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SOFTWARE QUALITY MANAGEMENT

CSP 587

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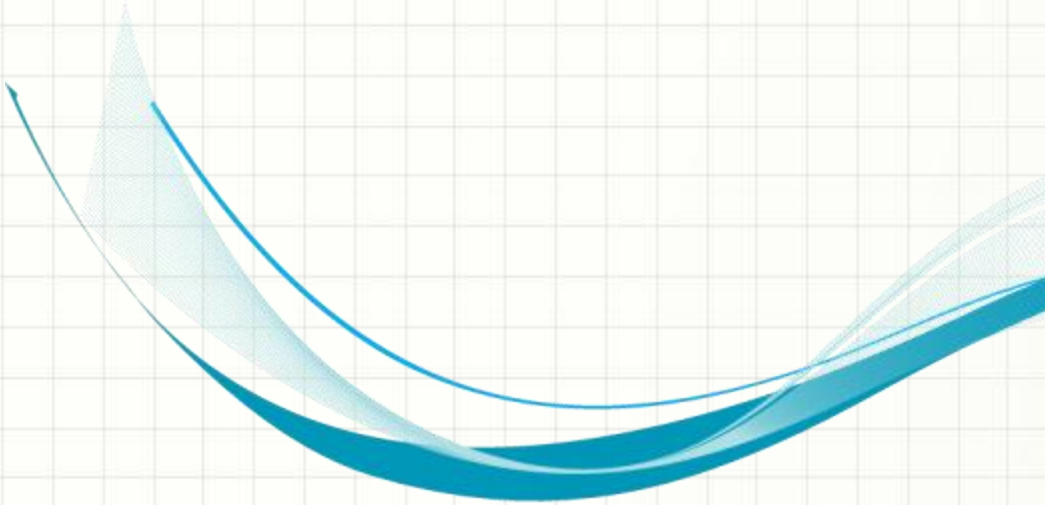
Computer Science

Reading

- Quality Metrics
- Reading
  - Ch. 10 - Measurement
- Objectives
  - Understand the role of measurement in both delivering quality products and improving the development process over time
  - Identify metrics to support these efforts
  - Analyze the costs and benefits of these metrics
  - Discuss the role of tool support

Topics for Discussion

- Discuss the use of metrics in:
  - Project management
  - Risk management
  - Change management
  - Process improvement
  - Testing / auditing
- Describe a way to automate the collection of this metric and discuss the impact this automation has on cost.
- Describe the role of metrics collection and analysis in automated management of exceptional events.
- Describe the role of metrics collection and analysis in process improvement.



Week 11
Quality Metrics

Measurement Objectives

- Provide managerial control
  - Are things going according to plan?
  - Quality of results, schedule, budget, etc.
- Trigger contingency actions
  - Is an alarm going off?
  - Early warning gives the best opportunity for avoiding problems
  - False alarms breed cynicism
- Knowledge for future use
  - Process improvement

Indicators of Performance

- Defined software quality standards
- Quality targets
- Baselines
  - Previous year
  - Previous project
  - Average across other teams / organizations
  - Best practices

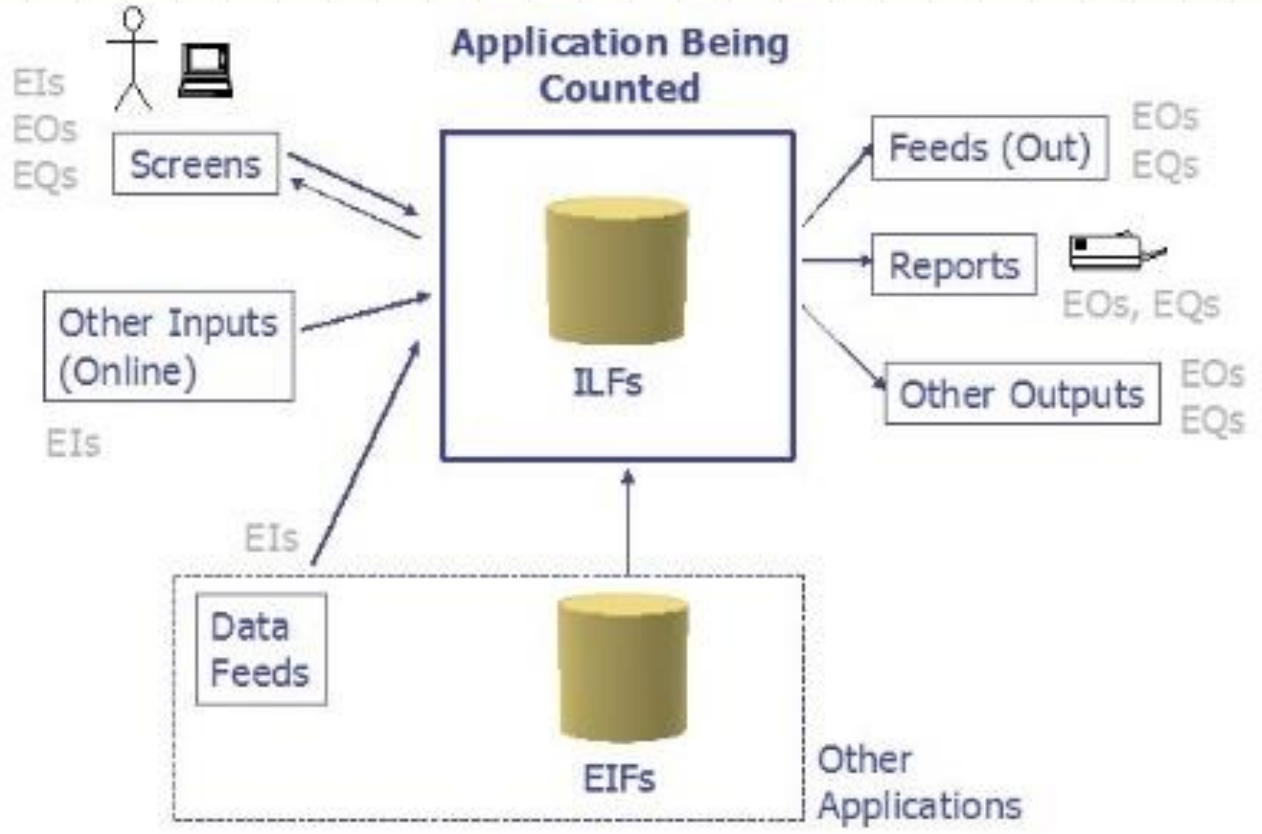
Requirements

- General
  - Relevant – related to an attribute of substantial importance
  - Valid – measures the required attribute
  - Reliable – produces consistent results
  - Comprehensive – applies to a large variety of situations
  - Mutually exclusive – doesn’t overlap other metrics
- Operative
  - Easy to collect and simple to use
  - Generally available through other data collection
  - Immune to bias

Quality Metrics Qualifiers

- Measurement of system quality can be qualified by including the “magnitude” of the system
  - KLOC
    - Increasingly problematic as development has matured away from straight-line code
  - Function points
    - More focused on the user perspective

Function Point Architecture



Process Metrics

- Software process quality
  - Error density and severity metrics
  - McCabe's cyclomatic complexity
- Software process timetable
  - Milestone achievement, etc.
- Error removal effectiveness
  - Defects discovered and removed in development vs. those only discovered later
- Software process productivity
  - Development team productivity
  - The extent of software reuse

Product Metrics

- Metrics collected during maintenance
- Byproduct of maintenance responsibilities
  - Help desk
    - Call density
    - Severity
    - Resolution success, productivity and effectiveness
  - Corrective maintenance
    - Failure density and severity
    - System availability
    - Bug fixing, patching, workaround development, etc.
    - Feature enhancement development

Implementation

- Define relevant and adequate metrics
- Develop collection and reporting processes
- Collect and analyze
- Utilize the knowledge gained, but respect the limitations of metrics
- Improve the process