

# Software Engineering

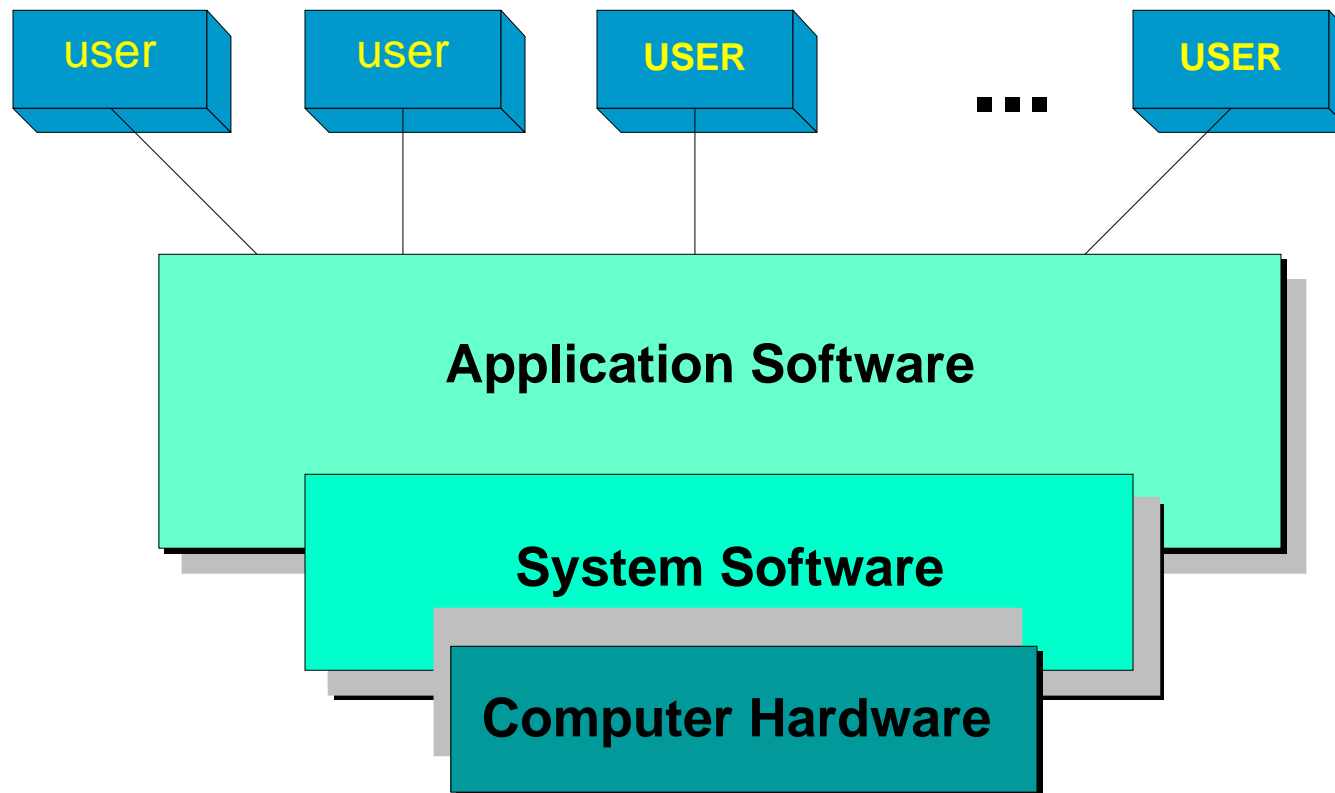
# Software Engineering

- 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



# 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](http://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

- desk top systems, OO technologies, Expert Systems, artificial neural networks, parallel computing.



# Introduction to SE

## Karakteristik Software

- Developed / engineered [not manufactured]
- Doesn't "wear out" (tidak usang)
- Custom-built [not assembled]

## Aplikasi potensial

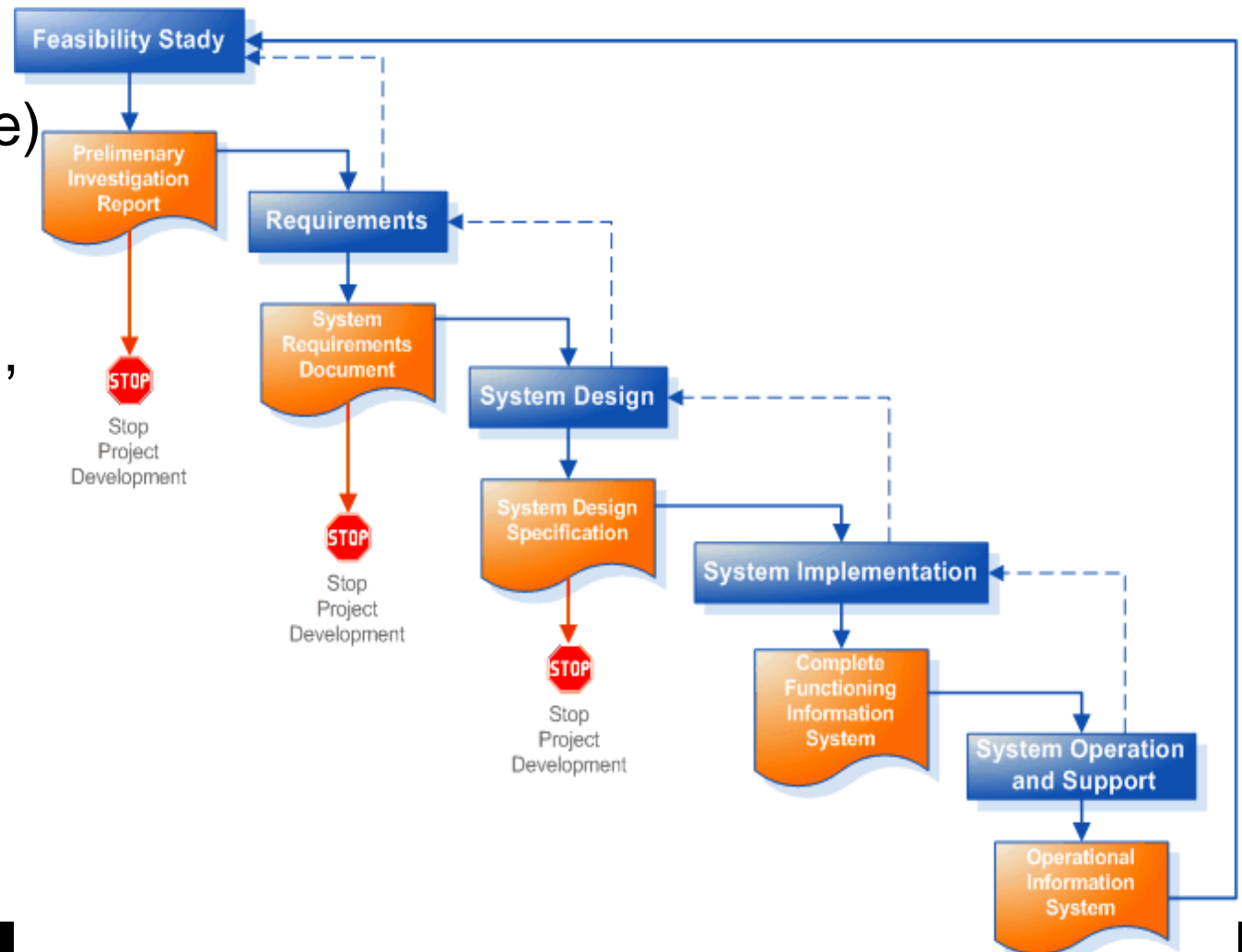
- Computer system [compiler, editor, ... ]
- Real-time
- Business [penggajian, persediaan, customer relationship ... ]
- Engineering & scientific
- Embedded [microwave, fuel control, brake system, .. ]
- PC [wordpro, spreadsheets, ..... ]
- Artificial Intelligent [Expert System, DSS, pattern recognition,



# Modelling / Paradigm of SE

Waterfall model  
(classic life cycle)

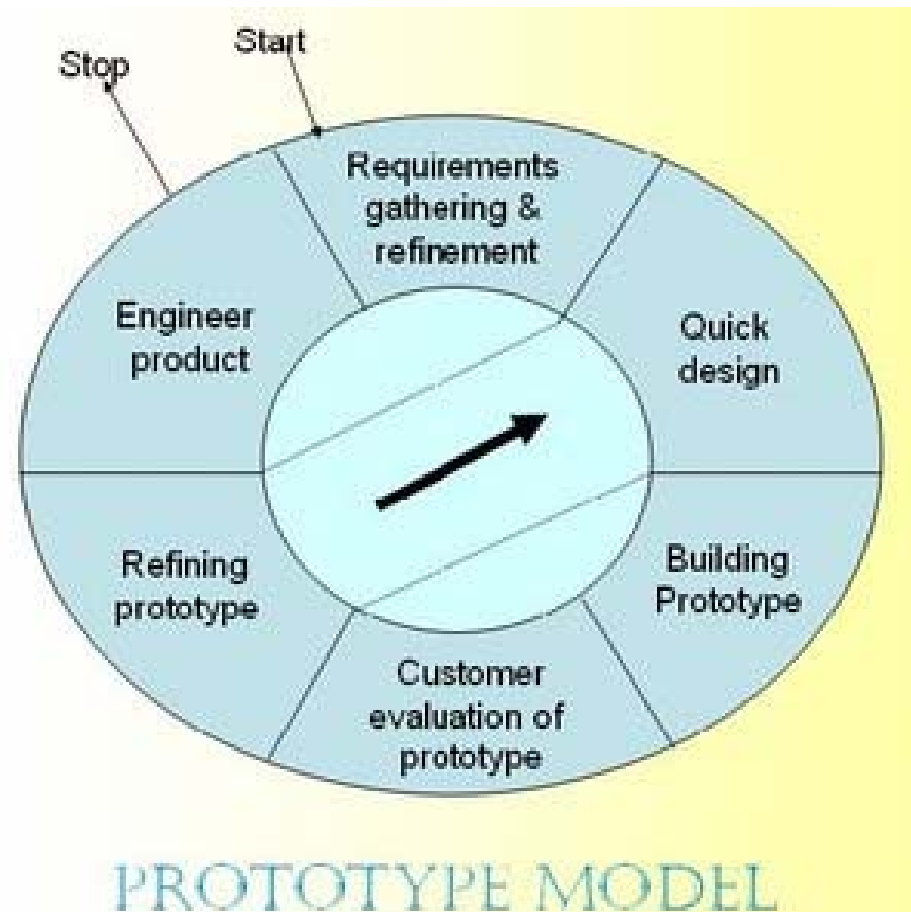
- system engineering, analysis, design, coding, testing, maintenance.



# Modelling of SE / Paradigm

## Prototyping (circle model)

- requirements&refinements, quick design, prototyping, evaluation of prototype, refining prototype, engineer product.





# Modelling of SE / Paradigm

## Spiral model

- planning, risk analysis, engineering, customer evaluation.

## Fourth-Generation Techniques

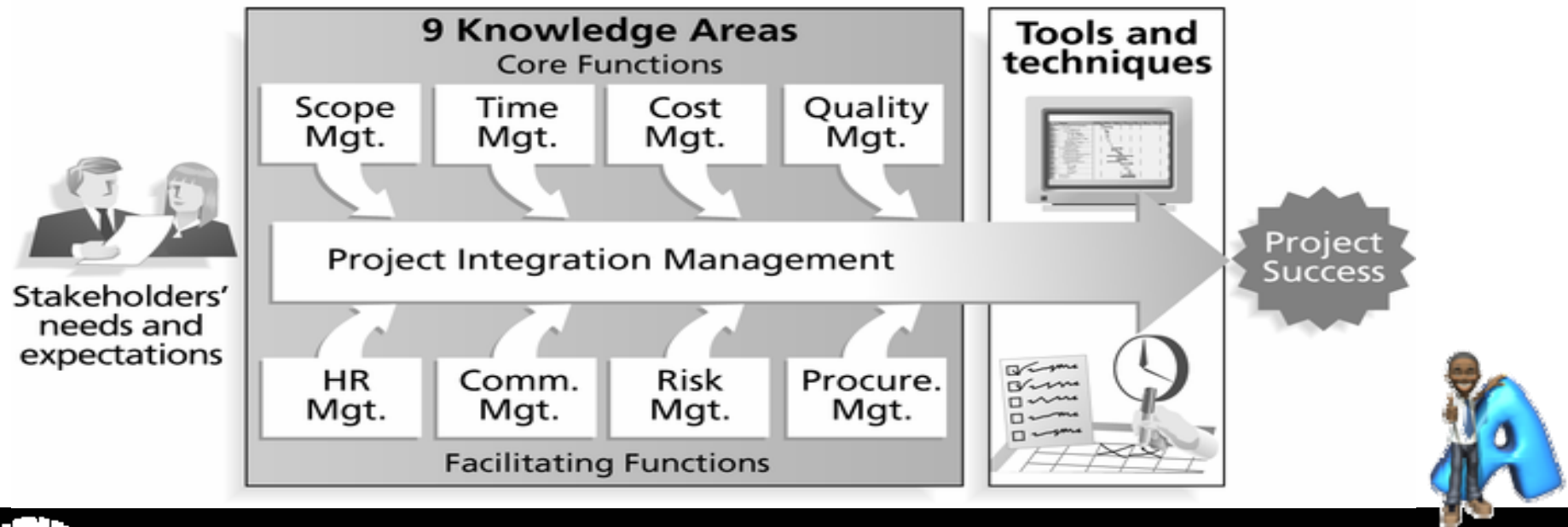
- requirements, design strategy, impl. using 4<sup>th</sup>GL, testing.

## 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**

