Pengantar Teknologi Informasi
Software Engineering

- Review
- Definisi
- Software Evolution
- Introduction to Software Engineering
- Modelling of Software Engineering
- IT’s Project Management
- Analyzing of System Requirements
- Design and Implementation
Review

Abstract view

Application Software

System Software

Computer Hardware
Definition

Software [ adalah ? Macamnya ?]

Software Engineering (SE)
• The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software [IEEE Standard 610.12].

Business software definition
• Software for business is a huge industry. Software can make a business more efficient and improve the bottom line. Business software packages exist for many key functions of businesses. Business software can be off the shelf, or specially configured for the specific application. [www.commercedatabase.com/businesssoftware.htm]
Software Evolution

Era-1
• berorientasi batch, distribusi terbatas, custom SW.

Era-2
• multiuser, real time, database, product SW.

Era-3
• distributed systems, embedded intelligence, low-cost HW, consumer impact.

Era-4
Introduction to SE

Karakteristik Software
• Developed / engineered [not manufactured]
• Doesn’t “wear out” (tidak usang)
• Custom-built [not assembled]

Aplikasi potensial
• Computer system [compiler, editor, … ]
• Real-time
• Business [penggajian, persediaan, customer relationship … ]
• Engineering & scientific
• Embedded [microwave, fuel control, brake system, .. ]
• PC [wordpro, spreadsheets, …… ]
• Artificial Intelligent [Expert System, DSS, pattern recognition, … ]
Modelling / Paradigm of SE

Waterfall model (classic life cycle)

- system engineering, analysis, design, coding, testing, maintenance.
Modelling of SE / Paradigm

Prototyping (circle model)
• requirements & refinements, quick design, prototyping, evaluation of prototype, refining prototype, engineer product.

![Prototype Model Diagram]
Modelling of SE / Paradigm

Spiral model
• planning, risk analysis, engineering, customer evaluation.

Fourth-Generation Techniques
• requirements, design strategy, impl. using 4thGL, testing.

Kombinasi
IT’s Project Management

Project management is “the application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements” (PMI, Project Management Body of Knowledge, 2000)
IT’s Project Management

Metrik → semua aktifitas terukur

• Proses: objective & scope, measures & metrics, estimation, risk analysis, scheduling, tracking & control.

Kualitas

• faktor-faktor yang mempengaruhi: operation, revision, transition.

• Pengukuran: correctness, maintainability, integrity, usability.

Faktor-faktor yang mempengaruhi produktifitas

• manusia [struktur organisasi & keahlian]
• tingkat kesulitan masalah
• proses: teknik-teknik analisis & desain, bahasa & CASE tools,
• review
• produk: reliability & performance
• keberadaan sumber: tools, HW, SW.
IT’s Project Management

Estimasi

• Observasi: complexity based on past efforts, size of effort, degree of structure, definition, variability.
• Objektif perencanaan proyek
• Model estimasi empirikal: COCOMO, Putnam, Function-point

Lingkup: fungsi [cost&schedule], kinerja [processing &response time], kendala [SW vs HW available], antarmuka [HW, SW, BW, procedures], kehandalan.

Sumberdaya: manusia [skills, availability, tasks duration], HW, SW [tools: BSP, PM, support, A&D, programming, integration&testing, prototyping&simulation, maintenance, framework], reusability.

Teknik dekomposisi
IT’s Project Management

Perencanaan

• Risk analysis: identification, projection, assessment, management & monitoring.
• Project scheduling: people-work relationships, task definition & parallelism, effort distribution, scheduling methods & example, project tracking & control.
• Software acquisition
• Software re-engineering
• Organizational planning
• Software project plan
Analysis of System & Software Requirement

Computer-based Systems
• HW, SW, BW, IW [DB & doc., procedures]

Computer Systems Engineering
• HW, SW, DB

System Analysis
• Need identification, feasibility study, economic analysis, technical analysis, trade-offs.

System Architecture Modeling
• Diagram, specification

Modeling & Simulation

System Specification
Analysis of System and Software Requirement

Analisis Kebutuhan
• Analysis tasks: problem recognition, evaluation & synthesis, modeling, review.
• Analyst

Lingkup Masalah

Teknik Komunikasi
• Process initiating
• Facilitated Application Specification Techniques (FAST).

Prinsip-prinsip analisis
• Information domain, modeling, partitioning, essential & implementation views.
Analysis of System and Software Requirement

Software Prototyping
• Scenario [6 steps]
• Methods & tools

Specification
• 8 Principles
• Representation
• SW requirements specification

Basic Notation [of structured analysis]
• DFD & other structured methods

Mechanics [of structured analysis]
Requirements Dictionary
Structured Analysis & Case
Analysis of System and Software Requirement

Object-oriented

- Concept
- Analysis Modeling
- Data Modeling

Alternative analysis techniques & formal methods

- Requirement analysis
- Data structured-oriented
- System development
- Formal specification techniques
- Automated techniques
Design and Implementation

Design Fundamentals
• Data-flow oriented design
• Object-oriented design
• Data-oriented design
• User interface design
• Real-time design
• Programming languages & coding
Design and Implementation

Integrity
• Quality Assurance
• Testing Techniques
• Testing Strategies
• Maintenance
• Configuration Management

Role of Automation
• CASE (Computer Aided Software Engineering)
• Integrated case environment
• Road head