Software Project Management

Impact of Change

Process Maturity Levels (CMM)
- Initial: ad hoc, few processes defined, success depends on individual effort
- Repeatable: cost, schedule, and functionality are tracked to repeat earlier success
- Defined: process for both management and engineering is documented, standardized and integrated. All projects use documented and approved version of process for development and maintenance
- Managed: process and products are quantitatively understood and controlled using detailed measures
- Optimizing: continuous process improvement, feedback and testing new ideas and technologies

Team Structure
- Democratic Decentralized (DD): no permanent leader, horizontal communications
- Controlled Decentralized (CD): a defined leader, partitions problems among sub groups, horizontal (and vertical) communication
- Controlled Centralized (CC): top-level problem solving and team coordination by leader, vertical communication

Risk Management
- Risk Categories: product size, business impact, customer related, process, technology, development environment, staff size and experience.
- Impact: 1-catastrophic 2-critical 3-marginal 4-negligible
- Risk Projection: identity, likelihood, consequences.
- RMMM: Risk Mitigation, Monitoring, Management

Chief Programmer (CD)

Risk Categories
- Estimates may be very low: PS 65% 2
- End users will resist system: BU 35% 3
- Funding will be lost: CU 40% 1
- Lack of training on tools: DE 70% 3
Risk Referent Point

Referent point (cost, time)

Project termination area

Cost Overrun

Schedule Overrun

Project Scheduling
- Compartmentalization: number of manageable tasks
- Interdependency: parallel/sequential
- Time allocation: effort, start and completion dates
- Effort validation: tasks should deserve the allocated effort
- Responsibilities: tasks assigned to members
- Outcomes: tasks have deliverables
- Milestones: time to review for quality & approve

Task Network (PERT, CPM)

Plan 2
Build 1
Build 1
Build 2
Build 2
FTR
Integration
walkthrough

Task Network (PERT, CPM)

Task
Interview users
Study material
Write SRS
Milestone: req.
Logical design
Detailed design
...

Timeline Chart (Gantt)

Task	Week1	Week2	Week3	Week4
Interview users
Study material
Write SRS
Milestone: req.
Logical design
Detailed design
...

Project Plan
- Introduction
  - Purpose of plan
  - Project scope
- Project Estimates
  - Historical data
  - Estimation techniques
  - Effort, Cost, and Duration Estimations
- Risk Management
  - Discussion of Risks
  - Risk Table
  - RMMM plan for each risk

Project Plan II
- Schedule
  - Work breakdown structure
  - Task Network
  - Timeline Chart
- Project Resources
  - People
  - ...
- Staff Organization
  - Team Structure
  - Management Reporting
- Tracking and Control Mechanisms
  - Quality Assurance and Control
  - Change Management and Control
- Appendices
Software Quality Assurance

• A Quality Management Approach
• Effective Software Eng. Technology
• Formal Technical Reviews throughout
• Multi-tiered testing strategy
• Control of documentation and its changes
• Standards compliance procedure
• Measurement and reporting mechanisms

Three Points in SQA

• Requirements are the foundation from which quality is measured
• Standards set development criteria directly affecting quality
• Unmentioned implicit requirements are important (e.g. maintainability)

Defect Amplification Model

Formal Technical Review

• 3-5 people attend: producer, review leader, reviewers
• advance preparation < 2 hours/person
• meeting duration < 2 hours
• record results: accept, reject, or provisions
• review product not the producer
• maintain agenda
• limit debate
• find problems, don’t attempt solutions
• ...

Statistical Quality Assurance

Pareto principle: 80% of defects relate to 20% of causes
The following causes are found to be representative:

• IES Incomplete/erroneous specs
• MCC Misinterpretation customer comm.
• IDS Intentional deviation from specs
• VPS Violation of programming standards
• EDR Error in Data representation
• IMI Inconsistent module interface
• EDL Error in design logic
• IET Incomplete/erroneous testing
• IID Inaccurate/incomplete documentation
• PLT programming language translation of design
• HCI ambiguous/inconsistent interface
• MIS miscellaneous

Software Configuration Management

• Preserving the variations on intermediate products
• Change Management
• Version Management / Family of Products
• Baseline

Software Project Management
Software Configuration Items

- Documents
- Code
- Data
- …

Configuration Item Pool

Access and Synchronization

Decision Tree - make or Buy?