CSC 221 – Introduction to Software Engineering

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

course text

Ian Sommerville
Software Engineering, 6th Edition
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www.software-engin.com

overview

Alan Dix
- introduction and rationale (ch1-ach)
- 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 ...