SS ZG622: Software Project Management (Lecture #16)

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Text Books

T1: Bob Hughes, Mike Cotterel, and Rajib Mall, Software Project Management, 5th Edition, McGraw Hill, 2011

T2: Pressman, R.S. Software Engineering : A Practitioner's Approach, 7th Edition, McGraw Hill, 2010

R1: Sommerville, I., Software Engineering, Pearson Education, 9th Ed., 2010

R2: Capers Jones., Software Engineering Best Practices, TMH ©2010

R3: Robert K. Wysocki, Effective Software Project Management, John Wiley & Sons © 2006

R4: George Stepanek, Software Project Secrets : Why Software Projects Fail, Apress ©2012

R5: A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition by Project Management Institute Project Management Institute © 2013

R6: Jake Kouns and Daniel Minoli, Information Technology Risk Management in Enterprise Environments. John Wiley & Sons © 2010

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L16: Sotware Project Management –

Review Session

Source Courtesy: Some of the contents of this PPT are sourced from materials provided by publishers of prescribed books

Software Characteristics

- Software is a logical entity; It is engineered; not manufactured
- Software deteriorates in different ways than hardware
- Software Engineering could be looked upon as layers of elements
- Software Engineering requires framework activities and umbrella activities
- David Hooker offers seven valuable software engineering principles

Software Process Models

- Plan-driven vs. Agile development
- Unified Process
- Agility manifesto & principles
- Choices of project model
  - Waterfall
  - Incremental
  - Evolutionary
  - Agile

Software Project Basics

- Definition of Project
- Software Projects vs. Other Projects
- Project Activities & Management Activities
- Project Stakeholders
- Project Objectives (SMART)
- Business Goals, Benefit Analysis
- Declaration of interdependence
- Role of PM in traditional vs. agile projects
- GROW (Goal-Reality-Options-Will) model

Project Evaluation

- Definition of Project, Program, Portfolio
- Program origins, objectives
- Cost-Benefit analysis of projects
  - Net Profit
  - Payback period
  - ROI
  - Net Present Value (using Discount Factors)
  - Internal Rate of Return
  - Decision Tree based assessment
- Profitable projects & Beneficial projects

Software Metrics

- Metrics fundamentals
  - Measures, metrics, indicators
  - Metrics Process, Attributes, Etiquette etc.
- Product metrics taxonomy
  - Analysis,
    - Function Points (for functionality delivered), Specification qualitymetrics
  - Design
    - Architecture (hierarchical), OO Design, Class design
  - Coding, Testing, Maintenance
- Process Metrics
  - Quality, Productivity, SQA, Reuse etc.
- Project Metrics
  - Status, Risks, Work flows, Work product quality
- Internal attributes vs. external attributes
- Helpful metrics vs. harmful metrics
- Establishing metrics program

Software Estination

- Project Planning
  - Contents in a plan
  - Supplements in a plan
- Factors affecting software pricing
- Software Estimation basics
- Decomposition Techniques
  - Product based decomposition
    - LOC, FP, Use cases
  - Process based decomposition
- Empirical Techniques
  - Cocomo2
    - Application Composition, Early Design, Reuse, Post architectural, Project duration
  - Software Equation
- Estimation for object-oriented projects
- Estimation for agile projects

Activity and Resource Planning, Risk Management

- Project Scheduling Practices, Principles
- Software Project effort distribution
- Activity Planning
  - Types of links between activities
  - ES, EF, LS, LF, Float, Duration
  - Free & interfering floats, Critical Path
- Resource Planning
  - Types of resources
    - People, Environmental resources, Reusable components
  - Resource Smoothing
- Risk Management
  - Risk Projection
  - Risk Mitigation, Monitoring, and Management Plan (RMMM)

Time to Market, EVA

- Time to market
  - Reducing project duration
    - Options, Impact on cost
- Monitoring & Control
  - Project Reporting
  - Prioritizing monitoring
  - Exception planning & reporting
- Earned Value Analysis
  - Accounting conventions

Software Quality

- Quality perspectives
  - Transcendental, user, manufacturer, product, value
  - Bessin's definition for software quality
  - David Garvin's quality dimensions
  - Barry Boehm's quality tree
- ISO 9126 software product quality
  - Functionality, reliability, usability, efficiency, maintainability, portability
  - ISO 25010-2011 model
- Cost of quality
  - Prevention, appraisal, failure costs
- Achieving quality
  - SE, PM, QA, QC

Achieving Quality - SQA, Reviews etc.

- Achieving Software Quality
- Reviews
  - Defect amplification model
  - Defect removal costs analysis
  - Formal & informal reviews
  - Review meeting participants & etiquette
- Software Quality Assurance
  - Role, Goals
  - Statistical SQA
  - Six sigma
  - ISO 9001:2000
    - QMS, Resources, Management, Measurement, Realization

Human Resources, Organizational Behavior

- Human Resources Management
- Organizational Behavior
  - Frederick Taylor's theory
  - Hawthorne Experiments
  - Theory X & Theory Y by Donald McGregor
- Software Developer Characteristics
  - Eligibility vs. Suitability
  - Selection Process
  - Multi-criteria decision analysis
  - Motivation(Maslow vs Taylor), Job Satisfaction, Expectancy
- Human Factors
  - Stress, Professional ethics, Organizational ethics
  - Roles, rights, &responsibilities

Development of Teams, Leadership

- Software Development Teams
- Team leadership traits
- Team paradigms by Constantine
  - Closed, Random, Open, Synchronous
- Team Formation
  - Forming, Storming, Norming, Performing, Adjourning
- Team Performance
  - Balanced teams, Team roles
  - Egoless programming
  - Chief programmer teams
- Virtual Teams
- Leadership Styles

Writing Business Proposals

- Project Procurement Management
- The Value of Proposals to Clients.
- The Value of Proposals to Seller
- Writing persuasive proposals by incorporating NOSE
  - Needs
  - Outcomes
  - Solutions
  - Evidence
- Understanding Decision Maker
- Art of conveying what you mean

Contract Management

- Software acquisition could be
  - bespoke, off-the-shelf, customized off-the-shelf
  - may be considered goods or service
- Software tendering process
  - Identify requirements, Plan for evaluation, Invitation to tender, Selection
  - Tender can be open, restricted, negotiated
  - May involve bidders conferences, MOA
- Software contracts
  - Fixed price, Time & materials, Fixed price per unit
  - Contract elements
  - NDA
  - Professional services agreements

Software Evolution

- Software Lifecycle (beyond development)
  - Maintainable software, Supportability
  - Software Evolution, Lehmann's laws
  - Types of software maintenance, Maintenance costs, Maintenance cost factors
- Legacy software management
  - Business value assessment
  - Software quality assessment
    - Business process assessment
    - Environment assessment
    - Application assessment
- Software Reengineering
  - Inventory Analysis, Document restructuring, Reverse engineering, Code & data restructuring, Forward engineering
  - Reengineering economics

Software Configuration Management

- Software Configuration Management
  - Configuration identification, Configuration control, Configuration auditing, Configuration status reporting
- SCM Repository
  - Version control, Dependency tracking, Requirements tracing, management, audits
- SCM for WebApps
  - Content management, Change Control
- Build Functionality
  - Automation, Continuous integration,
- Release Management

Thank You

Any Questions?