Software Engineering

Project Management

Project management…

- **Project management** involves the planning, monitoring, and control of the people, process and events that occur as software evolves from preliminary concept to operational implementation." – Pressman, 2000
- For most projects, **important goals are**:
  - Deliver the software to the customer at the agreed time.
  - **Keep overall costs within budget**.
  - Deliver software that meets the customer's expectations.
  - Maintain a happy and well-functioning development team.

Project management…

- **software engineering** is different from other types of engineering in a number of ways that make software management particularly challenging.
  - *The product is intangible*
  - *Large software projects are often 'one-off' project*
  - *Software processes are variable and organization-specific*

Project management…

- **What is it?**
  - Planning, monitoring and control of
    - People
    - Process
    - Events
  - as software evolves from preliminary concept to operational implementation
- **Who does it?**
  - Everyone, to some extent, e.g.:
    - A software engineer manages his/her daily activities: planning, monitoring and controlling technical tasks
    - A project manager plans, monitors and controls the activities of a team of software engineers
    - A senior manager coordinates the interactions between business and software professionals

Project management…

- Why is it important?
  - As we saw earlier, many projects fail
  - Software development is a complex task
    - particularly if it involves many people and lasts a long time

  “ there are no technical failures; only management failures” – Braude, 2001

Project management…

- What are the steps?
  - Understand the four P's:
    - **People** – must be organized to work effectively
    - Product – must have effective communication with the customer to specify scope and requirements
    - Process – must be appropriate for people and product
    - **Project** – must estimate effort and time needed, define work products, establish quality checkpoints, establish methods to monitor and control work defined by plan
  - We will focus on **people and project**

The People

- People working on software projects play various roles, which can be organized into five basic types:
  - Senior managers
    - Define business issues that often have great impact on project
  - Project managers
    - Plan, motivate, organize and control the people who do technical aspects of work – the practitioners
  - Practitioners
    - Deliver necessary technical skills to engineer the product
  - Customers & Stakeholders
    - Specify requirements and scope for software
  - End-Users
    - Interact with software product once it is released

The Team Leader

- Project management is a *people-oriented* activity
  - People with great technical skills don't necessarily make good team leaders – people skills are needed too
- Weinberg suggests an **MOI model of leadership**
  - Motivation
    - Ability to encourage technical people to work to the best of their abilities (push or pull)
  - Organization
    - Ability to adapt existing processes, or devise new ones, to enable the concept to be turned into a product
  - Ideas/Innovation
    - Ability to encourage people to create, and to feel creative, within the bounds of the particular product
- Team leader must let everyone know, by words and deeds, that quality is important – lead by example!

The Team Leader

- Another view of what makes a good team leader:
  - Problem solving
    - Decide which technical and organizational issues are most important
    - Create a systematic solution to the problem – or motivate others to do so
    - Apply lessons from past projects to new ones
    - Remain flexible enough to change direction if initial proposed solution doesn't work
  - Managerial Identity
    - Confidence to take charge of project when necessary, but also to let good technical people use their initiative
  - Achievement
    - Reward initiative and accomplishment
    - Demonstrate that controlled risk-taking will not be punished
  - Influence and Team building
    - Be able to "read" people – understand both verbal and non-verbal signals from team members, and react to their needs

The Team Leader

- Mantei suggests three generic team organizations:
  - Democratic Decentralized (DD).
    - Has no permanent leader.
    - Task coordinators are appointed for short durations and then replaced by others who may coordinate different tasks
    - Decisions on problems and approach are made by group consensus
  - Controlled Decentralized (CD)
    - Has a defined leader who coordinates specific tasks and secondary leaders that have responsibility for subtasks
    - Problem solving remains a group activity, but implementation of solutions is partitioned among subgroups
  - Controlled Centralized (CC)
    - Top-level problem solving and internal team coordination are managed by a team leader

END