

Software Engineering in Practice

Software engineering management

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Why the software engineering management is different

- Unknown specifications
- Wide range of applications, often innovative
- High complexity
- Implementation will generate new or changed software requirements
- Often an iterative process
- Requires creativity and discipline
- Rapid change in the underlying technology

The three layers of software engineering management activities

- Organisation and infrastructure management
- Project management
- Management of the measurement program

Overview

- Initiation and scope definition
- Software project planning
- Software project enactment
- Review and evaluation
- Closure
- Software engineering measurement
- Management tools

Initiation and scope definition

- Determination and negotiation of requirements
- Feasibility analysis
- Requirements' review and revision process

Software project planning

- Process planning
- Determine deliverables
- Estimation of
 - effort,
 - schedule,
 - cost
- Resource allocation
- Risk management
- Quality management
- Plan management

Software project enactment

- Implementation of plans
- Software acquisition
- Supplier contract management
- Implementation of measurement process
- Monitor process
- Control process
 - Cost overruns
 - Time overruns
- Reporting

Supplier contract management

- Contract example
 - Fixed price
 - Time and materials
 - Cost plus fixed fees
 - Cost plus incentive fees
- Intellectual property
 - Industrial property (plan, patents, etc.)
 - Copyright (source code, graphics, music)
- Quality requirements for acceptance of the delivered software

Review and evaluation

- Determining satisfaction of requirements
 - Per milestone or development cycle
- Reviewing and evaluating performance

Closure

- Delivery and acceptance
- Documentation of known problems
- Data archiving and destruction of sensitive information
- Update the organization's measurement database
- Retrospective analysis
- Lessons learned

Software engineering measurements

- Establish and sustain measurement commitment
- Plan the measurement process
 - Goal
 - Question
 - Metric
- Perform the measurement process
 - As part of the development process
- Evaluate measurement

Measurement caveats

- Goodhart's law: "When a measure becomes a target, it ceases to be a good measure"
- "You can only measure three percent of what matters." —Deming
- "Tell me how you measure me, and I will tell you how I will behave." — Goldratt
- "It is wrong to suppose that if you can't measure it, you can't manage it — a costly myth." —Deming
- What gets measured gets managed — even when pointless and harming the organization. —Drucker
- "Managers who don't know how to measure what they want settle for wanting what they can measure." —Ackoff

Management tools

- Project planning and tracking
- Risk management
- Communication
- Measurement

Codes of Ethics

- ACM Code of Ethics and Professional Conduct
- IEEE Code of Ethics

Preparation for the next lecture (1)

- Study Chapter 8 from SWEBOK v 3.0
- Assignment (Software engineering processes)

Perform the following tasks on a popular open source project:

- Identify and classify the software engineering processes.
- Identify the software life cycle model. Is it suitable?
- How is the software process assessment performed?

You can retrieve information relevant to these tasks from the source code and the documentation of the project. In the case that the project misses some of the aforementioned information, how do you think that they should have performed them?

Preparation for the next lecture (2)

- Video Software engineering processes: UML - activity diagrams

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