CSC 221 – Introduction to Software Engineering

Alan Dix
John Mariani

www.hcibook.com/alan/teaching/CSC221/

course text

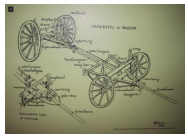
Ian Sommerville
Software Engineering, 6th Edition
Addison-Wesley, 2001
ISBN 0-201-39815-X

www.software-engin.com

overview

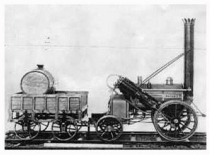
Alan Dix	introduction and rationale (ch1-ish) software engineering processes (ch 3), system engineering (ch 2), debugging!
John Mariani	verification and validation (part 5: ch 19,20,21) project management (ch4) management (part 6: ch 22–25) professional, ethical and legal issues (ch 1)

engineering?



- craft
  - personal skill
  - experience
  - flexible materials

- engineering
  - tables and tools
  - recorded knowledge
  - controlled materials



size matters

design and construction in the small

- garden path
- tree house
- program to add up numbers

craft

- garden path, tree house
- program to add up numbers
  - complete view of problem
  - one person in control
  - focus on final goal
  - personal skills

design and construction in the large

- garden path ® motorway
  civil engineer
- tree house ® skyscraper
  architect
  structural engineer

engineering

- motorway, skyscraper
  - complex problem
  - decomposed goal
  - many people involved
  - logistics, management, costs
  - quality control, safety

... and software?

- garden path ® motorway
  civil engineer
- tree house ® skyscraper
  architect, structural engineer
- add up numbers ®
  hospital record system
  airbus control system

software engineer!

physical things

- directness of effect
  – push and it moves
- locality of effect
  – here and now
- visibility of state
  – small number of relevant parameters

what's special about software?

- complexity of effect
  – computation
- non locality of effect
  – in space – networks
  – in time – memory
- hidden state
  – large number of invisible variables

other complex systems

- chemical plants
- economic systems
- large organisations
- hydraulics
  - non-locality
  - complex interactions

... increasing complexity

- chemical plants
- economic systems
- large organisations
- hydraulics

replaced or supported by

software

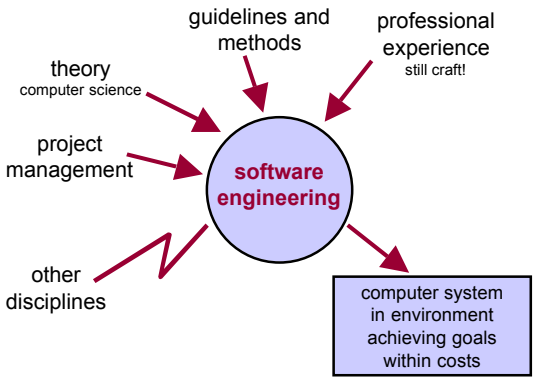
kinds of software

specialisation

- **generic**
  - word-processor
  - database
- **bespoke**
  - control system
  - business process
- \+ domain specific
  - SAP (customisable)

interaction

- **stand-alone**
  - word-processor
  - payroll
- **embedded**
  - washing machine
  - guided missile
- **networked**
  - ATM, web browser



when it goes wrong ...

- Ariane 5 ...