Team dynamics

CSE 403

Team pros and cons

- Benefits
  - Attack bigger problems in a short period of time
  - Utilize the collective experience of everyone
- Risks
  - Communication and coordination issues
  - Groupthink: diffusion of responsibility; going along
  - Working by inertia; not planning ahead
  - Conflict or mistrust between team members

Communication: powerful, costly!

- Communication requirements increase with increasing numbers of people
- Everybody to everybody: quadratic cost
- Every attempt to communicate is a chance to mis-communicate
- But *not* communicating will *guarantee* mis-communicating

Team structures

- Tricky balance among
  - progress on the project/product
  - expertise and knowledge
  - communication needs
  - …
- "A team is a set of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable." – Katzenbach and Smith

Common SW team responsibilities

- Project management
- Functional management
- Developers: programmers, testers, integrators
- Lead developer/architect ("tech lead")

- These could be all different team members, or some members could span multiple roles.
- Key: Identify and stress roles **and** responsibilities

Questions when organizing your team

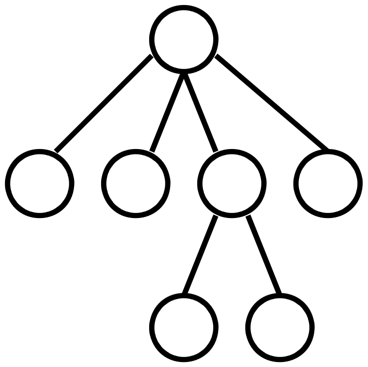
- How do you decide who should be project manager?
  - What's the difference between project manager and tech lead?
- How do you divide your team into subgroups? Who will work on what, and with whom?
- How will we make decisions about our project?
- How will everyone communicate and stay in sync about important decisions and issues?
- What will we do if someone is not doing their share?
  - How can we motivate team members to prevent this?

Issues affecting team success

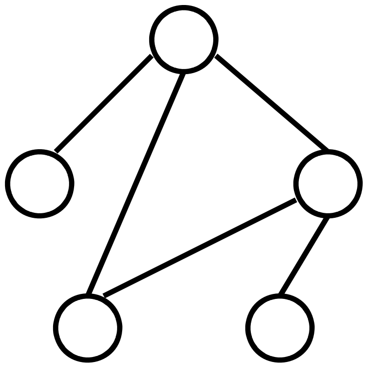
- Presence of a shared mission and goals
- Motivation and commitment of team members
- Experience level
  - and presence of experienced members
- Team size
  - and the need for bounded yet sufficient communication
- Team organization
  - and results-driven structure
- Reward structure within the team
  - incentives, enjoyment, empowerment (ownership, autonomy)

Team structure models

- Dominion model
  - Pros
    - clear chain of responsibility
    - people are used to it
  - Cons:
    - single point of failure at the commander
    - less or no sense of ownership by everyone



- Communion model
  - Pros
    - a community of leaders, each in his/her own domain
    - inherent sense of ownership
  - Cons
    - people aren't used to it (and this scares them)



Team leadership

- Who makes the important product-wide decisions in your team?
  - One person?
  - All, by unanimous consent?
  - Other options?...

  - Is this an unspoken or an explicit agreement among team members?

Organizing around functionality

- Pragmatic Programmer tip:
  "Organize around functionality, not job functions."

- What are some benefits of organizing teams around functionality vs. around job functions/titles?

- Who will do the ...
  - scheduling? development? testing? documentation (spec, design, write-ups, presentations)? build/release preparation? inter-team communication? customer communication?

Kinds of teams

- **problem-resolution**: a focused attack on specific bugs, problems, issues
- **creativity**: coming up with and exploring new ideas
- **tactical-execution**: carries out a defined plan

- Some team models
  - **business**: tech lead and a bunch of equal devs
  - **chief programmer / surgical**: lead dev does most of work
  - **skunkworks**: turn the devs loose
  - **feature**
  - **search-and-rescue**: focused on a specific problem
  - **SWAT**: skilled with a particular advanced tool(s)
  - **Professional Athletic**: carefully selected people w/ very specialized roles
  - **Theater**: "director" assigns roles to others

Surgical/Chief Programmer Team

[Baker, Mills, Brooks]

- Chief: all key decisions
- Copilot: chief's assistant
- Administrator: manages people, hardware, resources
- Editor: edits chief's documentation
- Secretaries (2): for administrator and for editor
- Program clerk: keeps all project records
- Toolsmith: builds programming tools for chief
- Tester: develops and runs unit and system tests
- Language lawyer: programming language expert, advises chief

Microsoft's team structure

[microsoft.com]

- **Program Manager**. Leads the technical side of a product development team, managing and defining the functional specifications and defining how the product will work.
- **Software Design Engineer.** Codes and designs new software, often collaborating as a member of a software development team to create and build products.
- **Software Test Engineer.** Tests and critiques software to assure quality and identify potential improvement opportunities and projects.

Toshiba Software Factory [Y. Matsumoto]

- Late 1970’s structure for 2,300 software developers producing real-time industrial application software systems (such as traffic control, factory automation, etc.)
- Unit Workload Order Sheets (UWOS) precisely define a software component to be built
- Assigned by project management to developers based on scope/size/skills needed
- Completed UWOS fed back into management system
- Highly measured to allow for process improvement

Common factors in good teams

- Clear roles and responsibilities
  - Each person knows and is accountable for their work
- Monitor individual performance
  - Who is doing what, are we getting the work done?
- Effective communication system
  - Available, credible, tracking of issues, decisions
  - Problems aren't allowed to fester ("boiled frogs")
- Fact based decisions
  - Focus on the facts, not the politics, personalities, …

Results-driven structure

- Clear roles and responsibilities
  - Each person knows and is accountable for their work
- Monitor individual performance, hold people accountable
  - Who is doing what, are we getting the work done?
- Effective communication system
  - Available, credible, tracking of issues, decisions
- Fact based decisions
  - Focus on the facts, not the politics, personalities, …

Motivation

- What motivates you?
  - Achievement
  - Recognition
  - Advancement
  - Salary
  - Possibility for growth
  - Interpersonal relationships
    - Subordinate
    - Superior
    - Peer
  - Status
  - Technical supervision opportunities

- Company policies
- Work itself
- Work conditions
- Personal life
- Job security
- Responsibility
- Competition
- Time pressure
- Tangible goals
- Social responsibility

Other?

De-motivators

- What takes away your motivation?
  - Micro-management or no management
  - Lack of ownership
  - Lack of effective reward structure
    - Including lack of simple appreciation for job well done
  - Excessive pressure and resulting "burnout"
  - Allowing "broken windows" to persist
  - Lack of focus in the overall direction
  - Productivity barriers
    - Asking too much; not allowing sufficient learning time; using the wrong tools
  - Too little challenge
  - Work not aligned with personal interests and goals
  - Poor communication inside the team