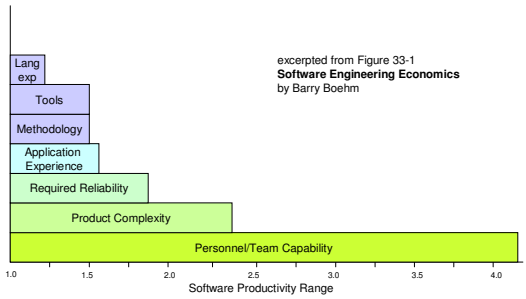
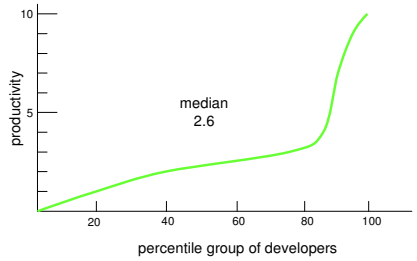
Team Structure and Processes

- Productivity
  - group and individual productivity
  - contributing factors, development
- Collaboration
  - practices, Pair Programming
- Teams & Projects
  - training & mentoring
  - team structure & leadership
  - distributed development issues
- Project 2: GKrellM plug-in

Contributors to Productivity



individual productivity



Individual Productivity

- more than a 10x difference among programmers with similar tenure
- there are many contributing factors
  - familiarity with domain and tools
  - range of experience (not years)
  - innate programming and debugging ability
  - motivation, initiative and enthusiasm
- raw speed often falls with experience
  - but quality rises, improving productivity

Improving Productivity

- work on many different domains
  - learn different programming techniques
  - learn different testing techniques
  - learn different debugging techniques
- work with many different people
  - help other people with their problems
  - learn perspectives & tricks from other people
- learn from your mistakes
  - ask “what should I have done differently?”

.

Was uns nicht umbringt macht uns nur stärker.

Friedrich Wilhelm Nietzsche
Mensch und Übermesnch

Good Collaboration

- prevents mistakes
  - a second set of eyes finds many problems
    - duplicated or unclear code
    - unwarranted assumptions
- helps us out of problems
  - give us options when we become blocked
- improves project understanding
  - learn how other parts of project work
- improves skill dissemination
  - we can learn others' skills and techniques

many ways to share the work

- collaborative design
  - working together at the white-board
  - **A** challenges, **B** defends
  - **A** draws/types, **B** suggests, enumerates
- cooperative coding
  - code different parts of a collaborative design
  - **A** codes functionality, **B** codes test cases
- Pair Programming
  - **A** types, **B** reviews, challenges, suggests

Pair Programming

- not a review, but a development practice
  - does not eliminate need for reviews
- difficult design/coding is done in pairs
  - two heads to solve difficult problems
  - two sets of eyes to see mistakes
  - serving complementary roles
    - design, code, review, how to test
- in many cases it works very well
  - improving productivity, reducing errors

getting Pair Programming right

- must be able to work very well together
  - approach, pace, personality, style
- each partner must carry his own weight
  - if one is doing most of the work, it is a waste
  - Pair Programming is not newby training
- don't re-use same teams every day
  - different people have different strengths
  - we learn new things from new people
- only use it on big enough problems

Training

- usually for new team members
  - familiarize them with domain and process
  - develop skill with tools and techniques
- may be formal, practical, or combination
  - reading, seminars, workshops
  - assignments chosen for skill development
  - internship rotations
- may be standardized or ad-hoc
- may involve a designated trainer

Mentoring

- usually for high potential individuals
  - long term, one-on-one relationship
  - to help them make the next step in growth
- career coaching
  - general discussion and counsel
  - seldom involves formal instruction
  - mentor may have little relationship to mentee
- protégé relationships
  - training and assessment for a new position
  - usually starts out as an assistantship role

Team Structure

- strict hierarchy works ...
  - if leader has required skills and experience
  - if team trusts the their leader
- flat collaboration works …
  - if members have required skills & experience
  - if people step-up to all responsibilities
  - if people can manage their own productivity
  - if the team can always reach consensus
- anarchy … probably doesn't work

Leadership

- trust and respect
  - ability and fairness must be beyond reproach
- ability to inspire and motivate
  - you can only lead if others will follow you
- communication skills
  - must be able to communicate up and down
- organizational and domain knowledge
  - must understand processes we are part of
  - must understand problem and solution

Distributed S/W Development

- Advantages
  - larger pool of developers
  - closer proximity to customers
  - potential cost savings
- Challenges
  - communications (language, distance, time)
  - coordination (aggravated by communication)
  - social distance (cultural, organizational)
- Effectiveness
  - depends on problem, organization, people

Project 2
(GKrellM plug-in)

a) Concept & Planning
b) Research & Specifications
c) Design
d) Test Plan
e) Design Review & Revisions
f) (EXTRA CREDIT) Build and Test

x) all project Post-Mortem

For Next Lecture

- McConnell 19.6, 22 (esp 22.3)
  - introduction to static complexity
  - tactical overview of key approaches
- Wikipedia: Software Testing
  - brief, definition and overview
- Kampe: Introduction to S/W Unit Test Cases
  - overview of key concepts in S/W testing
- Cornett: Code Coverage
  - good overview of coverage concepts & tools

Supplementary Slides

Poisonous Activities

- in-fighting
  - trying to make other people/groups look bad
- sabotage
  - undermining a process you disagree with
- finger pointing
  - blame avoidance rather than problem solving
- empire building
  - advancing yourself at the expense of others
- dishonesty
  - telling people what you think they want to hear
- putting form ahead of substance
  - following rules, while avoiding doing the right thing