

Changing Software Engineering

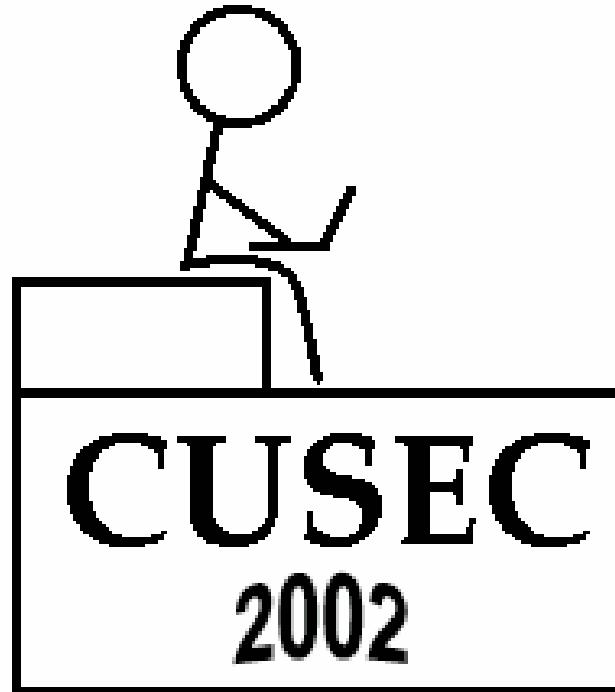
Peter Grogono

Department of Computer
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Software Engineering is changing

Making changes to Software Engineering

The Engineering of changing Software



Canadian Undergraduate Software Engineering Conference



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If builders built buildings the way programmers wrote programs, then the first woodpecker that came along would destroy civilization.

Jerry Weinberg

SOFTWARE ENGINEERING

Report on a conference sponsored by the
NATO SCIENCE COMMITTEE
Cernobbio, Italy, 27th - 30th October 1969

Chairman: Professor Dr. F. L. Bauer
Co-Chairman: Professor L. Afflerbach, Dr. H. J. Bartsch

Organizing Faculty: Dr. G. Baudet

January 1970

REPORT ON A CONFERENCE SPONSORED BY THE
NATO SCIENCE COMMITTEE
BOGUE, ITALY, 27TH - 30TH OCTOBER 1969

SOFTWARE ENGINEERING TECHNIQUES

CHAIRMAN : PROFESSOR P. EBCOU
CO-CHAIRMAN : PROFESSOR DR. F. L. BAUER

EDITORS : J. R. BURTON and B. TANDEL

APRIL 1970



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Paradigm shifts

- Structured design
- Abstract data types
- Information hiding
- Object oriented design
- Aspect oriented design
- Learner centered design

Programming languages

- COBOL
- FORTRAN
- C
- Pascal
- C++
- Java
- C#

But, as we look to the horizon of a decade hence, we see no silver bullet.

Fred Brooks

I find myself more and more exasperated with great inflexible sets of rules that many companies try to pour into concrete and sanctify as rules. The idea that a single method should govern even two different projects is highly suspect: the differences between projects are much more important than the similarities.

Tom DeMarco

Progress 1995 - 2000

Cancelled	31%	23%
Challenged	53%	49%
Successful	23%	16%
Overrun	12%	2.5%
Cost of failure	\$81 billion	\$75 billion
Cost overrun	\$59 billion	\$22 billion

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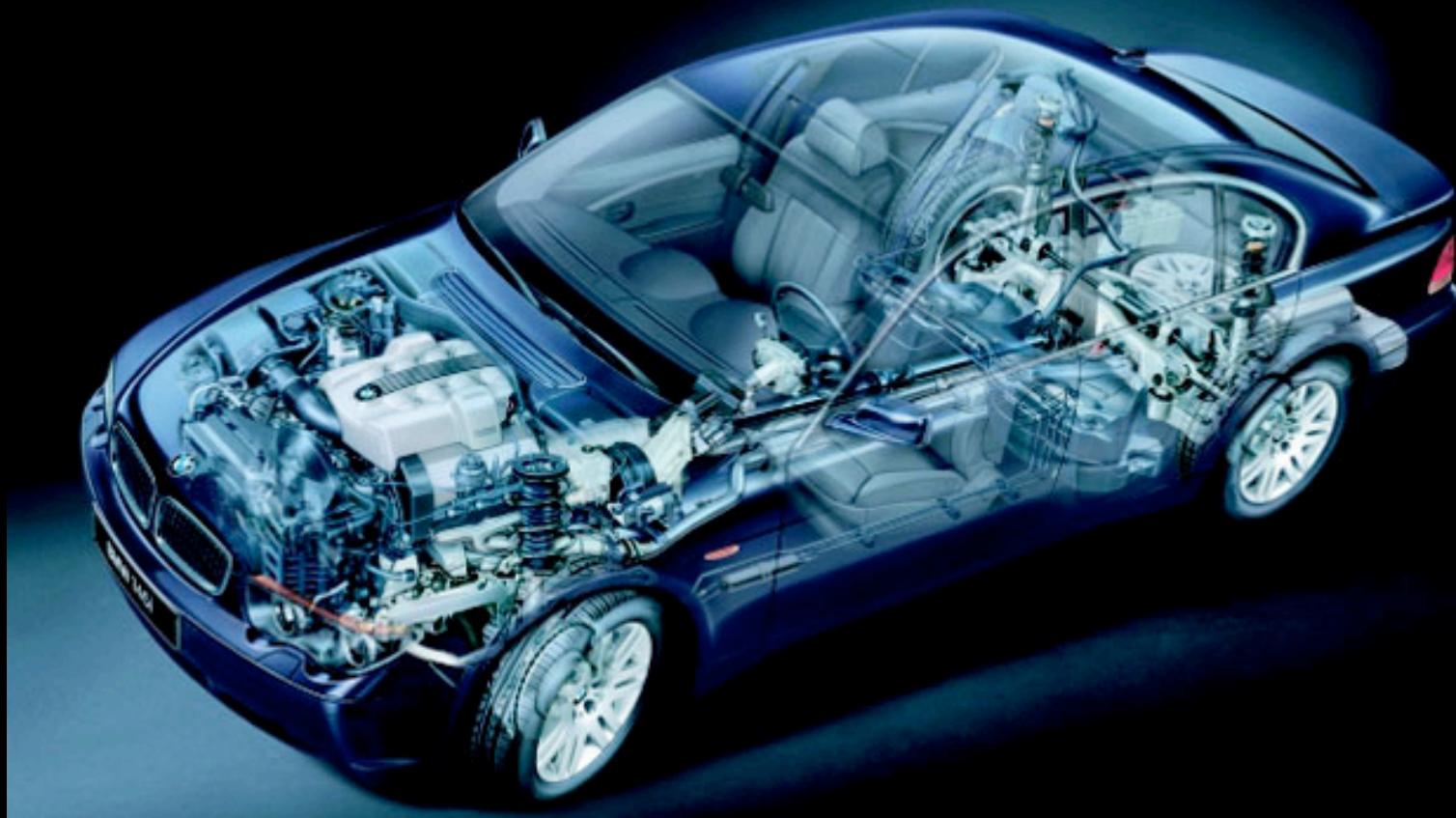
```
void qsort
(
    char *base,
    unsigned count,
    int size,
    int (*compar)
        (void *px, void *py)
) ;
```

```
template<  
    typename RandomAccessIterator,  
    typename Compare>  
void sort(  
    RandomAccessIterator first,  
    RandomAccessIterator last,  
    Compare comp );
```



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BMW Series 7 has 65 microprocessors

- One for each headlight
- One for each airbag
- One for the rear-view mirror
- Transmission talks to mirrors
- ABS talks to the radio
- GPS talks to the cell phone



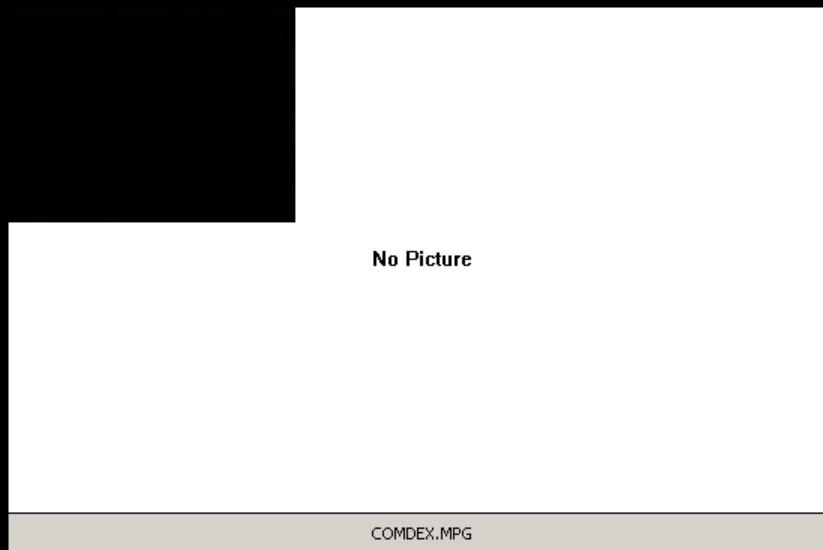
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- BMW hires **automotive engineers** and teaches them to program
- Boeing hires **aeronautical engineers** and teaches them to program
- **Software engineers** must learn to speak the jargon

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Software Engineers

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What Software Engineers have to do:

- Learn to talk to other engineers
- Be familiar with lots of tools and techniques
- Know how to choose the **best** tools
- Be prepared to learn local practices
- Stop being scared by mathematics
- Accept professional responsibilities

What Software Engineering educators have to do:

- Identify basic principles
- Relate principles to practice
- Be active researchers
- Be leaders, not followers
- Keep improving the curriculum
- Insist on high standards

- Training = how to use a tool
- Education = how to choose the best tool

What Software Engineering researchers have to do:

- Empirical research: find out what works, what doesn't work, and why
- Theoretical research: discover the basic principles that underlie software engineering
- Stop selling snake oil

But, in our enthusiasm, we could not resist carrying out a complete overhaul of the system, during which weaknesses were exposed, analyzed, and replaced with new weaknesses.

Bruce Leverett

Logic, like whiskey, loses its
beneficial effect when taken in too
large quantities.

Lord Dunsany (1878-1957)

You are not here to worship what is known, but to question it.

Nancy Leveson

Rules are my very humble,
obedient servants.

Josef Haydn (1732-1809)

PERSPECTIVE VIEW FROM GUY AND STE-CATHERINE



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