Requirements Management

Requirement

❑ **What is it?**

→ a condition or capability to which the system must conform

❑ **Examples**

- The QBS system shall, upon user request, display detailed customer information
- Each user shall have a unique login and associated password
- The QBS Banking system shall be user friendly
- The QBS Banking system requires 32 MB of RAM and a Pentium Processor for maximum performance
- Maintain Accounts
- Generate Reports
- After printing is complete, the system returns to ready
 ...

Requirements Management

→ a systematic approach to eliciting, organizing and documenting the requirements of the system, and

→ a process that establishes and maintains agreement between the customer and the project team on the changing requirements of the system

❑ Requirements Workflow in RUP:

- To come to an agreement with the customer and the users on what the system should do
- To give system developers a better understanding of the requirements on the system
- To delimit the system
- To provide a basis for planning the technical contents of iterations
- To define a user-interface for the system

Problems of RM

- ❑ Many sources and interested parties

- ❑ Not obvious and difficult to express in words

- ❑ Different levels of abstraction

- ❑ Unmanageable huge amount, if not controlled

- ❑ Needed to be managed by cross-functional groups of people

- ❑ Change

- ❑ Time-sensitivity
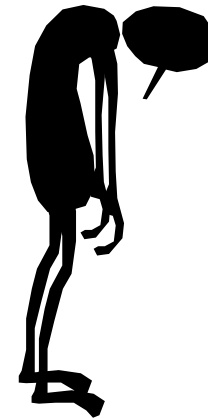
Results of RM Errors

- ❑ Poor understanding of the tasks

- ❑ An undisciplined approach to prioritizing, managing, and tracking requirements

- ❑ Lack of communication

- ❑ Schedule delays

- ❑ Cost overruns

- ❑ A product that only bears a slight resemblance to what users wanted

- ❑ A loss of competitiveness in the industry
  ...

Definition of RM

- ❑ Requirements model
- ❑ Requirements artifact types
- ❑ Stakeholder types and their roles
- ❑ Workflows
- ❑ Tools and their customization
- ❑ (Process and model quality criteria)

Requirement Types

→ **a class of requirements**

Examples

- stakeholder needs

- system features

- functionality (Use Cases)

- non-functional requirements (Supplementary Specifications)

  – usability, reliability, performance, supportability, design constraints, etc.

- implementation requirements

- interface requirements

- data requirements

- physical requirements
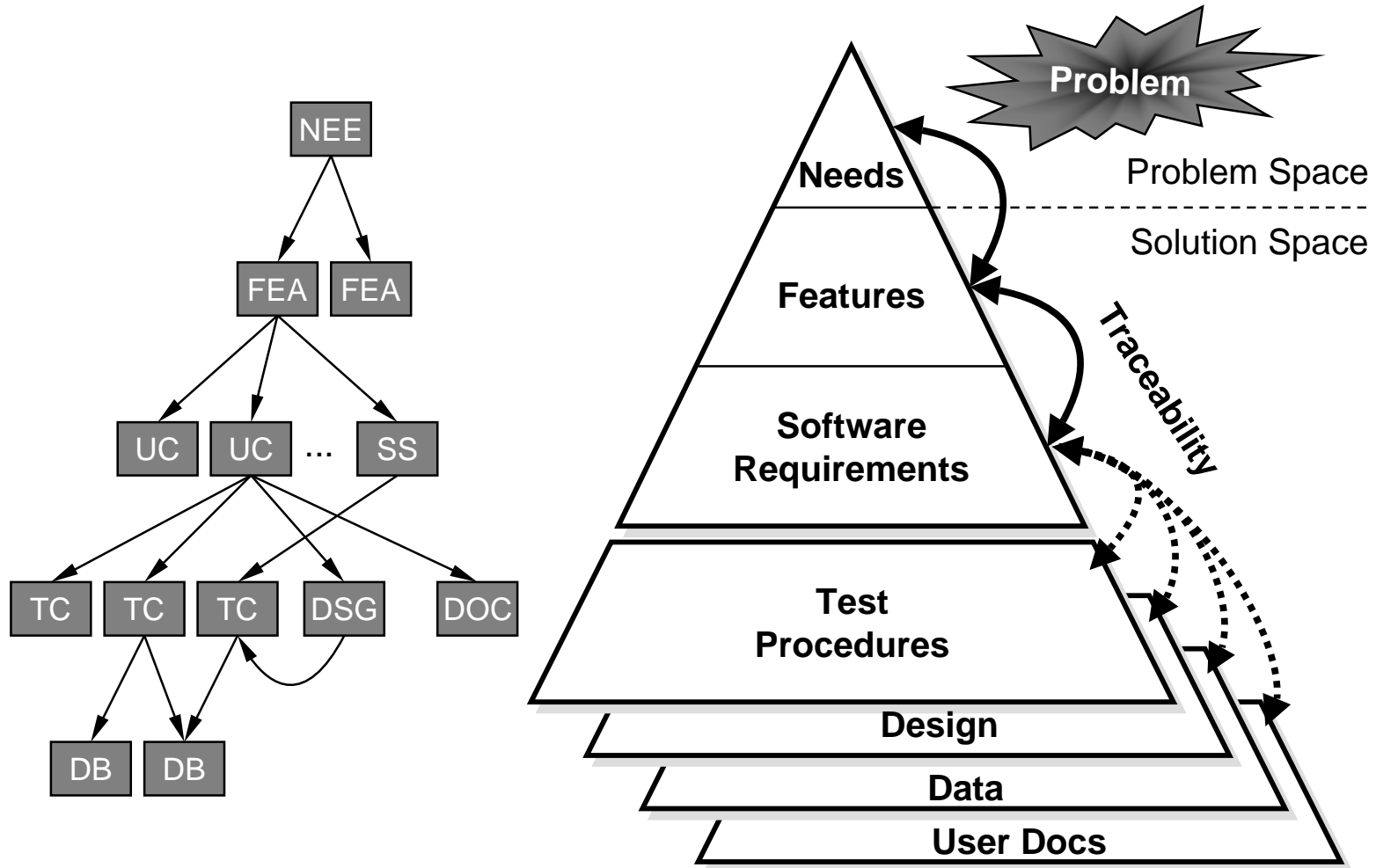
- Test Cases

  ...

Requirement Attributes

→ an information associated with a particular requirement providing a link between the requirement and other project elements, e.g. priorities,schedules, status, design elements, resources, costs, hazards, etc.

❑ each requirement type may have its specific attributes

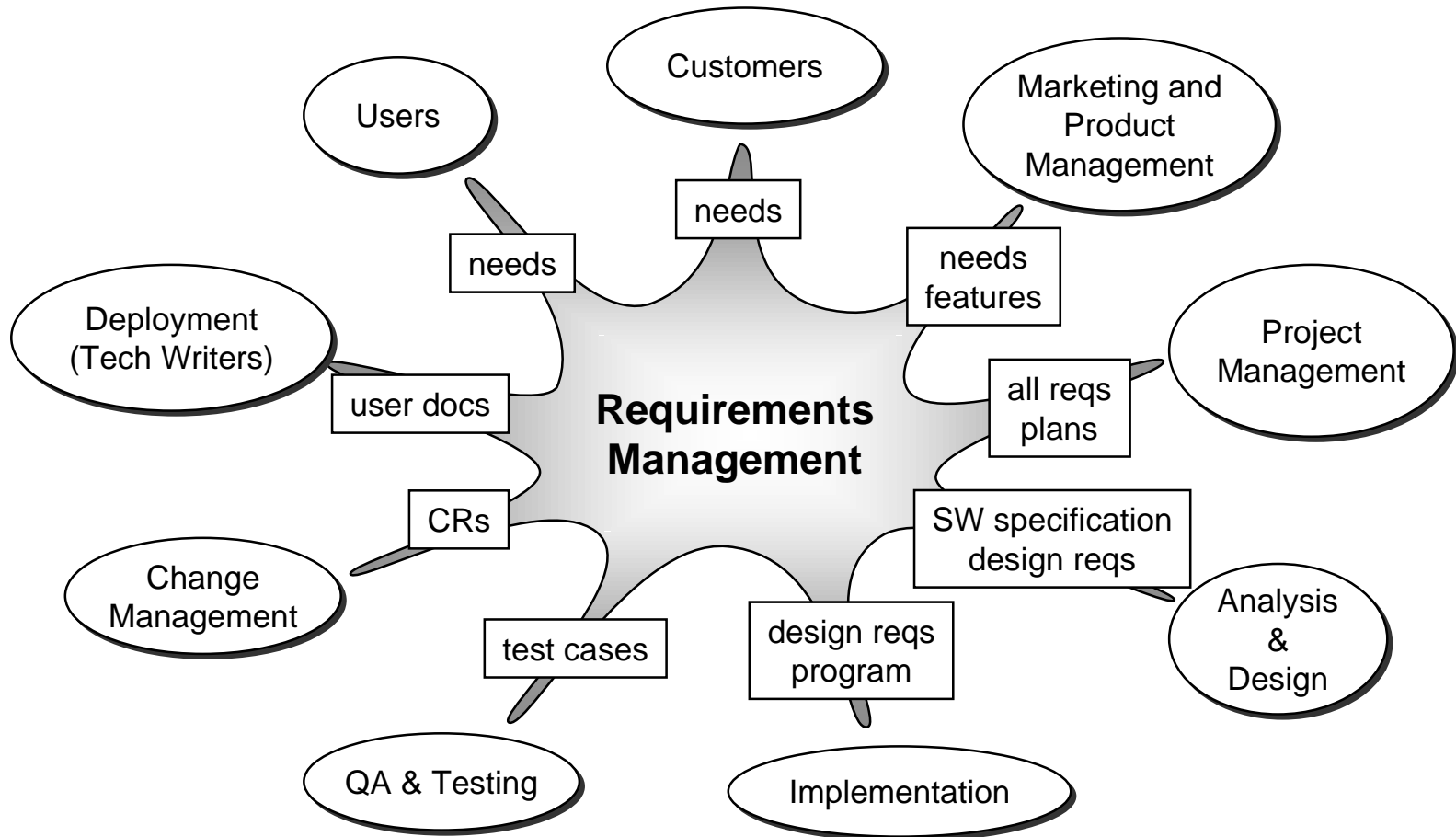| Features					
Id	**Name**	**Priority**	**Difficulty**	**Risk**	**Stability**
FEA 1	Save and restore user's configurations	Mid High	Mid Low	Low	High
FEA 2	Ability to cooperate with Xetra	Very High	Very High	High	Middle
FEA 2.1	Ability to send all kinds of orders to Xetra	High	Very High	High	Low

Use Cases						
Id	**Name**	**Goal**	**Scenario**	**Trigger**	**Precond.**	**…**
UC 1	Save Trading Overview Configurations	…	…	User action	…	
UC 2	Submit Container Window Status	…	…	User action	…	
UC 50	Submit Unrestricted Order to Xetra	…	1 Open Trading Window 2 Drag TI into FOE line 3 Press Submit button	User action	…	
UC 51	Submit FOK Order to Xetra	…	…	High	…	
UC 84	Get Xetra Trade	…	…	Xetra GW	…	

Requirements Traceability

NEE

FEA   FEA

UC   UC   ...   SS

TC   TC   TC   DSG   DOC

DB   DB

Problem

Needs

Problem Space

- -

Solution Space

Features

Software
Requirements

Traceability

Test
Procedures

Design

Data

User Docs

RM Connectivity

RM Skills

- ❑ **Problem Analysis**
  - → understand business problems, target initial stakeholder needs, and propose high-level solutions

- ❑ **Understanding Stakeholder Needs**
  - → determine project stakeholders and elicit their needs resulting in a "wish list"

- ❑ **Defining the System**
  - → translate needs into meaningful description of the system to be built, early prototyping and high-level analysis

- ❑ **Managing the Scope of the Project**
  - → managing requirement attributes, such as priority, effort, risk, ...

- ❑ **Refining the System Definition**
  - → detail UCs, supplementary specifications, and GUI

- ❑ **Managing Changing Requirements**
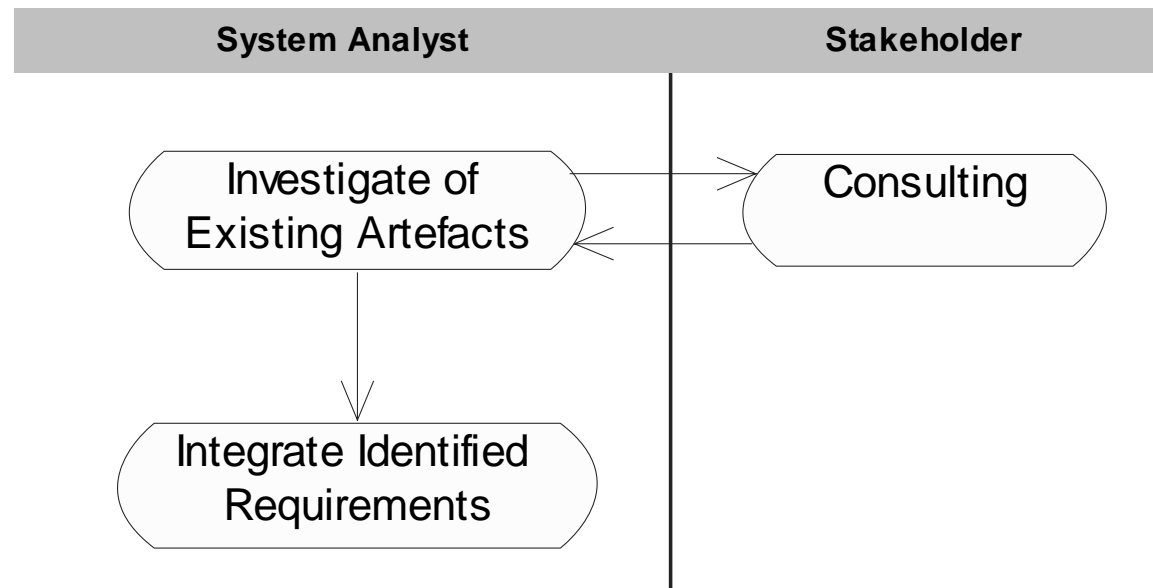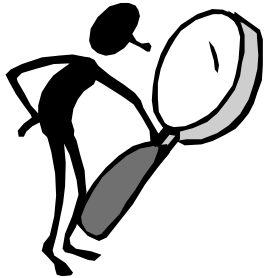 - → determining traceabilities, establishing a baseline, maintain history and version control; decision process
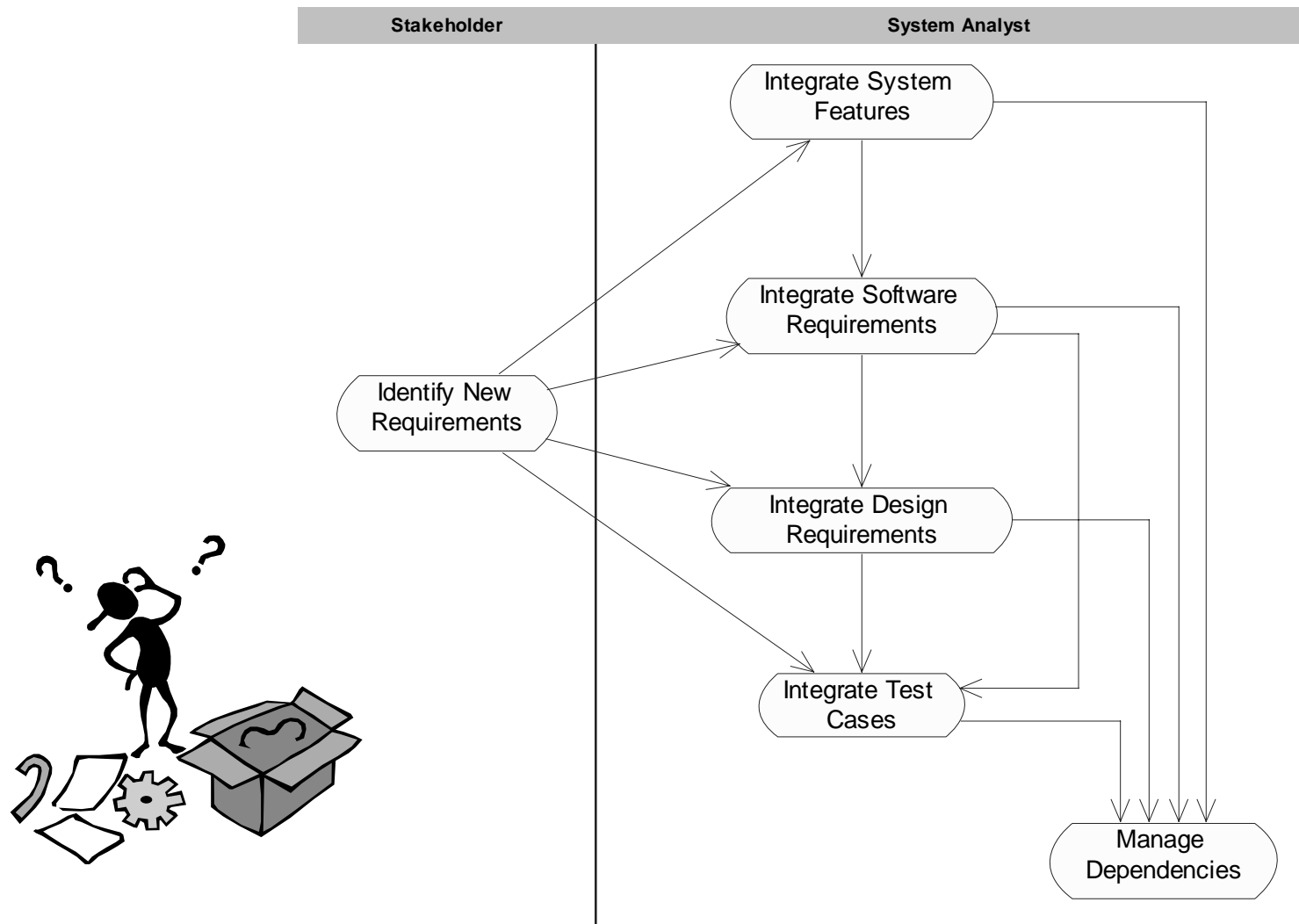
RM Workflows (Reqs. Lifecycle)

- ❑ Initial Requirements Identification
  - building of initial requirements model from existing artifacts and know-how

- ❑ New Requirements
  - identifying of new requirements and their integration into the requirements model

- ❑ Requirements Refining
  - detailing of use case model and test cases

- ❑ Requirements Change
  - changing of requirements, assessment of their impacts and consequent processing

- ❑ Requirements Review
  - official requirements reviewing

- ❑ Control of Requirements Adherence
  - checking the consistency of requirements, artifacts (A/D documents and models, test cases, user's documentation, etc.) and implementation
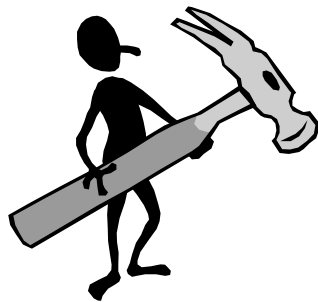
Initial Requirements Identification
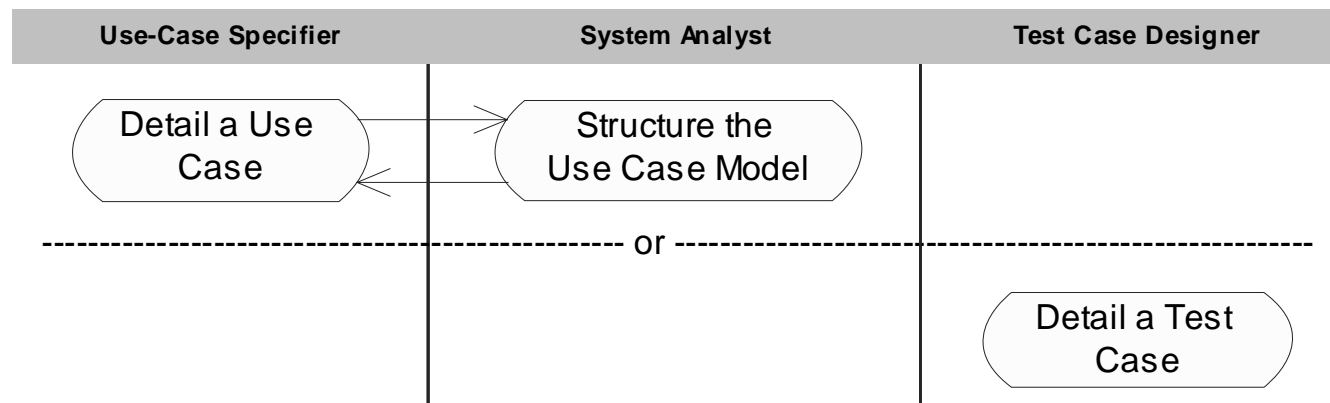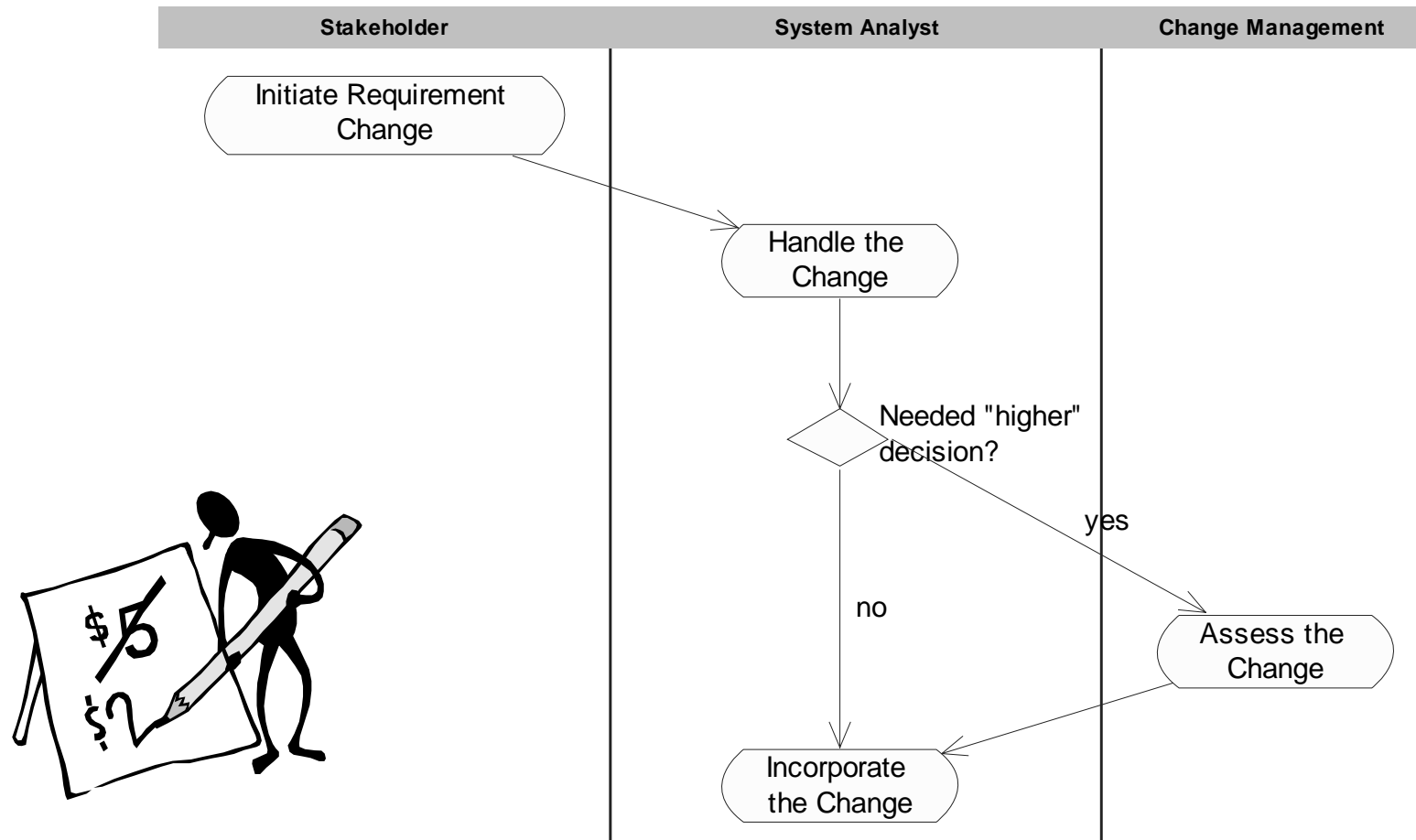
System Analyst	Stakeholder

Investigate of Existing Artefacts → Consulting

Investigate of Existing Artefacts ← Consulting

Investigate of Existing Artefacts → Integrate Identified Requirements

New Requirements

Requirements Refining

Use-Case Specifier	System Analyst	Test Case Designer

Detail a Use Case → Structure the Use Case Model

-- or --

Detail a Test Case

Requirements Change

Stakeholder	System Analyst	Change Management

Initiate Requirement Change

Handle the Change

Needed "higher" decision?

yes

no

Assess the Change

Incorporate the Change

Requirements Review

System Analyst	Stakeholder

Prepare Reviewed
Requirements

Review the
Requirements

Incorporate
Review Findings

Notify Requirements'
Consumers

Control of Requirements Adherence

Stakeholder	System Analyst	Change Management
New/Changed Artefact	New/Changed Requirement(s)	

Submit an Artefact

Lookup an Artefact

Check the Requirements Adherence

Significant impact of the changes?

no

yes

Incorporate the Changes

Prepare Change Request
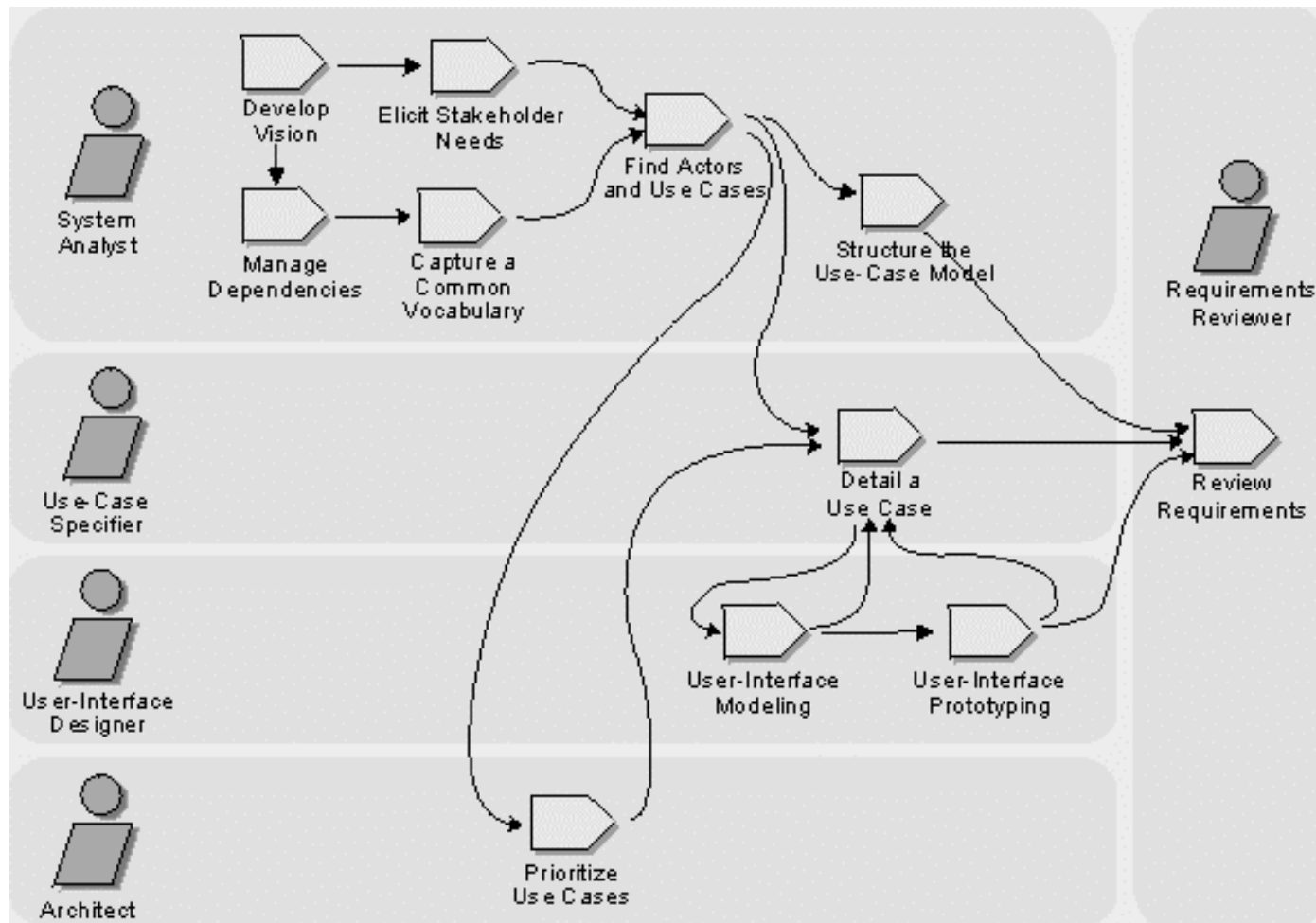
Assess the Change

RUP: Requirements Workflow

RUP: Requirements Artifacts