

The Architecture Definition Process

IT-architecture and user driven software design (BUITA)

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Learning goals

- Know the central concepts of the software architecture definition process: stakeholder concerns, principles, decisions, process outcomes, process context, process exit criteria, architecture development approaches
- Be able to choose and use techniques for stakeholder analysis for a chosen case
- Be able to discuss and reflect on the value of stakeholder analysis and planning



Stakeholders - Revisited and in-depth

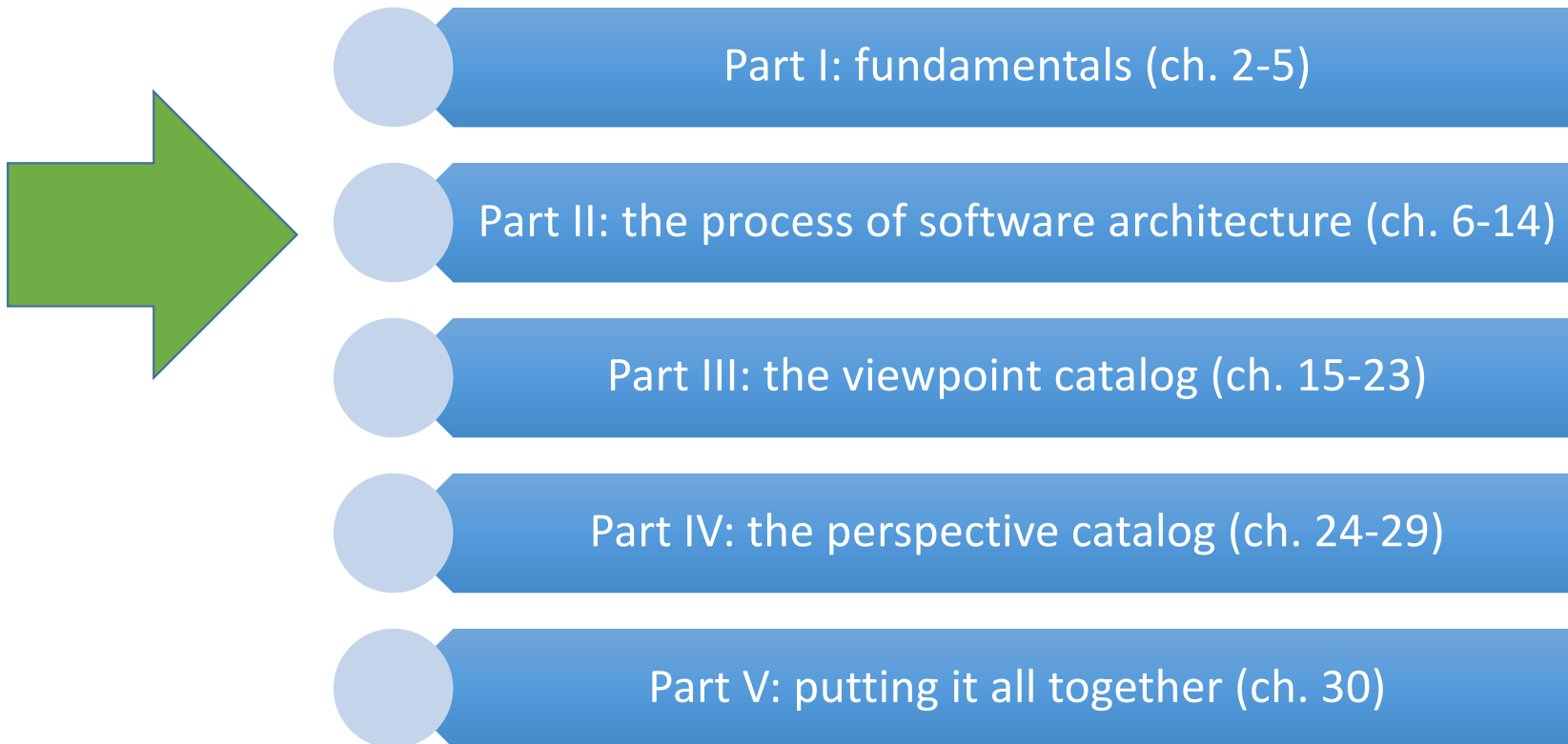


Architecture definition process,
principles and decisions



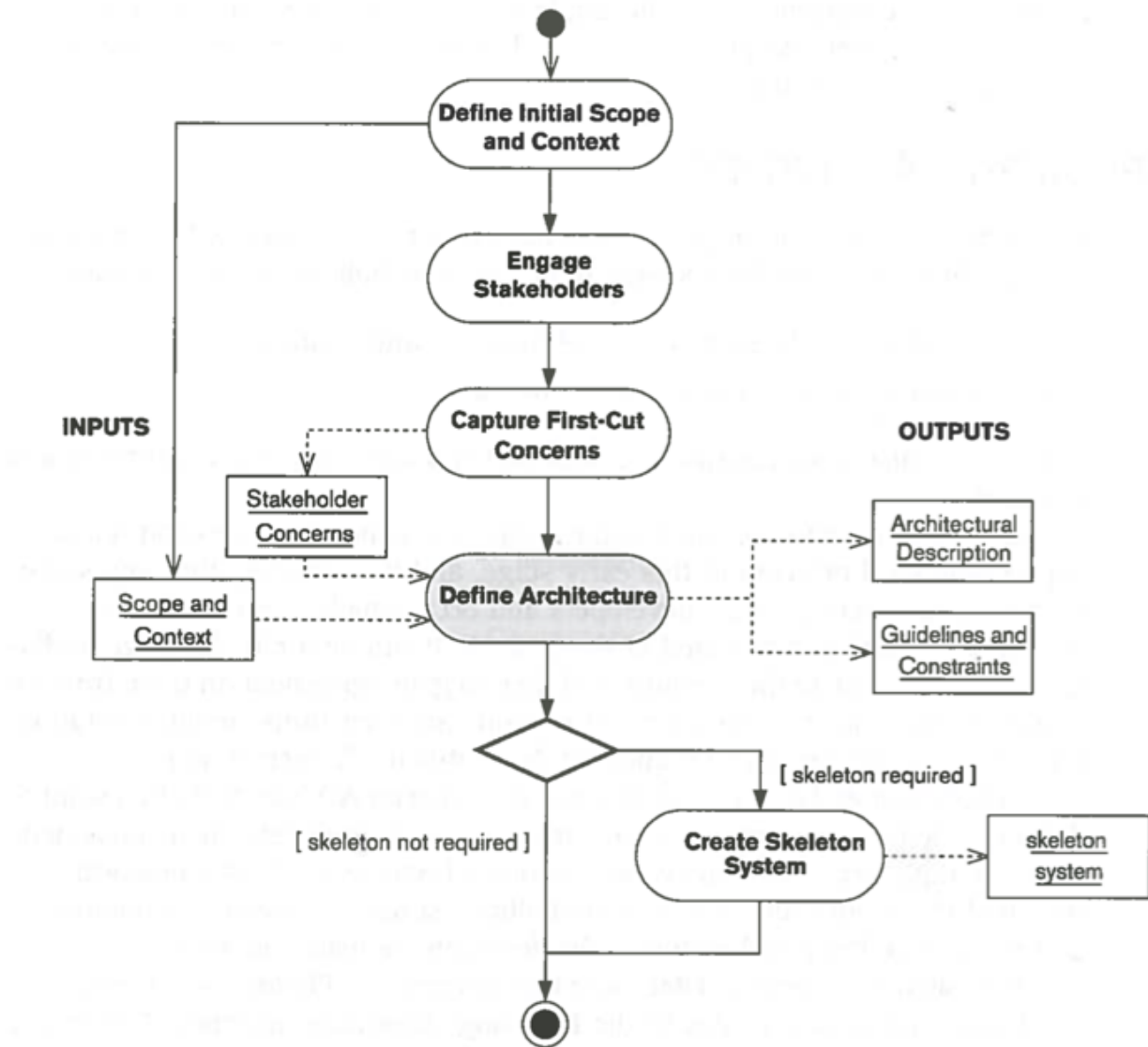
Groups and ideas

Course book: Software Systems Architecture



Stakeholders - Revisited and in-depth

The Architecture Definition Process



Stakeholder Concerns



DEFINITION A **concern** about an architecture is a requirement, an objective, a constraint, an intention, or an aspiration a stakeholder has for that architecture

- A "good" concern:
- Quantified and measureable \neq "must be easy to use"
- Testable for evaluation purposes
- Traceable forward and backwards from goals and strategy to features

Definition of stakeholders

- A person (or a group of persons) with something ***at stake***
 - ***stake, interest, concern***
 - ***users, developers, testers, maintainers, sponsors, suppliers/contractors, QA***
- Users – at many levels
 - Management user
 - Daily user, end-user
 - Indirect user

Stakeholder types

- Acquirers
- Assessors
- Communicators
- Developers
- Maintainers
- Production engineers
- Suppliers
- Support staff
- System administrators
- Testers
- Users

(A little too simplified)



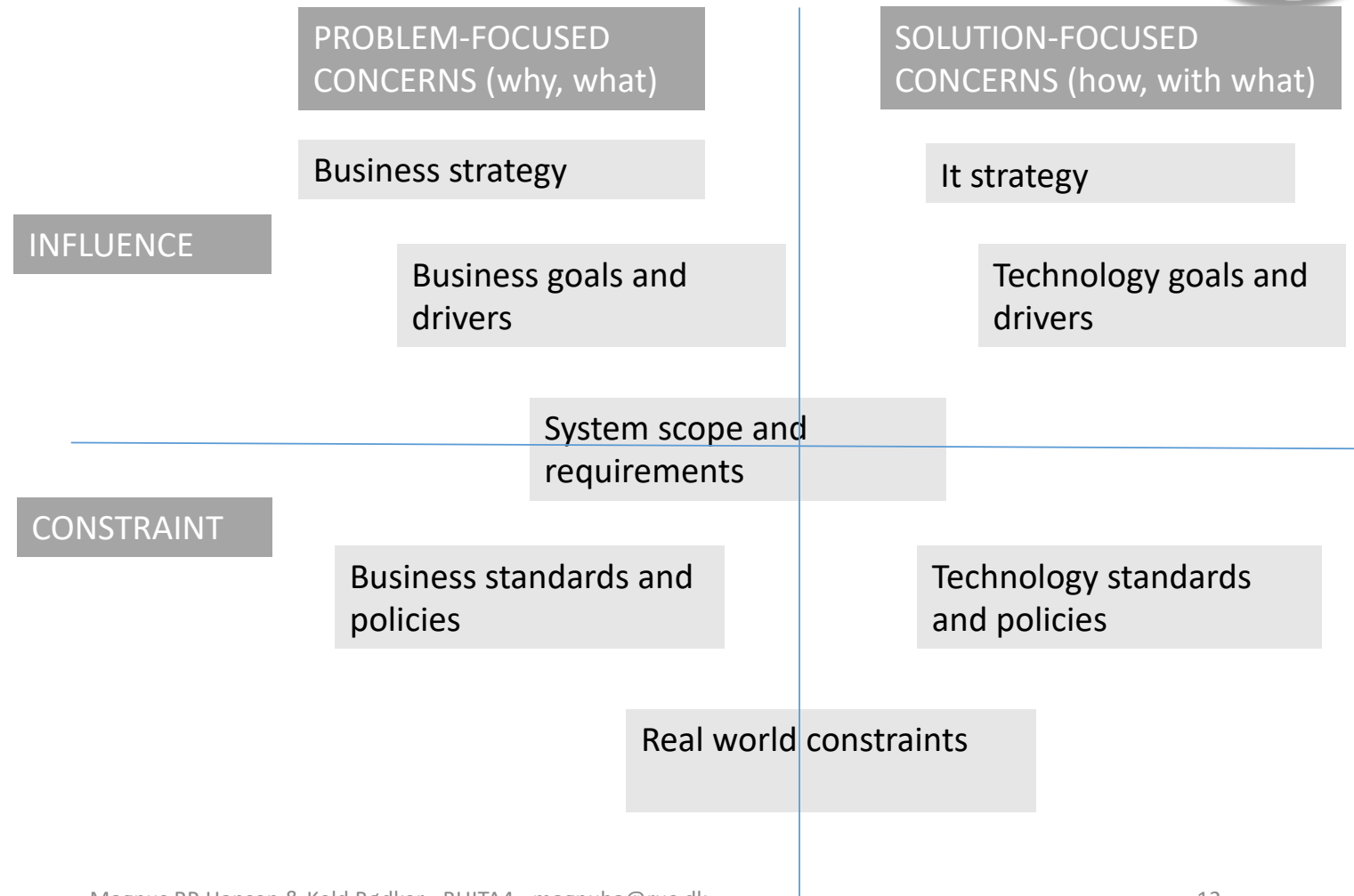
The "useful" stakeholder is

- Informed
- Committed
- Authorized
- Representative
- Not always easy in some project types
 - "Proxies"

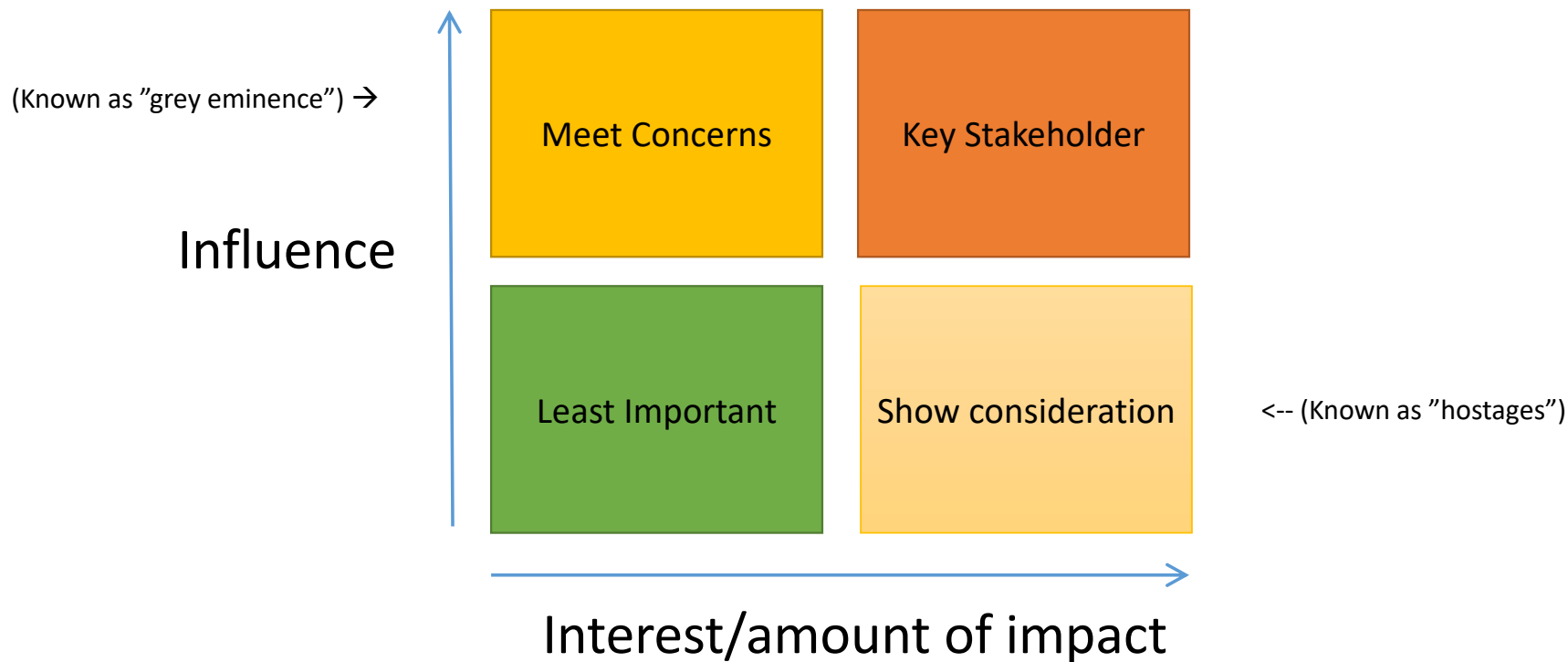
Usage and involvement of stakeholders

1. Initiation – who to talk to
2. Definition – who are they?
3. Design & Development – what visions do they have and what will change?
4. Evaluation – how usefull will their feedback be?
5. Acceptance – for go no-go decisions

Problem space vs. Solution space concerns



Mendelow Stakeholder Mapping



- Mendelow, 1991

Exercise: "monitor information system 2.0"

In small groups:

- Identify all relevant stakeholders of the monitor information system
- What could their first-cut concerns be? (use the steps on slide 11)

The monitor information system has shown promise but is now due for an update since it is not being used very much.

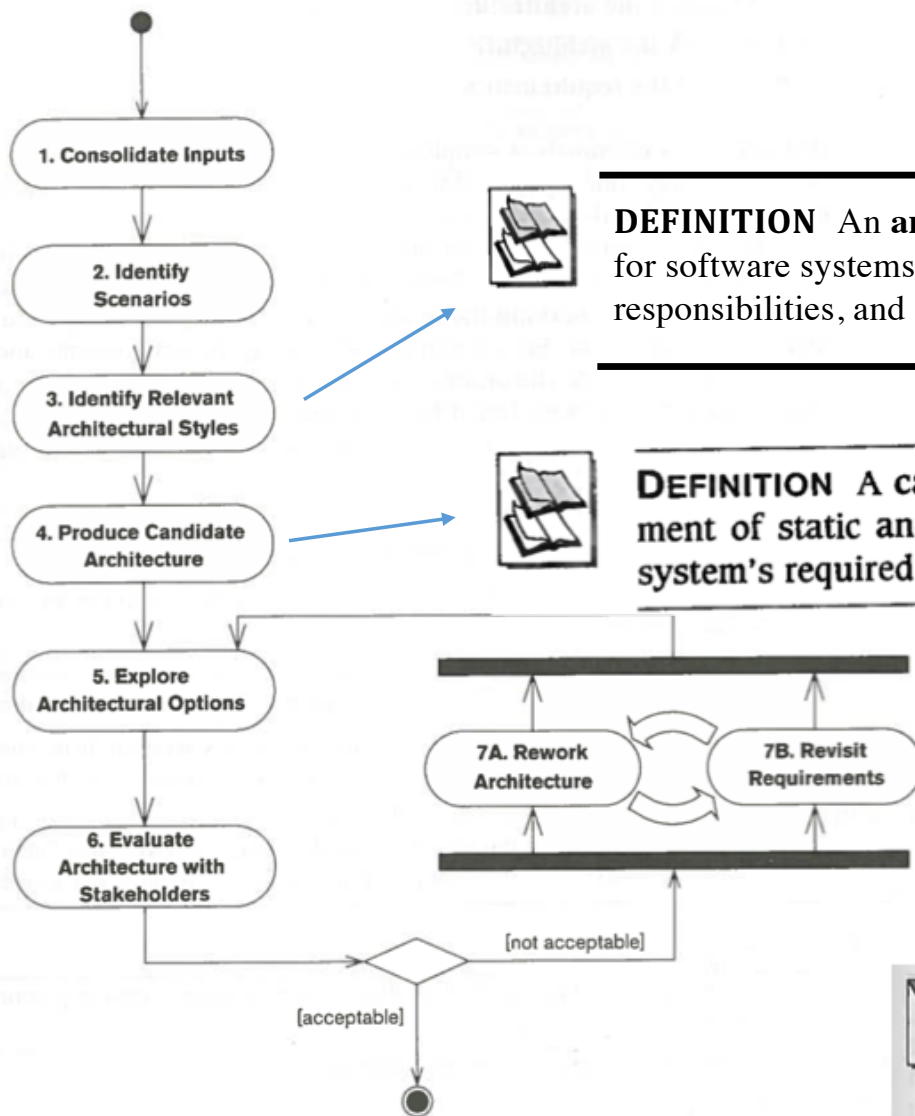
Exercise: "monitor information system 2.0"

In small groups:

- Position the identified stakeholders in the Mendelow model

The monitor information system has shown promise but is now due for an update since it is not being used very much.

Architecture definition process, principles and decisions



DEFINITION An **architectural style** expresses a fundamental structural organization schema for software systems. It provides a set of predefined element types, specifies their responsibilities, and includes rules and guidelines for organizing the relationship between them

DEFINITION A candidate architecture for a system is a particular arrangement of static and dynamic structures that has the potential to exhibit the system's required externally visible behaviors and quality properties.

The Activities

PRINCIPLE Architecture definition (or an iteration of it) can be considered complete once the material risks that the system faces have been mitigated, which can be judged by the absence of significant comments or actions after stakeholder evaluation of the architecture.

Guiding Principles (pp 85-86)

- Must be driven by stakeholder concerns and by balancing:
 - Communication
 - Pragmatism
 - Flexibility
 - Technology agnosticism
 - Etc.

Principles – links concerns and decisions

- DEF: An architectural principle is a fundamental statement of belief, approach, or intent that guides the definition of an architecture.
- Many available "off the shelf" – however should fit the specific situation
- Good principle:
 - Title of principle
 - Well articulated (understable to all stakeholders)
 - Constructive (what decisions can it help stakeholders make)
 - Reasoned (motivated by business drivers, goals,,)
 - Testable (possible to "prove")
 - Significant (not a "truism" – bullshit test!)

Principle of "standardization"

- *Well articulated*: "If given the choice between self-configuration or standard, always go with standard"
- *Constructive*: helps making decisions between following existing practice or adopting other practices
- *Reasoned*: rooted in business strategy of low cost, concerns of cycle of regular updates
- *Testable*: easily determinable by updating version
- *Significant*: passes the bull-shit test, simplifies architectural options

Principle of "shared data"

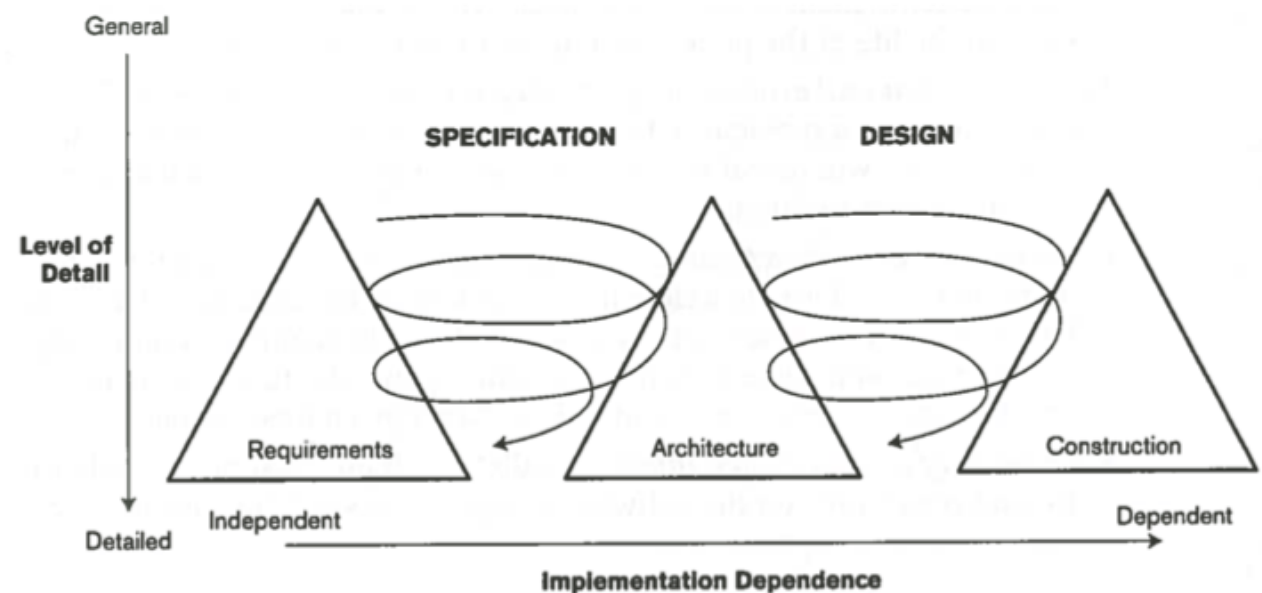
- *Well articulated*: "All data must be available to all users"
- *Constructive*: helps make decisions between ownership and access to data
- *Reasoned*: rooted in business culture of growing knowledge collectively
- *Testable*: compare data access between users
- *Significant*: not a truism since there is an opposing principle

Architectural decisions

- Answers "what", "how" and "with what"
- Traceability from concerns provided by principles, e.g.
 - "Business drivers and goals" form the rationale for a set of business principles
 - "Business principles" form the rationale for a set of technology principles
 - "Technology principles" are developed into architectural decisions
- Are specific and make it impossible to go other routes
- Examples:
 - Programming language "PHP" → principle of "Open Source" → concern of "cost"
 - Prioritizing quality properties such as performance over security → principle of instant data delivery → concern of "meeting customers' low patience"
 - Adopting the Model, View, Control pattern etc.
 - (pp. 123-128)

Process outcomes (pp 86-87)

- Clarification of requirements
- Management of stakeholders' expectations
- Identification and evaluation of architectural options



The Process Exit Criteria

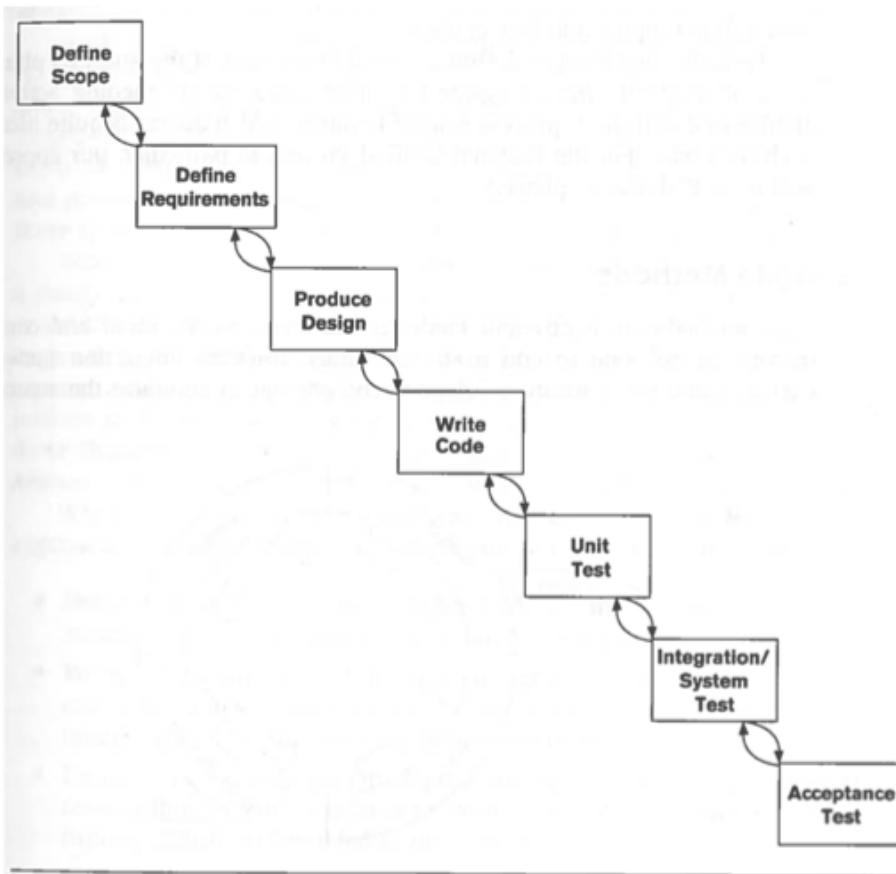
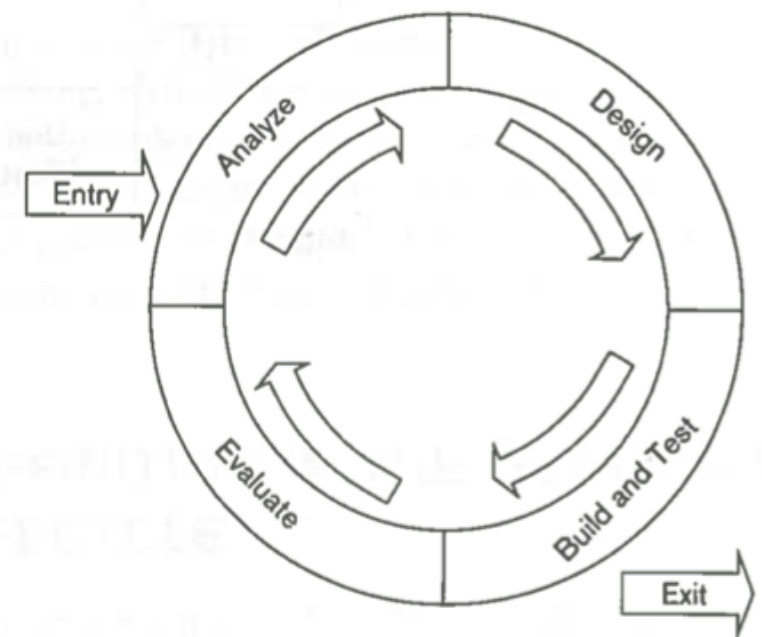


FIGURE 7-4 THE WATERFALL MODEL OF DEVELOPMENT

Vs.



ITERATIVE DEVELOPMENT

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