Software Development Team Structures
(3C05/D22)

Unit 7: SW Development Team Structures

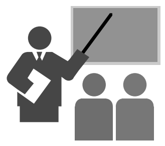
- Objective:
  - To discuss the different roles involved in large-scale software engineering projects
  - To show the qualifications and capabilities for team members adopting these roles
  - To review how teams are composed and projects are staffed.

Creating an OO Team

- Software Development Learning Curve
  - 1 month to learn language syntax
  - 6 to 9 months to become proficient in new paradigm
  - 12 to 18 months to become moderately proficient in modelling and methodology

How to Kick-Start an New-Paradigm Project

- Mentoring!
- Seed project with experienced people
- External/internal consultants at key stages
  - Planning
  - Project start up
  - Regular design and code reviews
  - Post-project review

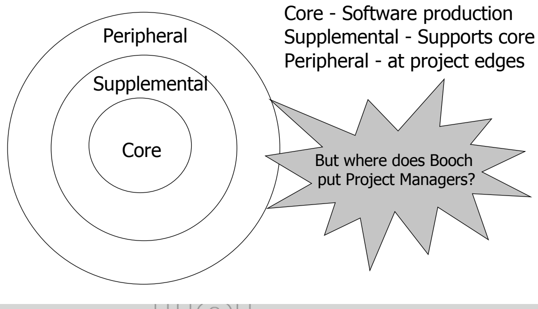


Case Study

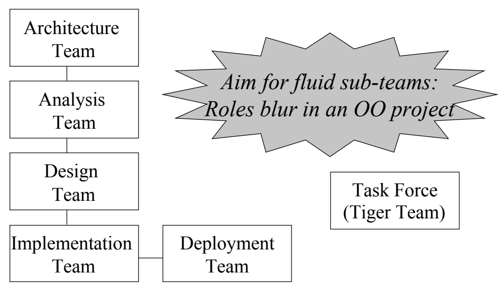
- A company took a group of non OO programmers and over a period of one month trained them in C++ and an OO methodology. They then launched them straight into a full-blown OO Project. Naturally the Project failed badly. How did this happen? Management did not understand that object technology is different to conventional software development.

The OO Project Team *According to Booch!*

Core - Software production
Supplemental - Supports core
Peripheral - at project edges



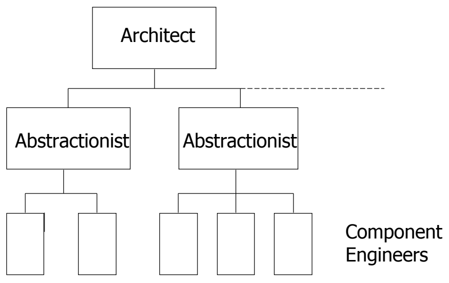
Sub-teams



Abstractionists

- To simplify our discussion, we introduce the role of *Abstractionist*
- Abstractionists embrace the following USDP roles:
  - Use-Case Specifier
  - Use-Case Engineer
  - System Analyst
  - System Integrator
- These USDP roles are often done by the same person anyway!

Core Team: Structure



What about testing?

- Testers can be a member of an Abstractionists team (just like a Component Engineer)
- Testers may belong to a separate Test Team

This often depends on company policy!

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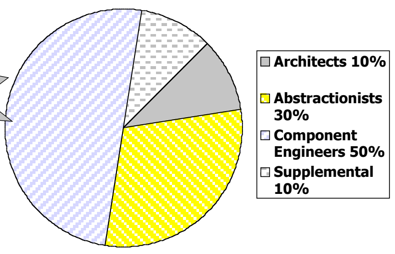
Staffing

These are just average figures!



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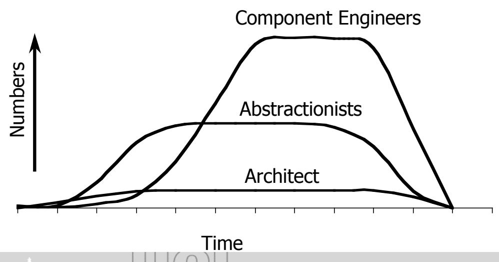
Staffing Profiles



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Core Team: Roles

- Architect
  - System architecture and vision
- Abstractionist
  - Micro-architectures
  - One Abstractionist per class package
- Component Engineer (programmer)
  - Implementing abstractions

Architect: Responsibilities

- System Architecture
- Assess technical risks
- Define content of successive iterations
  - Help in planning
- Consultancy
- Marketing
  - Future product definition

Architect: Skills

- Experience
  - Problem domain
  - Software engineering
- Vision
- Leadership
- Communication
- Proactive and goal-oriented
- Risk taker

Abstractionist: Responsibilities

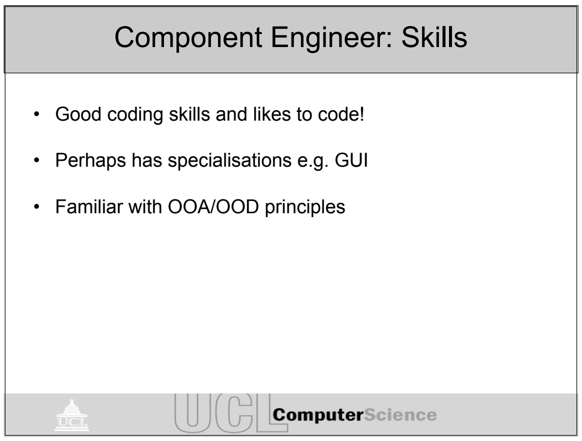
- Identify classes, packages, subsystems, mechanisms, frameworks
- Define interfaces
- Direct implementation and (possibly) testing
- Advise and support the Architect
- Mentor and lead Component Engineers

Abstractionist: Skills

- Experience
  - Must know how to find abstractions
  - Strong programming skills
- Leadership
  - Ability to manage a small team of developers
- Communication
  - Able to express complex ideas simply
- Proactive and goal-oriented

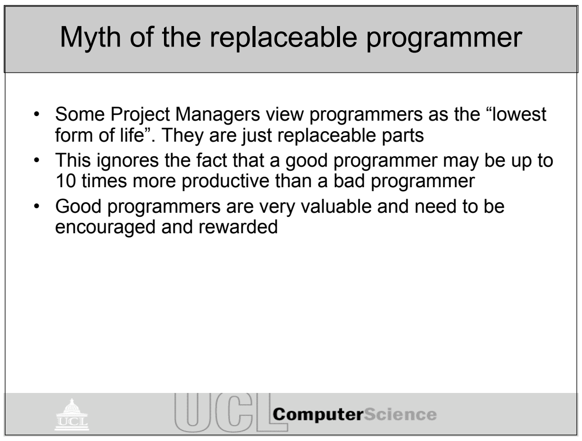
Component Engineer: Responsibilities

- Implement scenarios, mechanisms and classes
- Tactical class design
- Class-level testing
- Advise abstractionist about tactical risk
- Participate in Task Forces and code walkthroughs



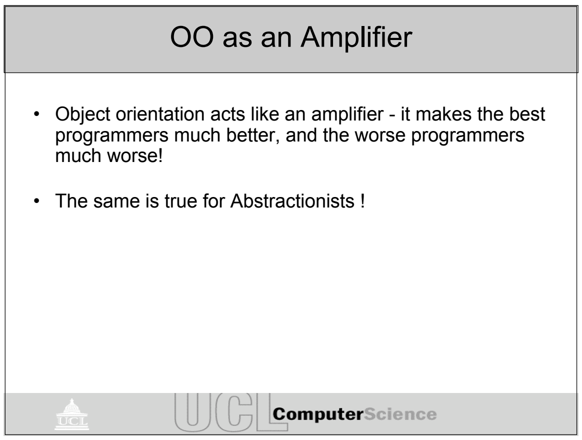
Component Engineer: Skills

- Good coding skills and likes to code!
- Perhaps has specialisations e.g. GUI
- Familiar with OOA/OOD principles



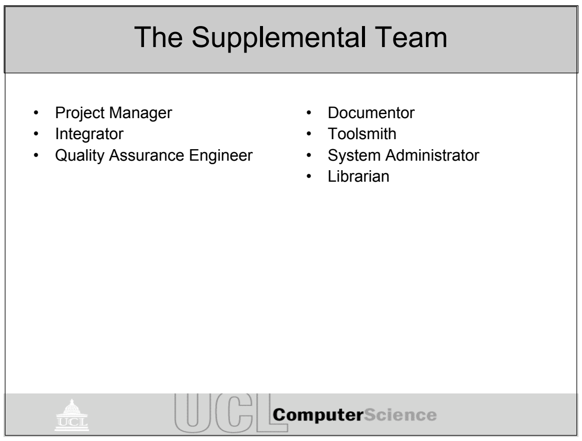
Myth of the replaceable programmer

- Some Project Managers view programmers as the “lowest form of life”. They are just replaceable parts
- This ignores the fact that a good programmer may be up to 10 times more productive than a bad programmer
- Good programmers are very valuable and need to be encouraged and rewarded



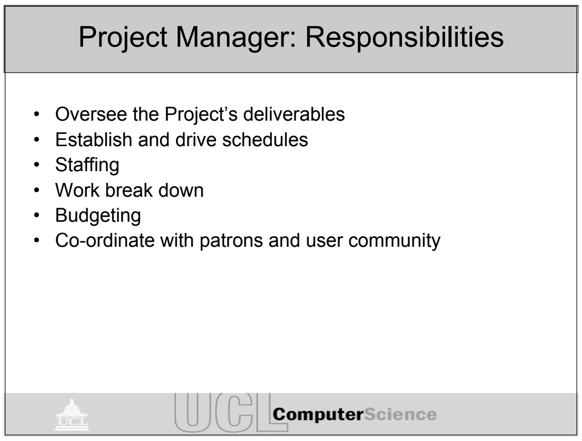
OO as an Amplifier

- Object orientation acts like an amplifier - it makes the best programmers much better, and the worse programmers much worse!
- The same is true for Abstractionists !



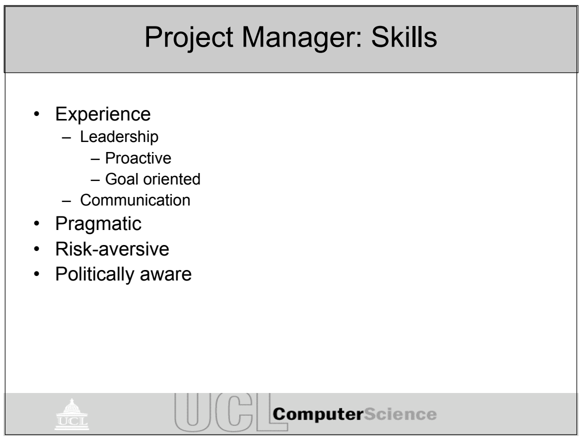
The Supplemental Team

- Project Manager
- Integrator
- Quality Assurance Engineer
- Documentor
- Toolsmith
- System Administrator
- Librarian



Project Manager: Responsibilities

- Oversee the Project's deliverables
- Establish and drive schedules
- Staffing
- Work break down
- Budgeting
- Co-ordinate with patrons and user community



Project Manager: Skills

- Experience
  - Leadership
    - Proactive
    - Goal oriented
  - Communication
- Pragmatic
- Risk-aversive
- Politically aware

The Peripheral Team

- Patron
  - Champions the Project
- Product Manager
  - Manages a product line
  - Manages marketing, training, support
- End user
  - Client of the Project
- Technical support

Key Points

- The key to successful operation of the USDP or any other OO lifecycle is to organise into small flexible teams
- There should be a “chain of responsibility” and continuity of ownership for artefacts from requirements down to code
- A good policy is to give responsibility for whole chains to individual teams