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# Methodology selection for System Analysis & Design

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Review of Different Approaches

# What is a System?

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- Elements:
  - Program
  - HW
  - People
  - Database
  - Documentation
  - Procedures
  - Education
  - ...

# What is Development?

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- Much more than programming
- A methodology of software development
  - A programming methodology?
  - An Analysis & programming methodology?
  - ...

# Methodology suggests ...

- how a project is to be broken down into stages;
- what tasks are to be carried out at each stage;
- what outputs are to be produced;
- when, and under what circumstances, they are to be carried out;
- what constraints are to be applied;
- which people should be involved;
- how the project should be managed and controlled;
- what support tools may be utilized.

# Methodology Definition 1

a recommended collection of philosophies, phases, procedures, rules, techniques, tools, documentation, management, and training for developers of information systems.

(Maddison, 1983)

# Methodology Definition 2

A systems development methodology is a recommended means to achieve the development, or part of the development, of information systems based on a set of rationales and an underlying philosophy that supports, justifies and makes coherent such a recommendation for a particular context. The recommended means usually includes the identification of phases, procedures, tasks, rules, techniques, guidelines, documentation and tools. They might also include recommendations concerning the management and organization of the approach and the identification and training of the participants.

# Methodology Components 1

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- manuals;
- education and training (including videos);
- consultancy support;
- tools and toolsets;
- *pro forma* documents;
- model-building templates, and so on.

# Methodology Components 2

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- a methodology can range from being a fully fledged product detailing every stage and task to be undertaken to being a vague outline of the basic principles in a short pamphlet;
- a methodology can cover widely differing areas of the development process, from high-level strategic and organizational problem solving to the detail of implementing a small computer system;
- a methodology can cover conceptual issues or physical design procedures or the whole range of intermediate stages;
- a methodology can range from being designed to be applicable to specific types of problem in certain types of environment or industry to an all-encompassing general-purpose methodology;
- a methodology may be potentially usable by anybody or only by highly trained specialists or be designed for users to develop their own applications;
- a methodology may require an army of people to perform all the specified tasks or it may not even have any specified tasks;
- a methodology may or may not include tools and toolsets.

# Reasons to adopt a methodology

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## ➤ **A better end product**

- *Acceptability*
- *Availability*
- *Cohesiveness*
- *Compatibility*
- *Documentation*
- *Ease of learning*
- *Economy*
- *Effectiveness*
- *Efficiency*
- *Fast development rate*
- *Flexibility*
- *Functionality*

## ➤ *Implementability*

- *Low coupling*
- *Maintainability*
- *Portability*
- *Reliability*
- *Robustness*
- *Security*
- *Simplicity*
- *Testability*
- *Timeliness*
- *Visibility*

## ➤ **A better development process**

## ➤ **A standardised process**

# Issues in Systems Development

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- Analysis Methodology
- Design Methodology
- Implementation Methodology
- Tools & Tool sets

# Designing methodologies

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- written up;
- made consistent;
- made comprehensive;
- made marketable;
- updated as needed;
- maintained;
- researched and developed;
- evolved into training packages;
- provided with supporting software.

# Tools and toolsets

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## ➤ Tools

- Project management :
  - MS Project
- Groupware:
  - GroupSystems Ventura
- Web site development:
  - Dreamweaver
- Drawing:
  - Microsoft Visio
- Database management system:
  - Access

## ➤ Toolsets

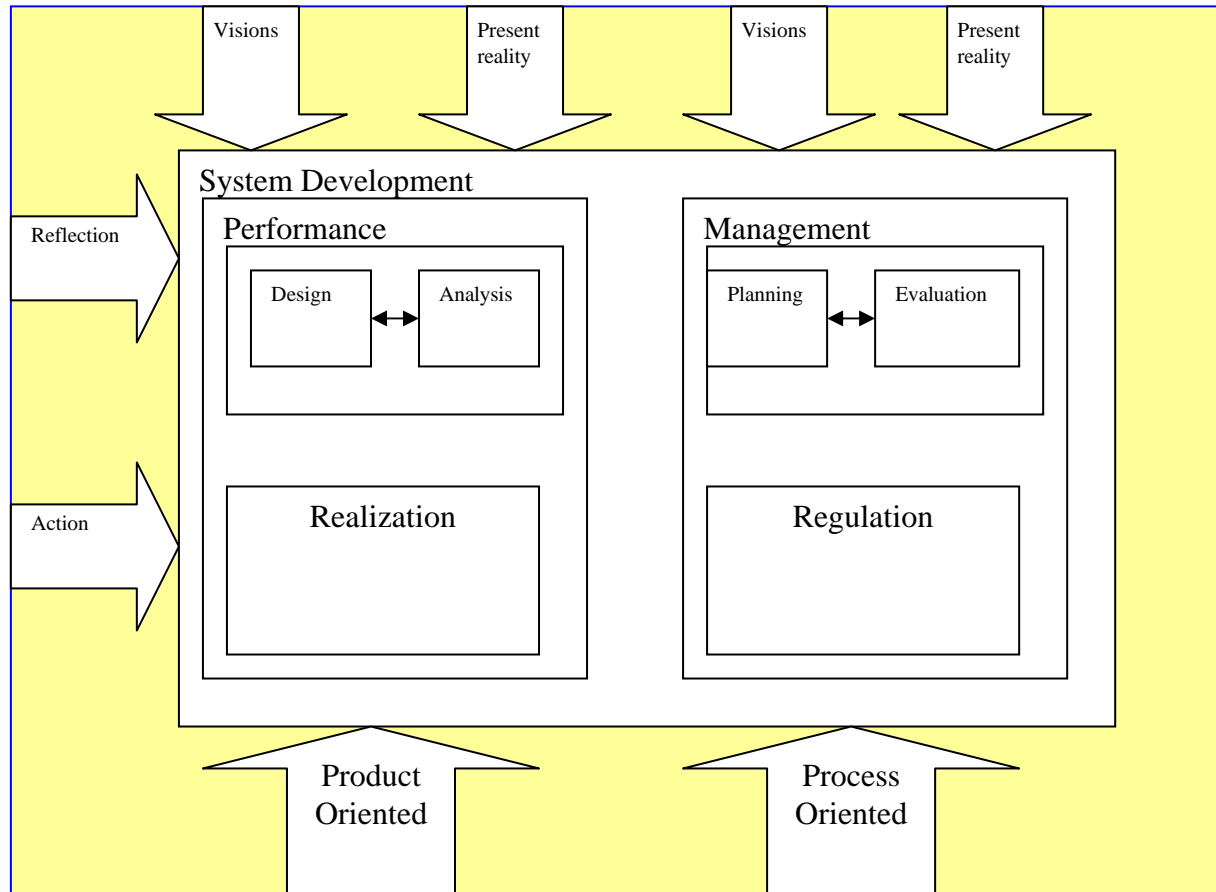
- Information Engineering Facility
- Select
- Oracle

# Yet more questions

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- Will methodologies solve the problems of IS development?
- Do methodologies have to change and develop?
- Do methodologies mean more bureaucracy and slower development?
- Should all organisations adopt a methodology?
- Where do methodologies go from here?

# System Development Components



# What is a Project?

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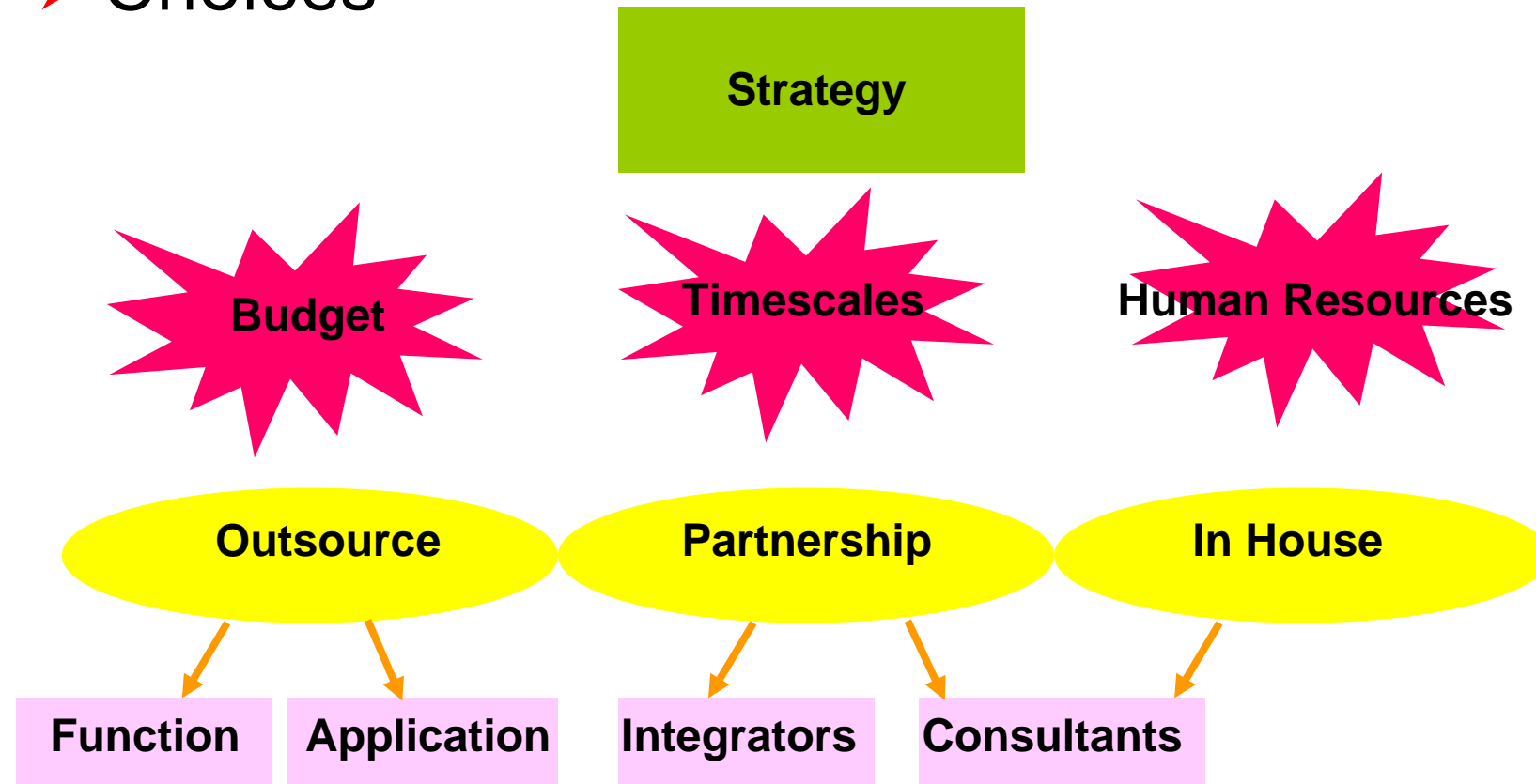
- 'A temporary endeavour undertaken to accomplish a unique purpose'
- Better understood by its attributes
  - Time frame
  - Purpose
  - Ownership
  - Resources
  - Roles
  - Risks / **Assumptions**
  - Interdependent tasks
  - Organisational change
  - **Operating in an environment larger than itself**

*Taken from Marchewka, J. T. Information Technology Management, Wiley 2003*

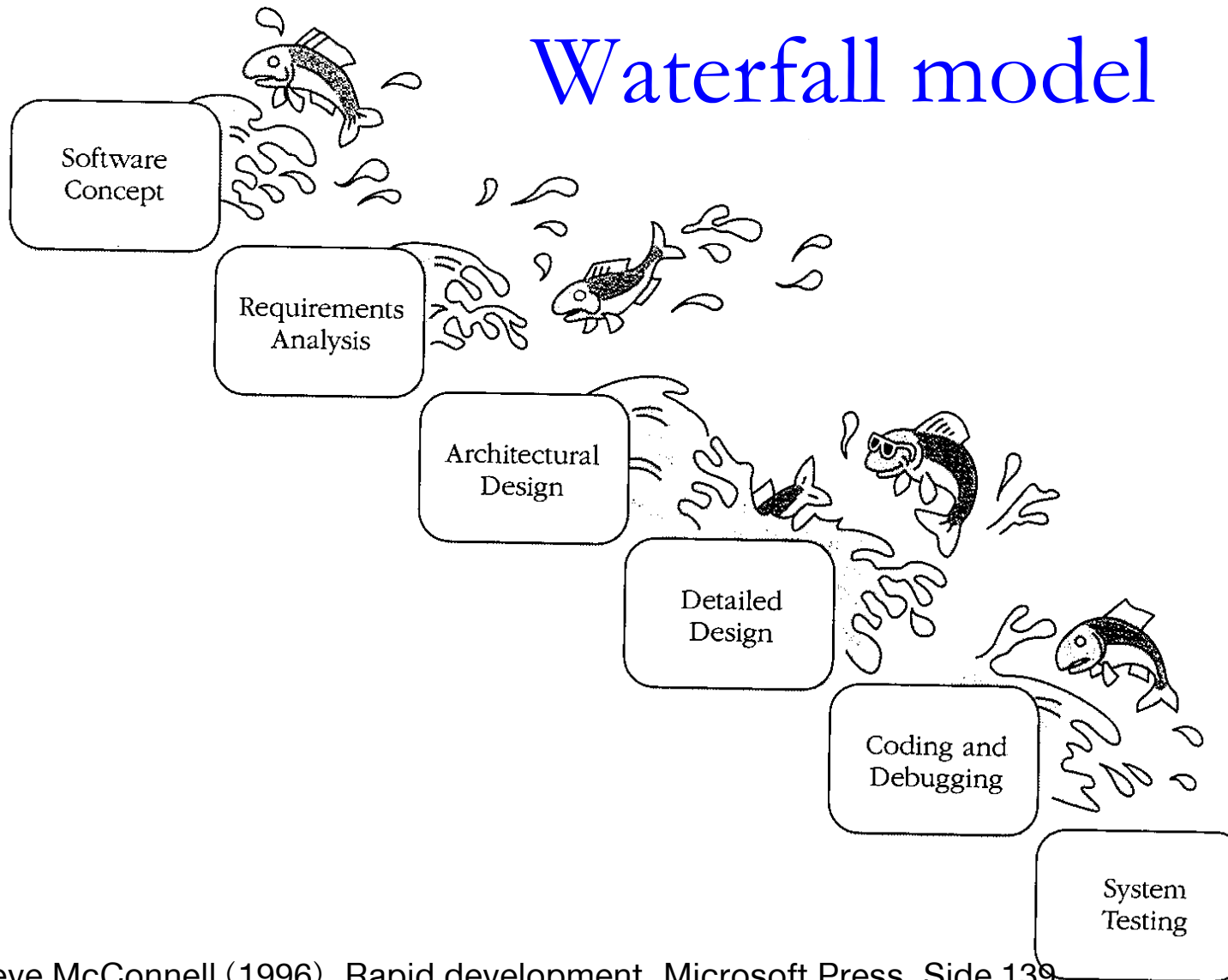
# Balancing Resources

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## ➤ Choices

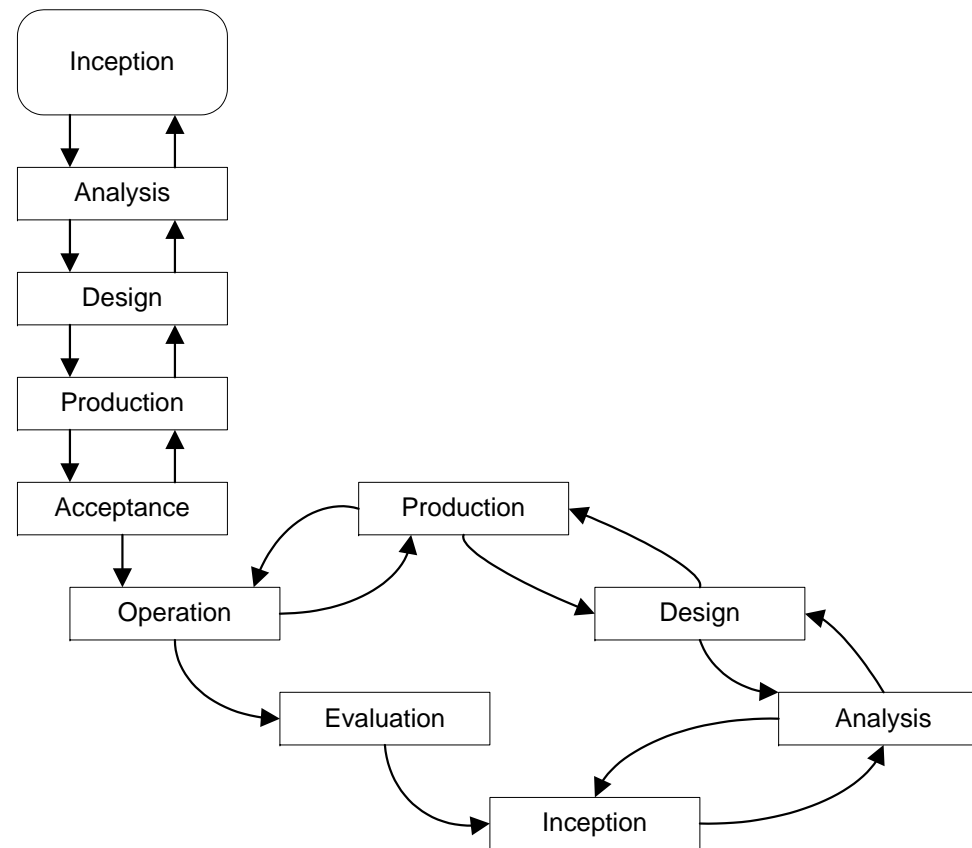


# Waterfall model



Kilde: Steve McConnell (1996). Rapid development. Microsoft Press. Side 139.

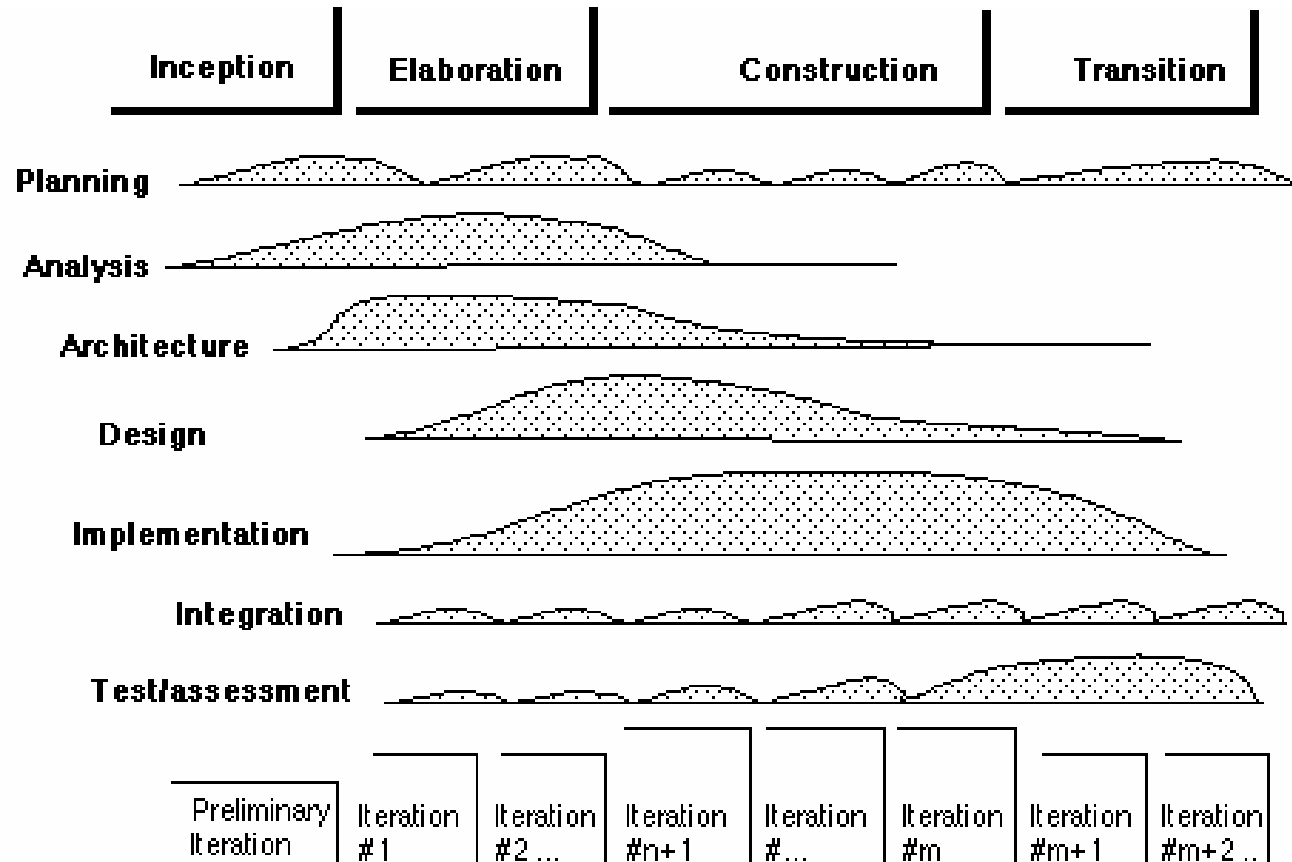
# The 'b' model



**Figure 6.2** The 'b' model

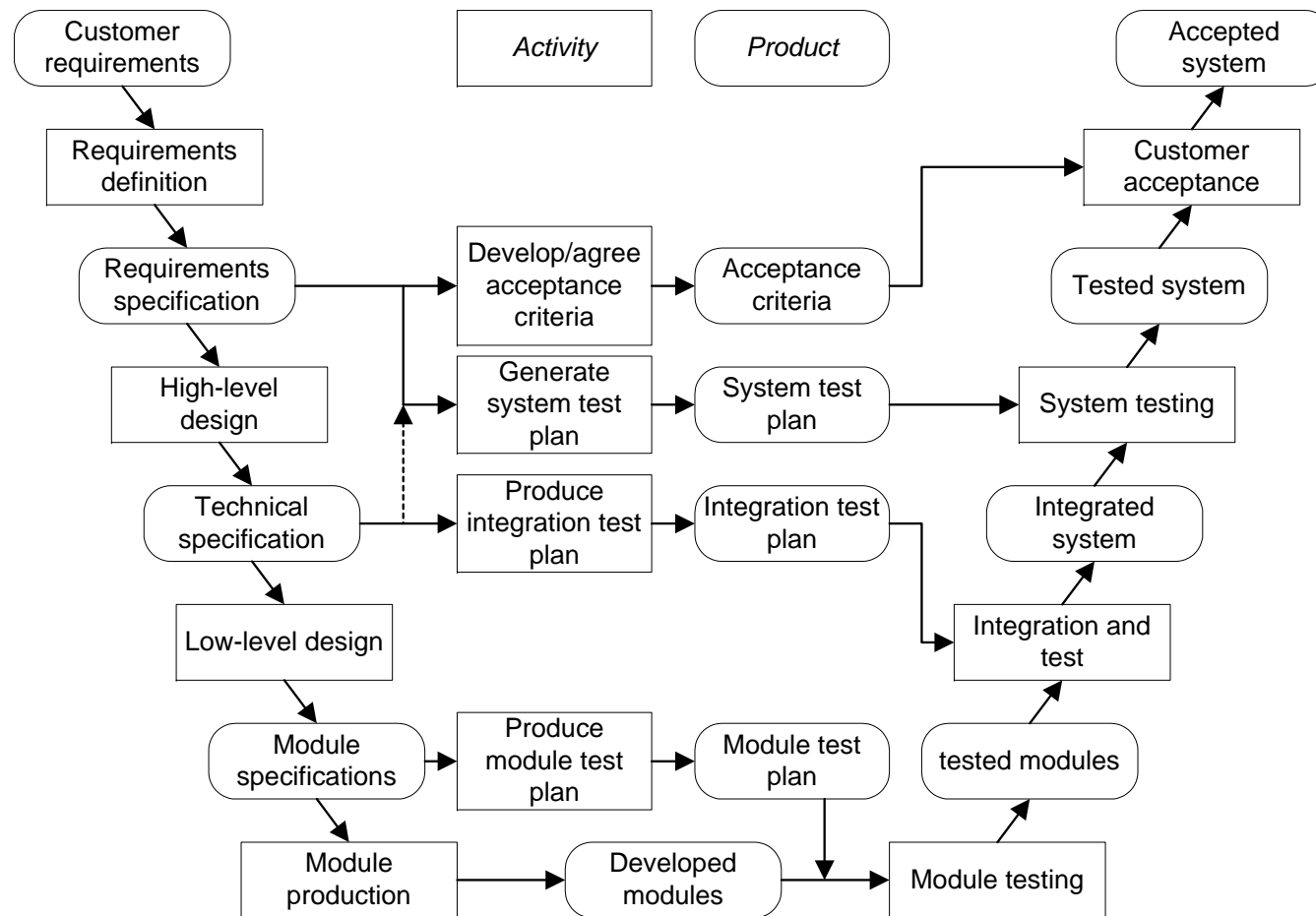
Source: Derived from N D Birrell & M A Ould, *A Practical Handbook for Software Development*, Cambridge University Press, 1985

# RUP - Rational Unified Model



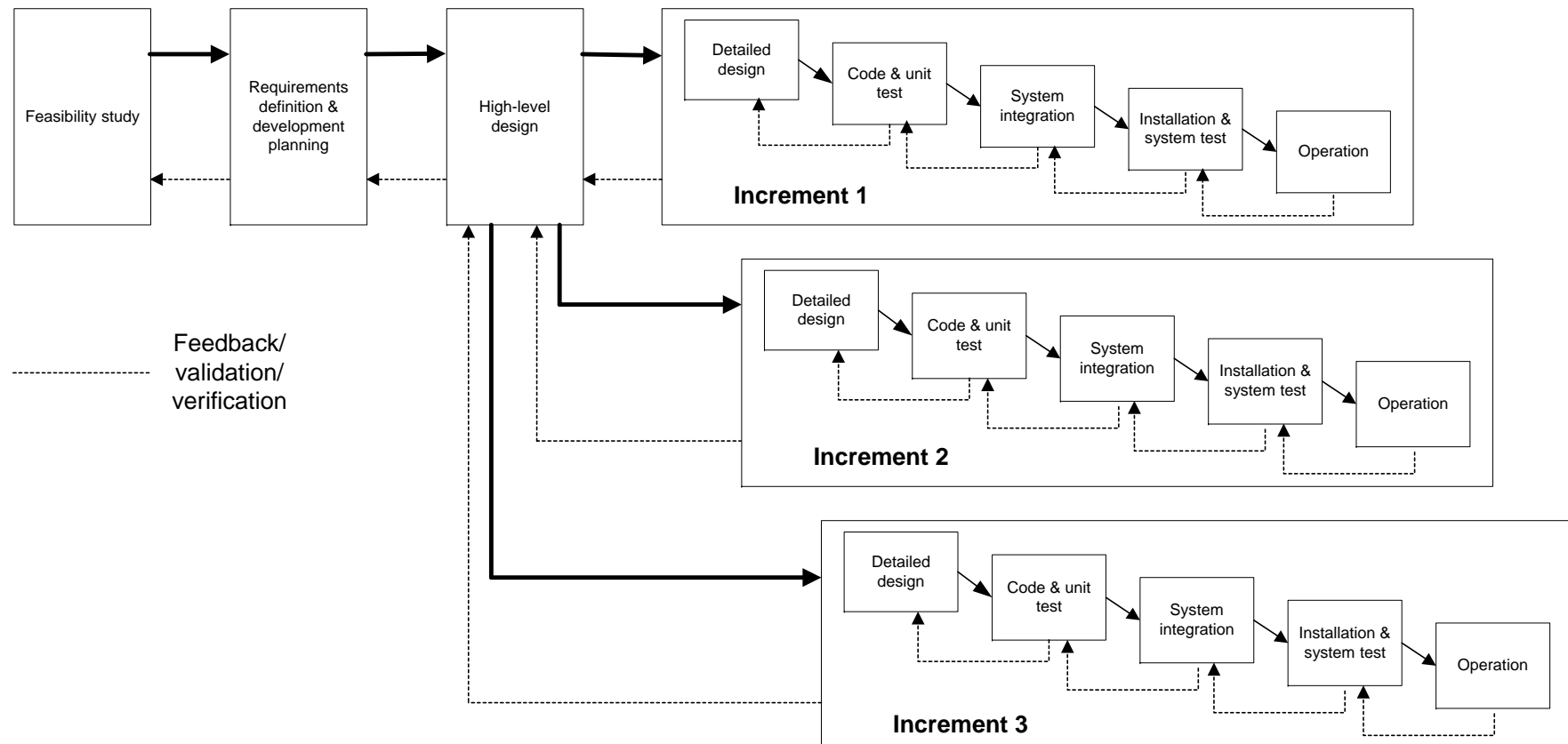
*Kilde: <http://www.rational.com/products/rup/whitepapers.jsp>*

# The 'V' model



Source: Adopted and reproduced with the permission of the National Computing Centre Limited from the *STARTS Guide*, 1987, which was supported by the Department of Trade and Industry

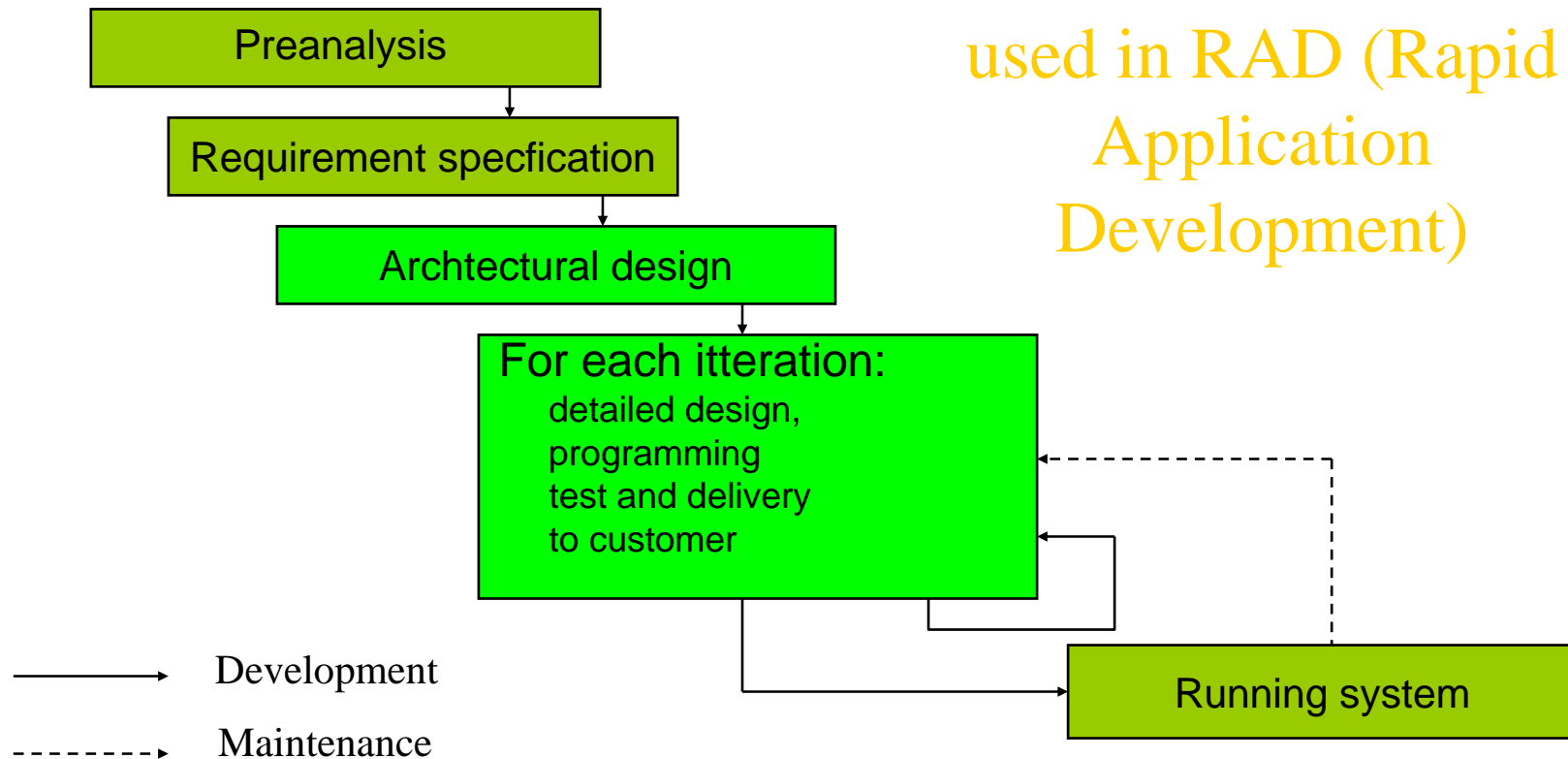
# The incremental approach



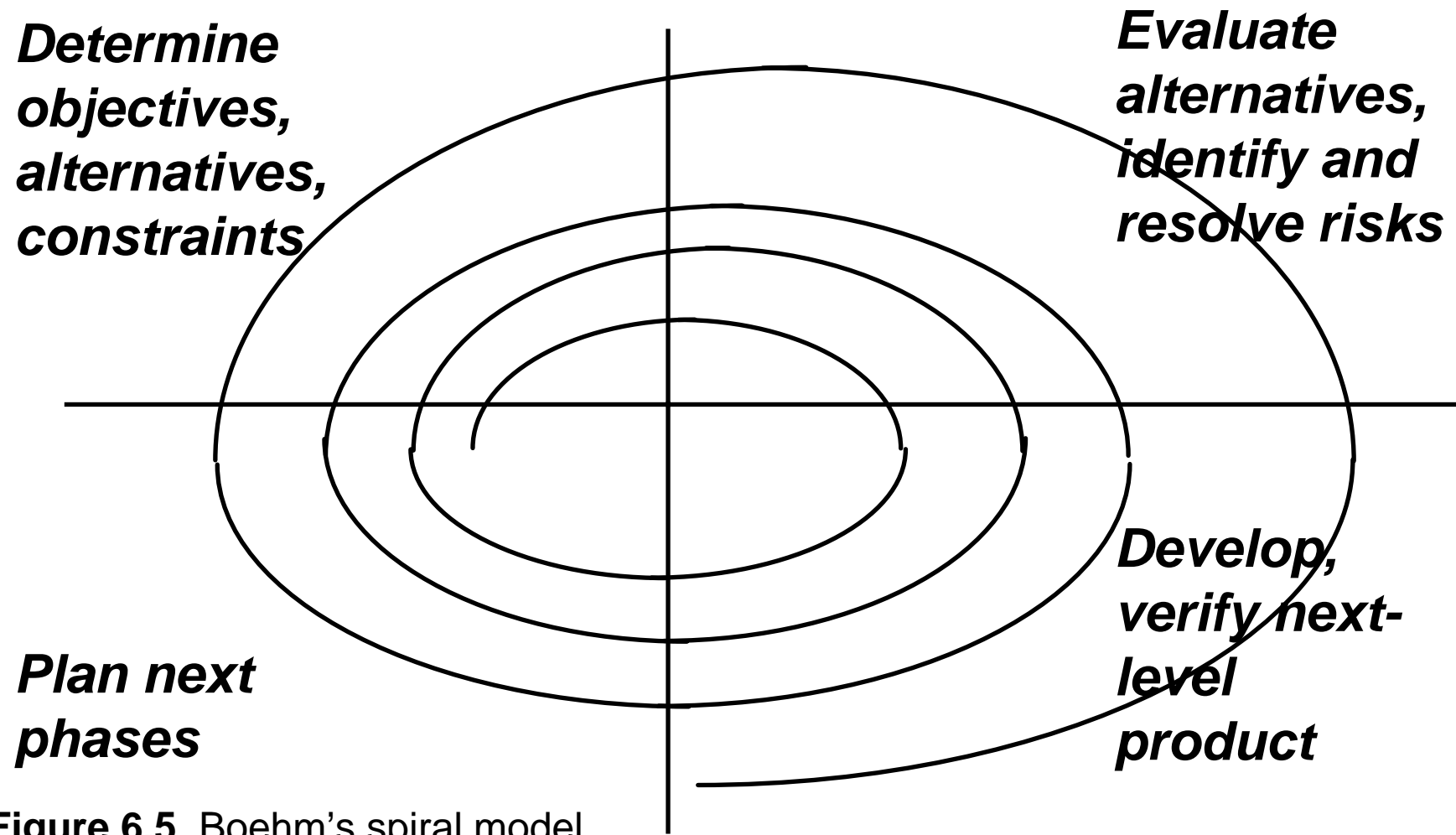
**Figure 6.4** The incremental model

# Partly incremental model

This model is often used in RAD (Rapid Application Development)



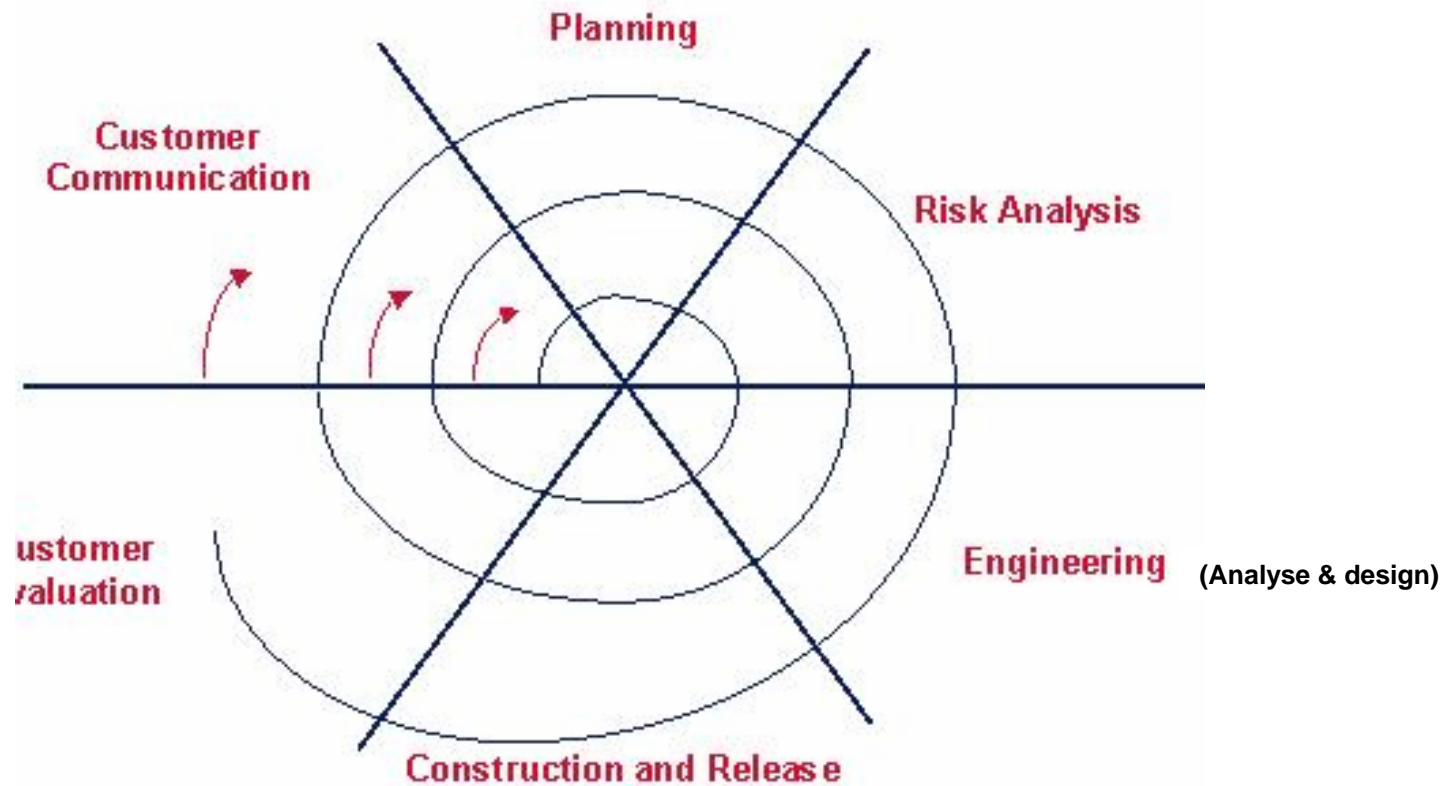
# The spiral model – evolutionary development



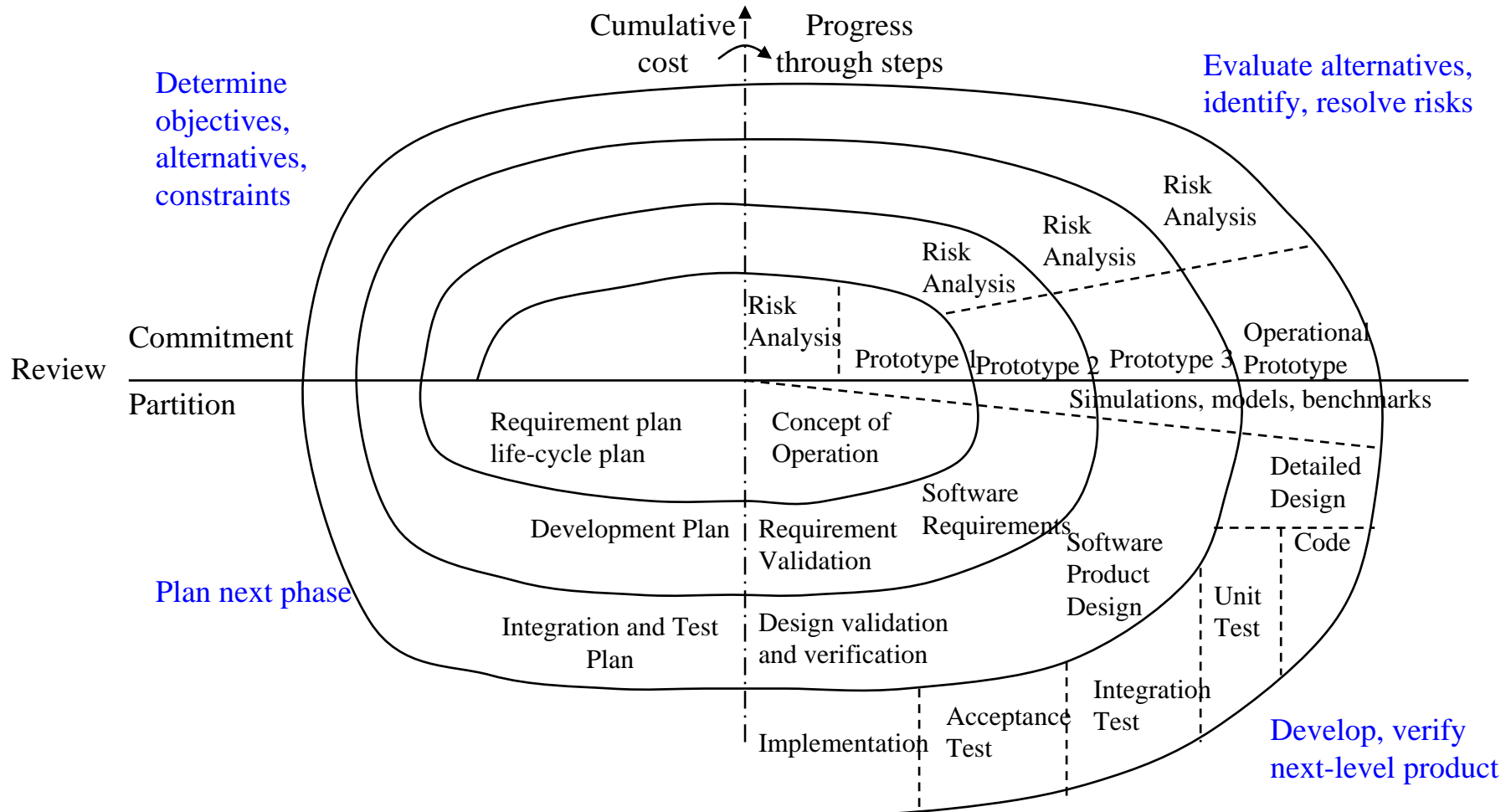
**Figure 6.5** Boehm's spiral model

# Spiralmodel – simpel form

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# Spiralmodel [Boehm, IEEE 1998]

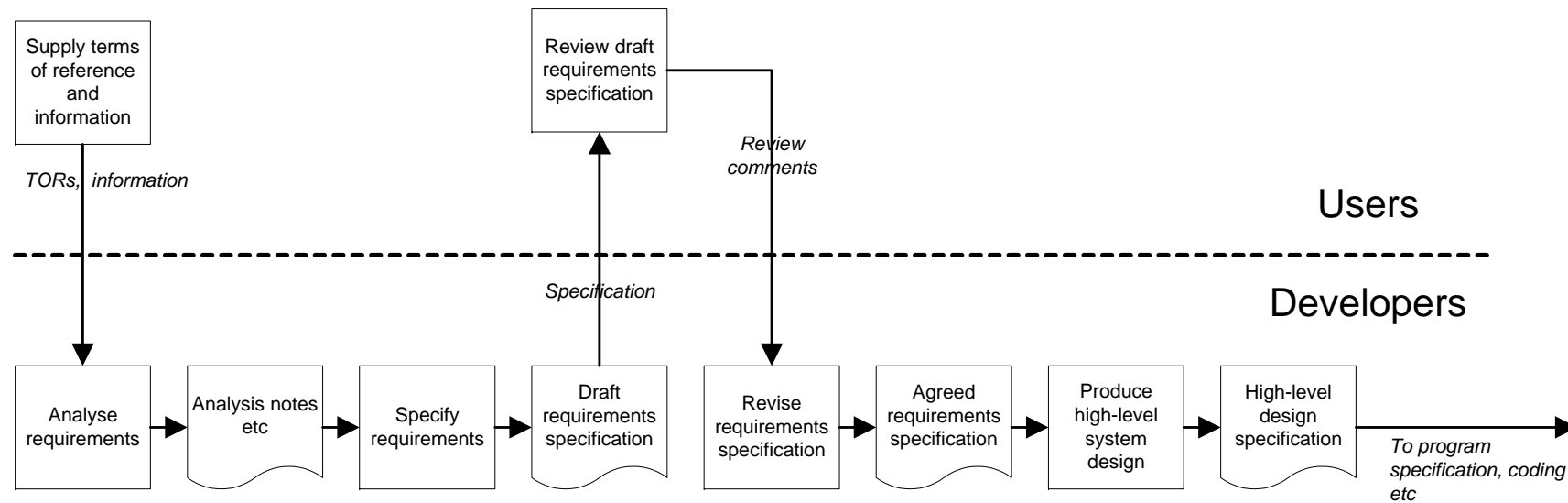


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# User Involvement

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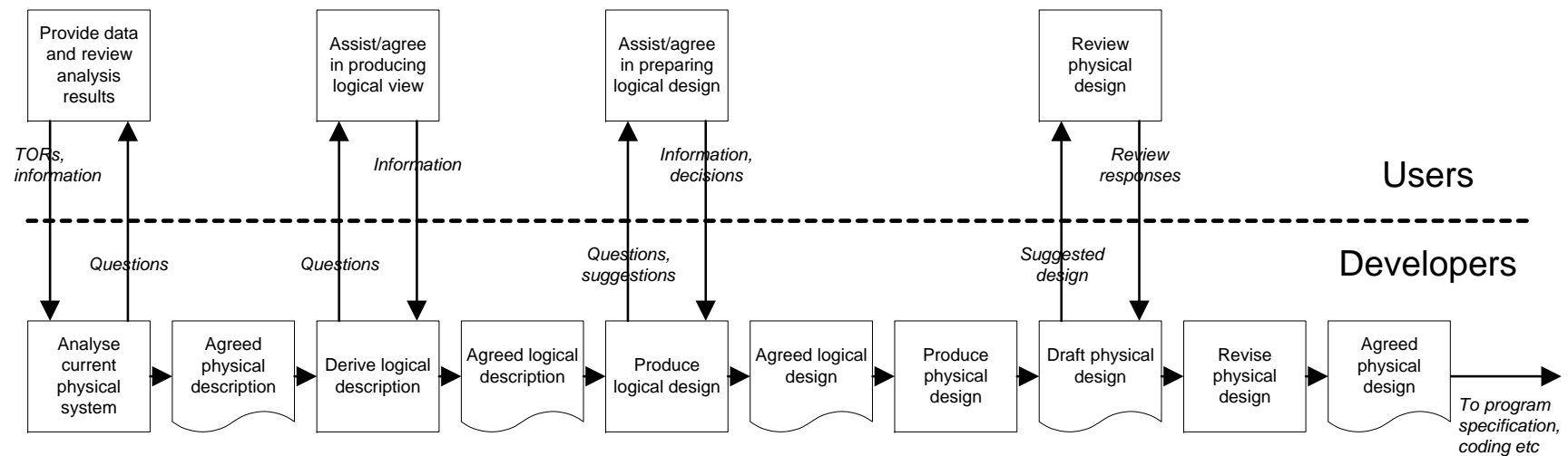
# Traditional approach to analysis



*Limited user involvement; driven by developers*

**Figure 6.6** The traditional approach

# Structured systems development



*Greater user involvement at all stages; driven by users*

# DSDM

## ➤ Dynamic Systems Development Method

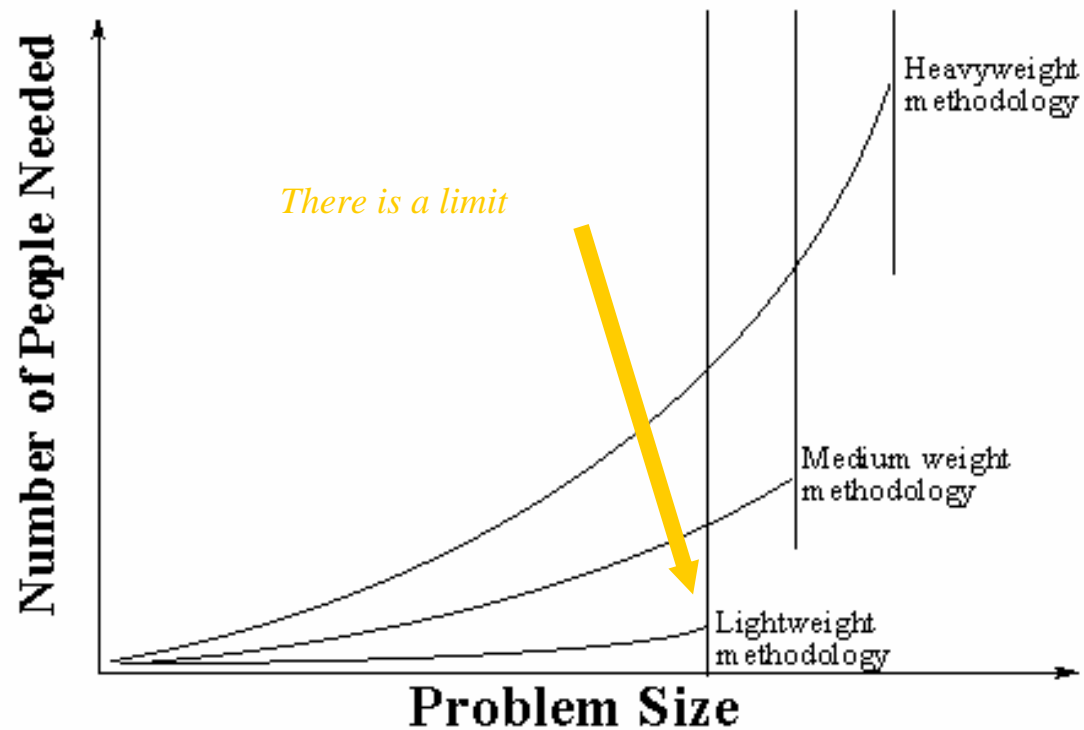
<http://www.dsdm.org/en/about/principles.asp>

### 9 key principles

- Users must be actively involved
- Teams must be empowered to make decisions
- Products are delivered frequently rather than perfected
- Each product should be fit for its business purpose
- Iterative and incremental development is an integral part of the approach
- All changes are viewed as being reversible
- The high level scope of the system should be agreed at a level which does not make it difficult to change it later in development
- Testing is an integral part of the lifecycle
- All stakeholders must co-operate and collaborate

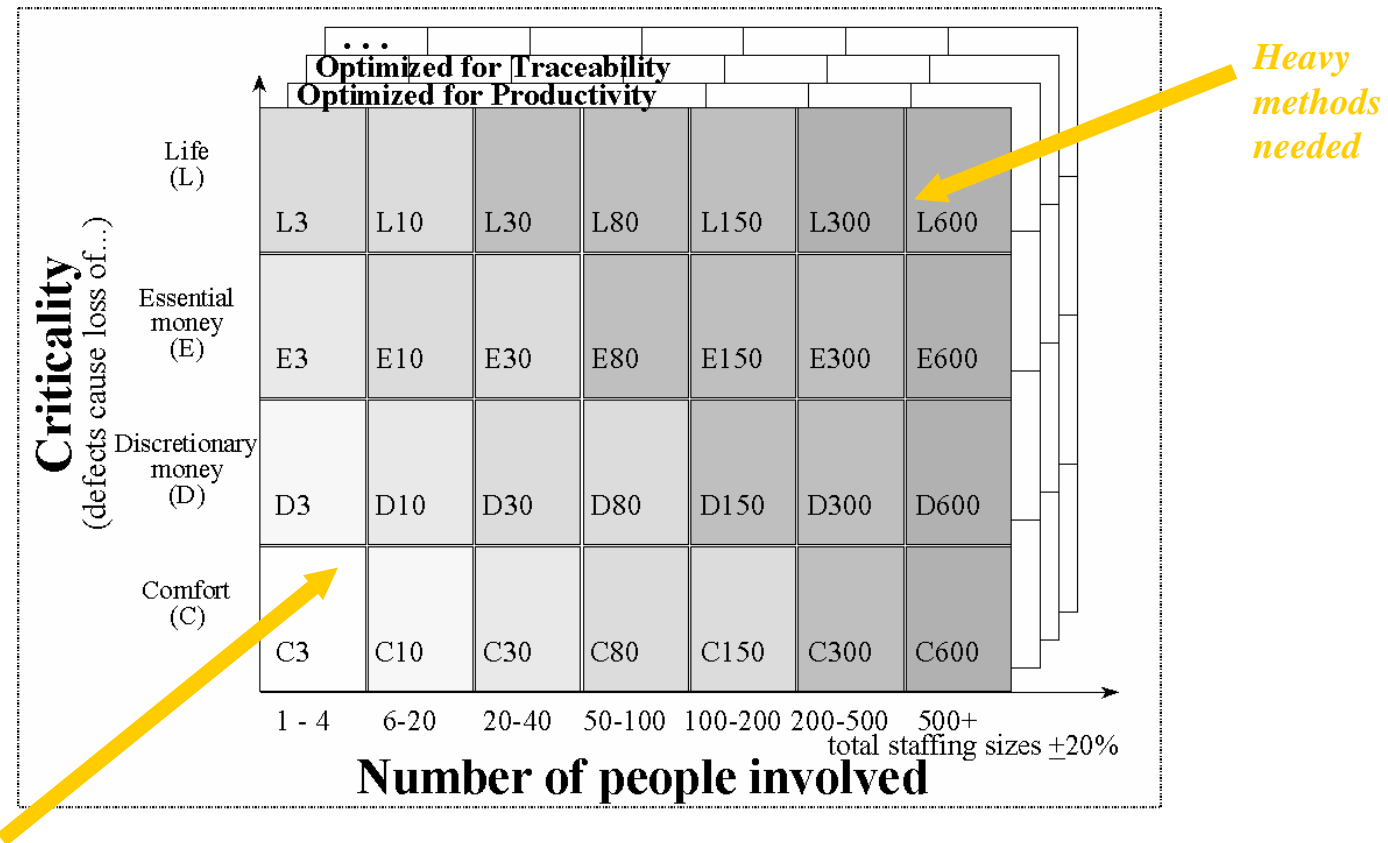
# Rightsizing methodology

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*Kilde: Alistair Cockburn (2001). Agile software Development. Addison-Wesley*

# Rightsizing methodology



Kilde: Alistair Cockburn (2001). Agile software Development. Addison-Wesley

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