing report	4	4

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Higher division

- Gradual introduction: students, pilot, full-scale
- Parallel design
- Comparative studies
- Controlled experiments

- + other methods from natural science and social science

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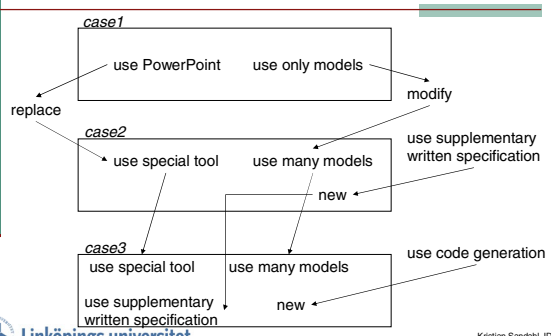
Example: Blocked case-study



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