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CS342 Software Engineering

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Lecture 9

Improving the Software Process

Improving the Software Process

- Software Process management is the fundamental problem with software products.
- Software process improvement initiatives are introduced to solve the software development processes:
  - Business Capability Maturity Model (BCMM)
  - (International Organization for Standardization) ISO 9000-series
  - ISO/IEC (International Electrotechnical Commission) 15504

Business Capability Maturity Model BCMM

- Business Capability Maturity Model (BCMM) is a methodology used to develop and refine an organization's software development process.

Business Capability Maturity Model

- No life-cycle phases, but a set of strategies:
  - SW–CMM for ("software")
  - P–CMM for human resources ("people")
  - SE–CMM for (systems engineering)
  - IPD–CMM for (integrated product development)
  - SA–CMM for (software acquisition) investment
- These strategies are unified into CMMI (Capability Maturity Model Integration)

SW–CMM

- A strategy for improving the software process
- Developed by the Software Engineering Institute (SEI)
- Measures the goodness of the software process itself.
- Improving the software process leads to
  - Improve software quality
  - Delivery on time, within budget
- Improving the software management leads to
  - Improve software development techniques

SW–CMM

- Five levels of *maturity* are defined
  - Initial
  - Repeatable
  - Defined
  - Managed
  - Optimized

- An organization advances stepwise from one level to the next higher level

Level 1 - Initial Level

- Ad hoc approach
  - The entire process is unpredictable
  - Management consists of responses to crises
- CASE (Computer-Aided Software Engineering) environments are not applicable

Level 2. Repeatable Level

- Basic software management
  - Management decisions are taken based on previous experience with similar cases
  - Measurements ("metrics") are described and used for cost and time predictions
  - Problems are identified then an immediate corrective action is taken
  - CASE environments are not applicable.

Level 3. Defined Level

- The software process is fully documented
  - Management and technical aspects are clearly defined
  - Reviews are focused to improve quality and productivity
  - CASE environments are applicable

Level 4. Managed Level

- Quality and productivity goals are set for each process
- Project processes are repeatedly monitored
- Statistical quality controls are in place
- CASE environments are applicable

Level 5. Optimized Level

- Continuous process improvement
  - Process optimization is taking place
  - Statistical quality and process controls are in place
  - Feedback of knowledge from each process is extracted.
  - Fault prevention.

Key Process Areas

- There are key process areas (KPAs) for each level (described in the next slide)
- Software processing management at SW-CMM levels
  - Level 2: Detection and correction of faults
  - Level 5: Prevention of faults

Key Process Areas in SW-CMM levels

SW-CMM	*Key Process Areas*
5. Optimizing level: Process control	Defect prevention Technology change management Process change management
4. Managed level: Process measurement	Quantitative process management Software quality management
3. Defined level: Process definition	Organization process focus Organization process definition Training program Integrated software management Software project engineering Intergroup coordination Peer reviews
2. Repeatable level: Basic project management	Requirements management Software project planning Software project tracking and oversight Software subcontract management Software quality assurance Software configuration management
1. Initial level: Ad hoc process	Not applicable