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Wrap-Up: Software Engineering

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"Good, Fast, Cheap:
Pick any two (you can't have all three)."
-- from RFC 1925

Replay: What is Software Engineering?

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- Software Engineering (SE) is
  multi-person construction of multi-version software [Parnas]
- SE as *Engineering* Discipline
  - Adherence to quality standards
  - Role model: classic engineering disciplines
    - *mechanical engineering, civil construction, ...*
- SE offers
  - management, theory, organisation, methods, tools, techniques ↳
  - ...for constructing large program systems

> When reporters asked astronaut Alan Shepard (Freedom 7, 1961) what he thought about as he sat atop the Redstone rocket, waiting for lift-off, he replied, 'The fact that every part of this ship was built by the low bidder'.
>
> -- Gene Kranz, *Failure Is Not an Option*

A Layered View on Software Engineering

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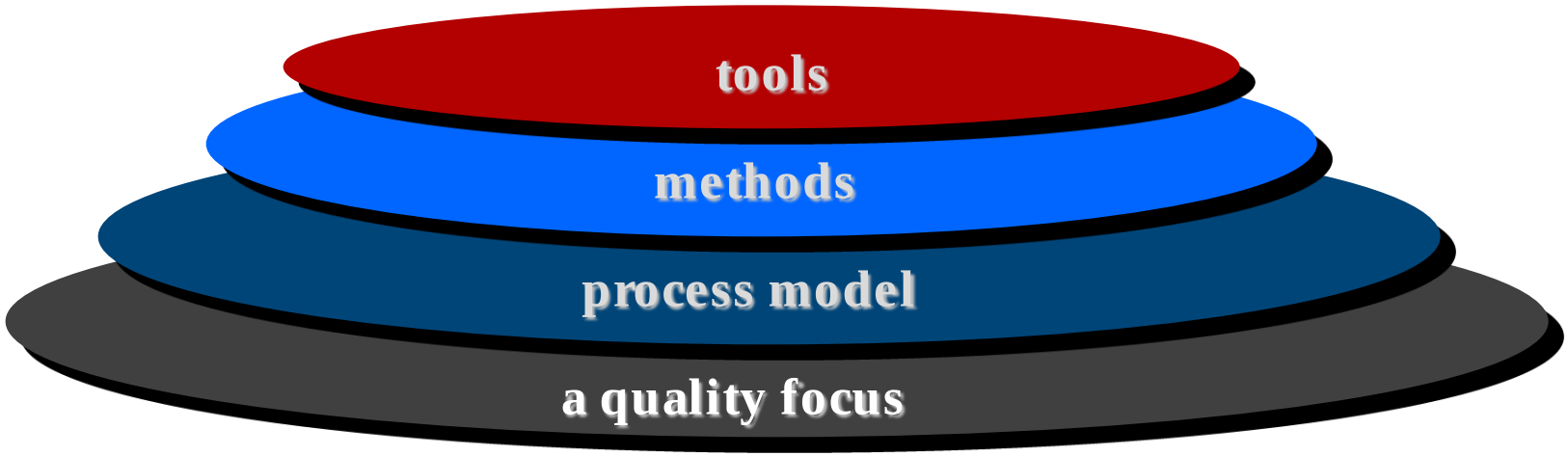

CASE Technology

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- CASE = Computer-Aided Software Engineering
- CASE technology has led to significant improvements in the software process
- However, not the "order of magnitude" improvements that were once predicted
  - Software engineering requires creative thought - this is not readily automated
  - Software engineering is a team activity and, for large projects, much time is spent in team interactions. CASE technology does not really support these.

Brief, Incomplete History of SE Paradigms

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- (symbolic) machine code ("assembler")
- High-level languages ("compiler"), abstracting from architecture
- Structured programming
  - Functions (with/without parameters & local variables)
  - blocks, scope replacing goto
- Object-oriented programming
  - Communicating objects – encapsulation, class hierarchies
  - *"Object-orientation is to data what structured programming is to control flow (goto!)"*
- Component-based architectures
- Service-oriented architectures (SOA)

The “New” SE Process

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- Structured
  - Data & code
    …and the SE process itself
- Object-oriented
  - Classes, responsibilities, collaboration
- Incremental
  - Delivery occurs in increments
  - All SE activities are iterative
- Agile
  - process & people must be adaptable

One voice out of zillions, but a good one IMHO:
www.stsc.hill.af.mil/crosstalk/2008/08/0808Weinberg.html
see also: www.geraldmweinberg.com/Site/Software.html

Your Goal as a Professional?

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www.airlineriskcalculator.com/

Quality isn't Job One

Being totally fucking amazing is Job One

[www.airliners.net – Paul Santos]

What Does Industry Expect From You?

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Marion Berkmann, Senior Manager HR Germany, NetApp:

- Flexibility, motivation, ability to work on your own.
- Basic technology know-how, in-depth market knowledge, a customer oriented approach, and willingness to learn.
- IT experts increasingly take over consulting and management tasks!

Programmer: A red-eyed, mumbling mammal capable of conversing with inanimate objects.

Programmer's Professionalism

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- knowledge
  - tools, methods, best practice – *keep on learning!*
- + diligence
  - documentation, testing, and all the other 'ugly' duties – *make it your habit!*
- + anticipation
  - what constellations can occur? Worst case? – *feeling for machine + circumstances*
- = **craftsmanship**
- *...plus responsibility & ethics*

Best success!
...for your sake
& that of your users

Quality...Why Bother?

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- „Nothing is as stable as an interim solution“
  - Y2K; rail track gauge 4 ft 8.5“
- Railway builder Stevenson relied on measure ~identical to Roman chariots

- → better do it right the first time
  - „quality“ is just a shorthand for „make it work – always“

(more discussion here and here)