11 Development Process for Multimedia Projects

11.1 Classical models of the software development process

11.2 Specific aspects of multimedia development projects

11.3 Example: The SMART process

11.4 Iterative development of multimedia projects

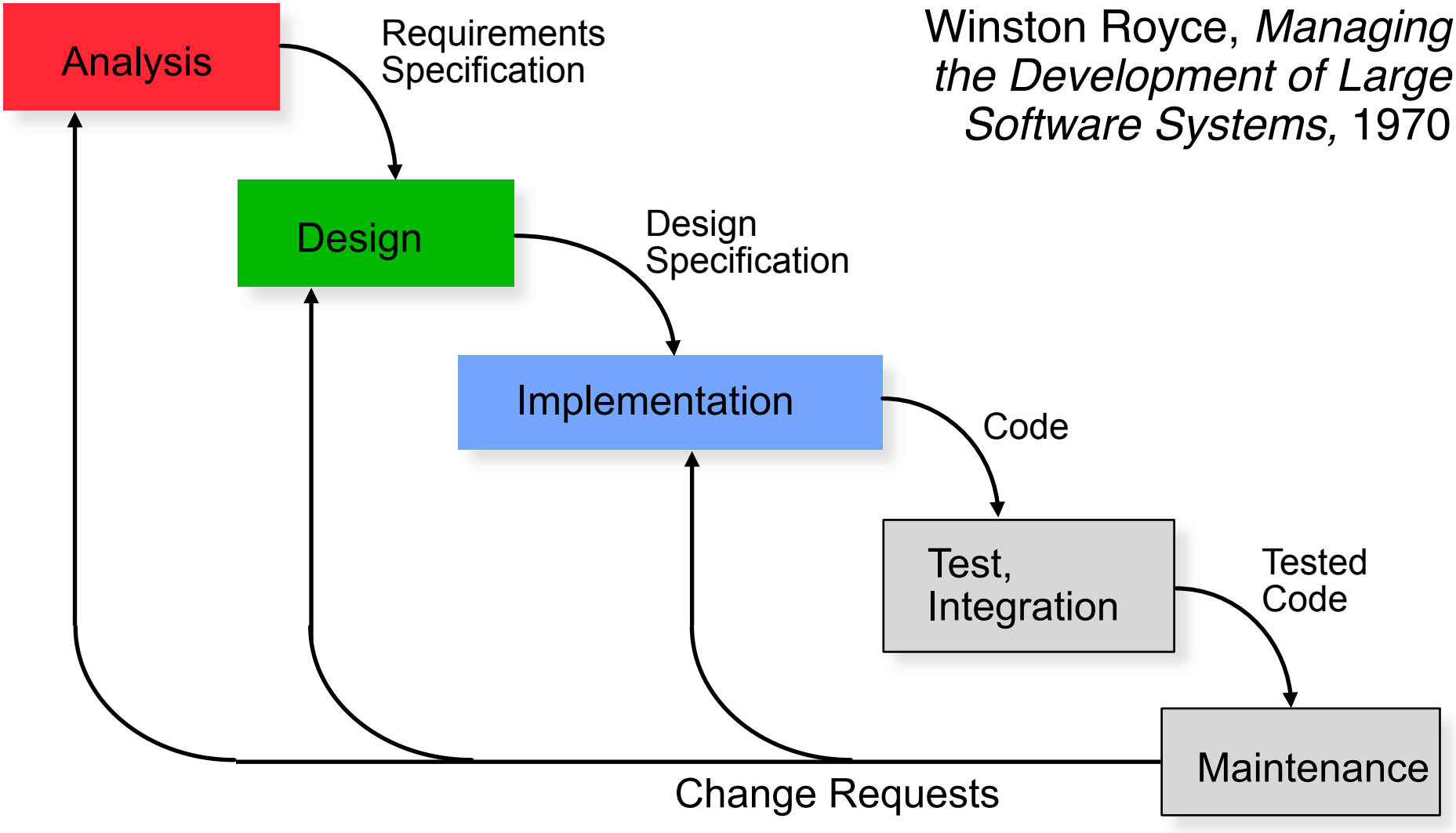
Literature:

- Ian Sommervile: Software Engineering, 9. Auflage. Pearson 2012
- Kerstin Osswald: Konzeptmanagement. Interaktive Medien – interdisziplinäre Projekte, Springer 2003

Models of the Development Process

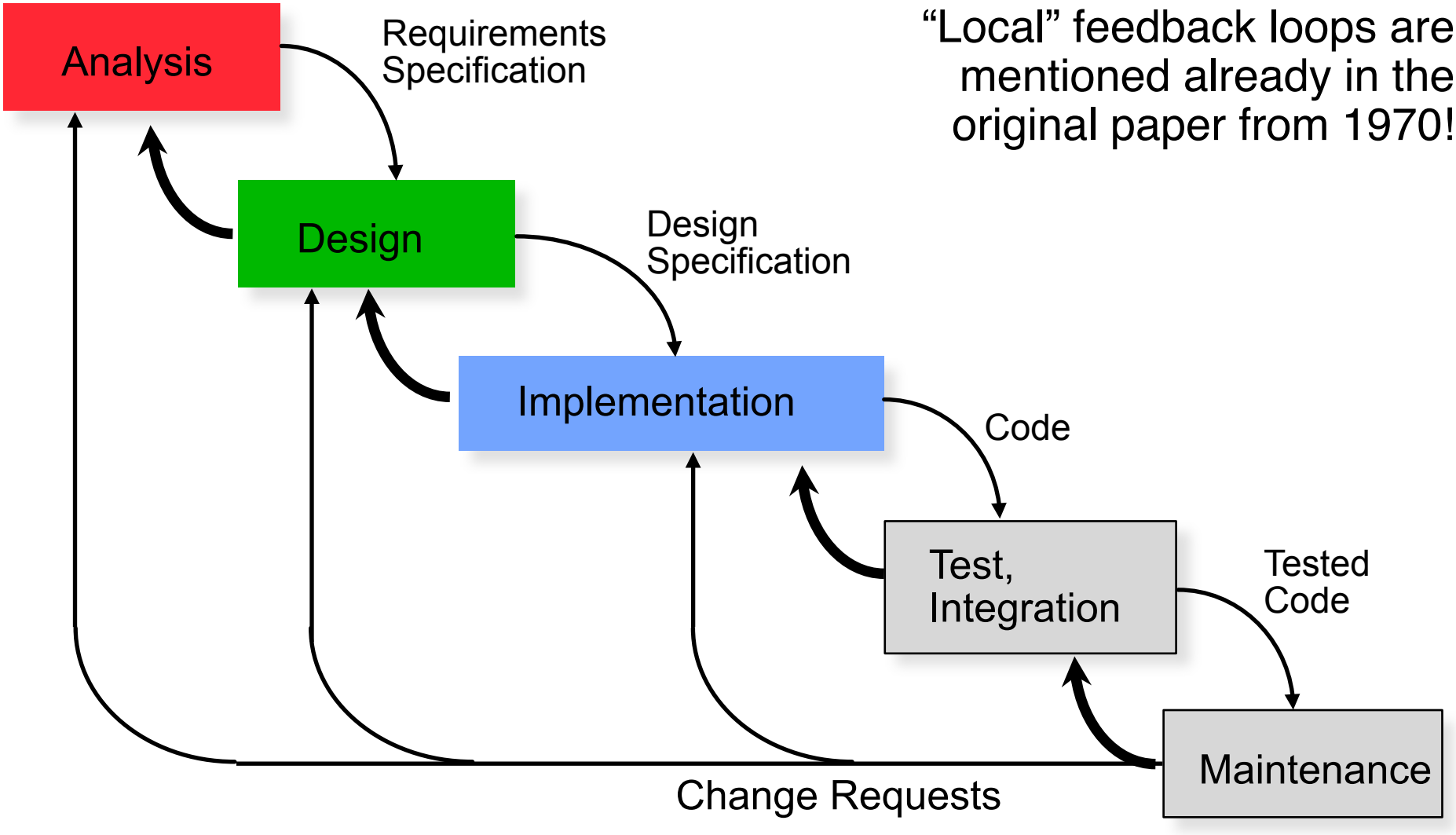
- Which workflows and activities take place?
  - In which order?
- What are the results (artifacts) produced in the activities?
  - Which are the dependencies between activities?
- Related issues:
  - Project management
    - » How to plan a project
    - » How to control a project
  - Quality assurance
    - » How to ensure that goals are met
- Process models:
  - Often rather informal sketches
  - Sometimes formal documents used as input to development support tools

The “Waterfall” Model - Textbook Version



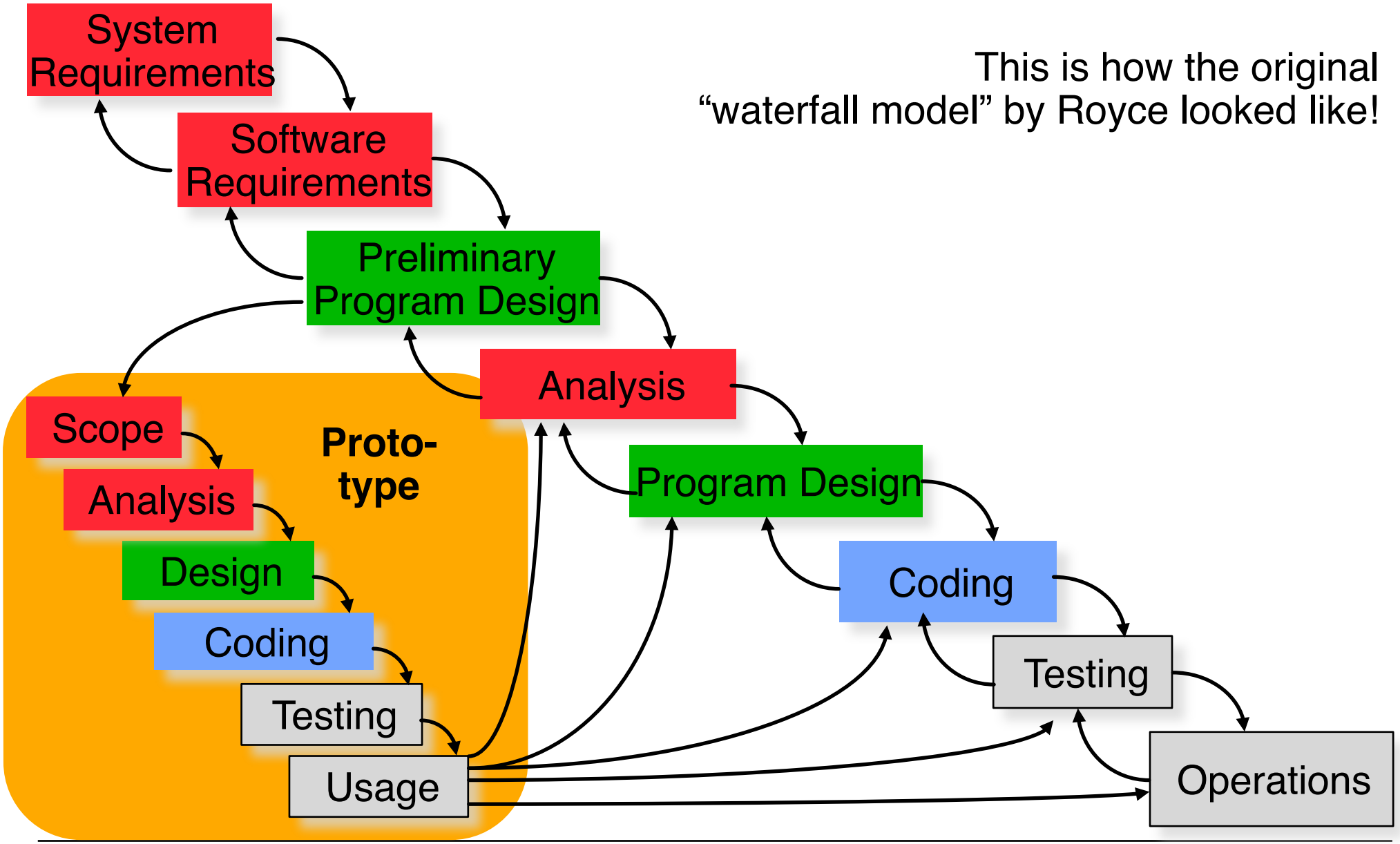
Winston Royce, *Managing the Development of Large Software Systems,* 1970

“Waterfall” With Quality Control



“Local” feedback loops are mentioned already in the original paper from 1970!

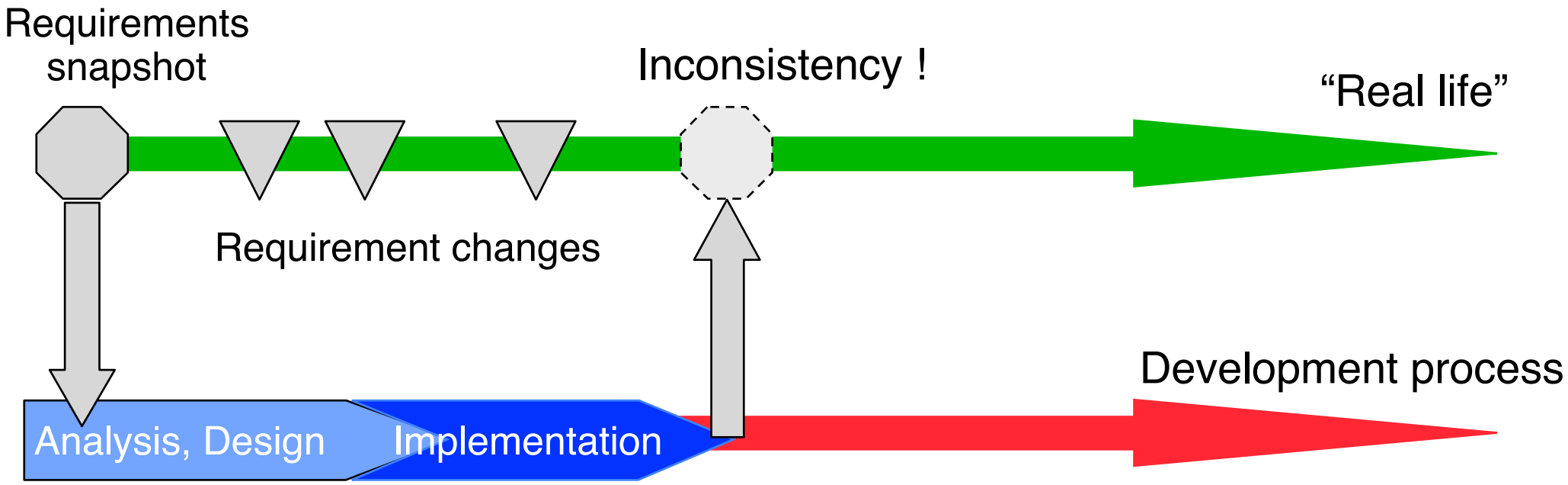
“Waterfall” With Prototyping



This is how the original “waterfall model” by Royce looked like!

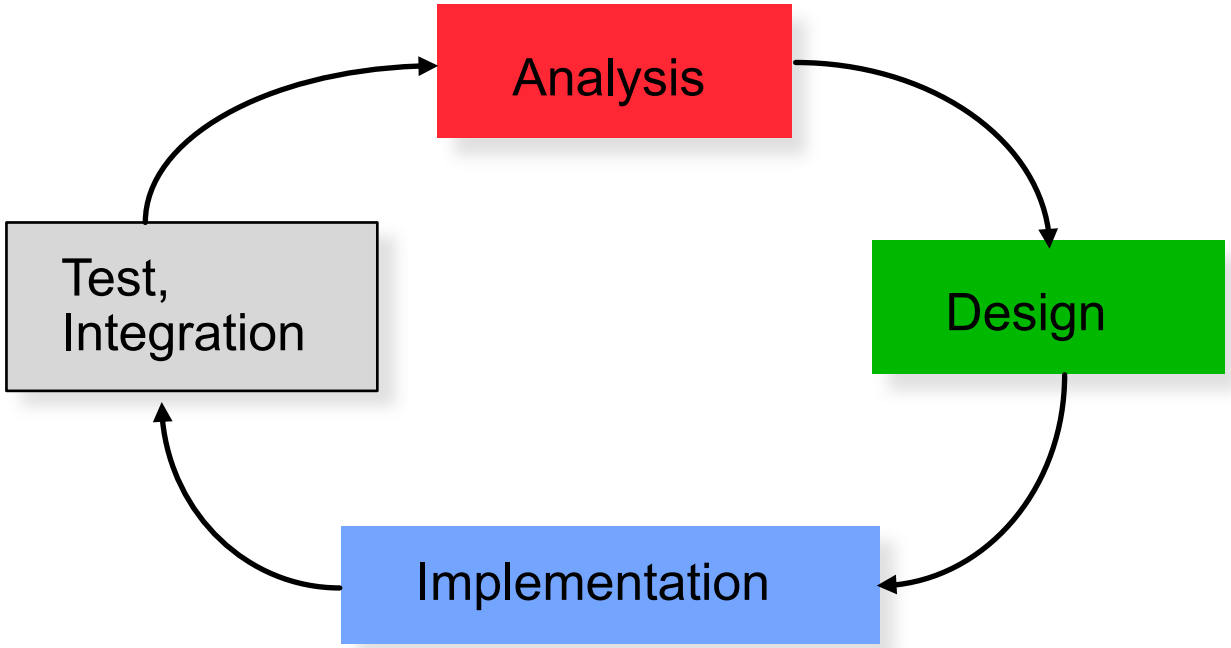
Changing Requirements

- Key problem in software development
  - Requirements change during course of project



Specific drivers for changes of requirements in multimedia projects:
- New technologies & devices, new (corporate) design rules, new services, …
- Feedback from non-technical reviewers (designers, customers)

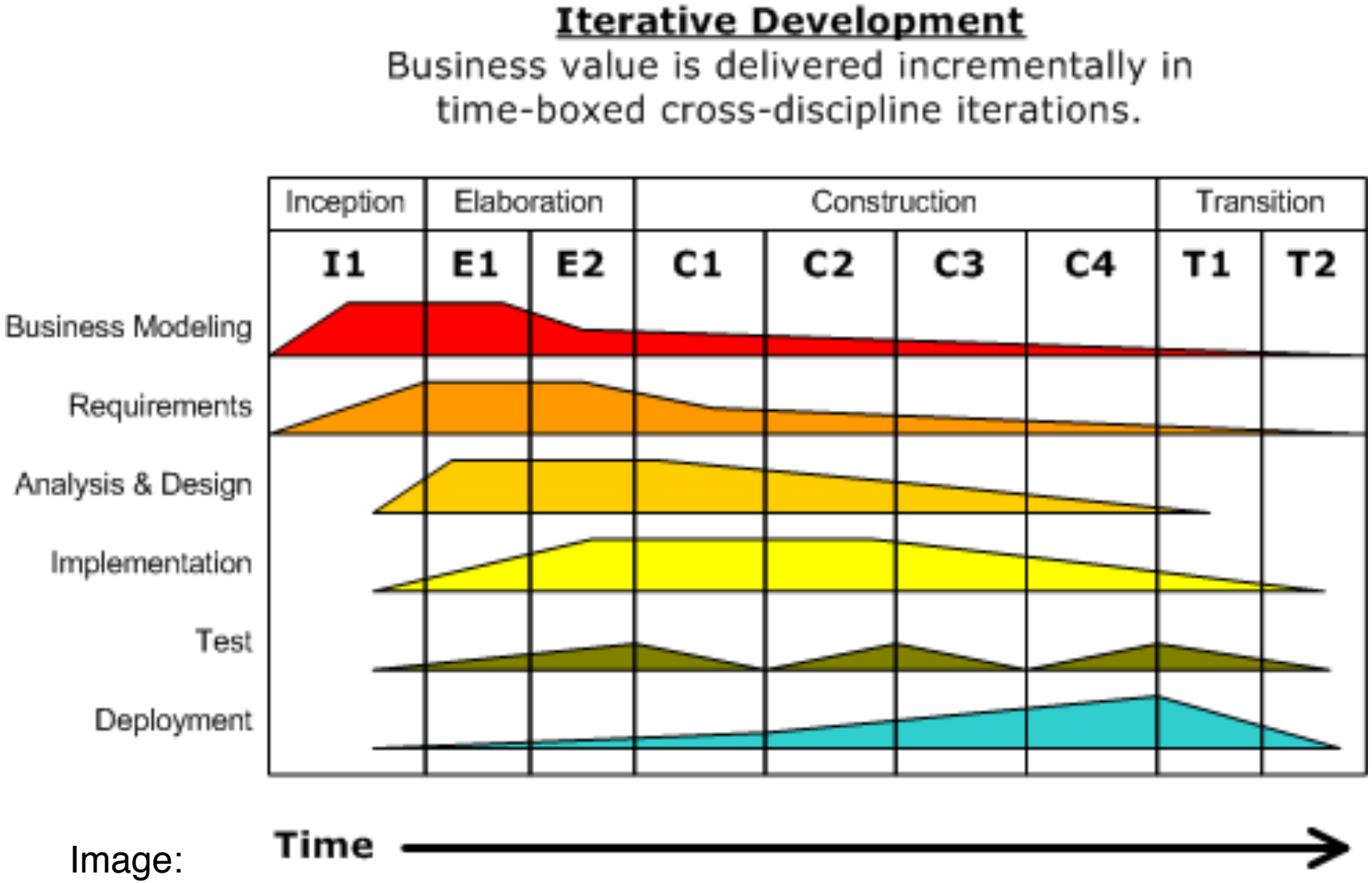
Iterative Development Models



Incremental development of prototypes and new versions of target system

Example:
“Spiral model” (Barry Boehm)

A Modern Iterative/Incremental Process: Rational Unified Process



Jacobson/ Rumbaugh/ Kruchten (Rational/IBM)

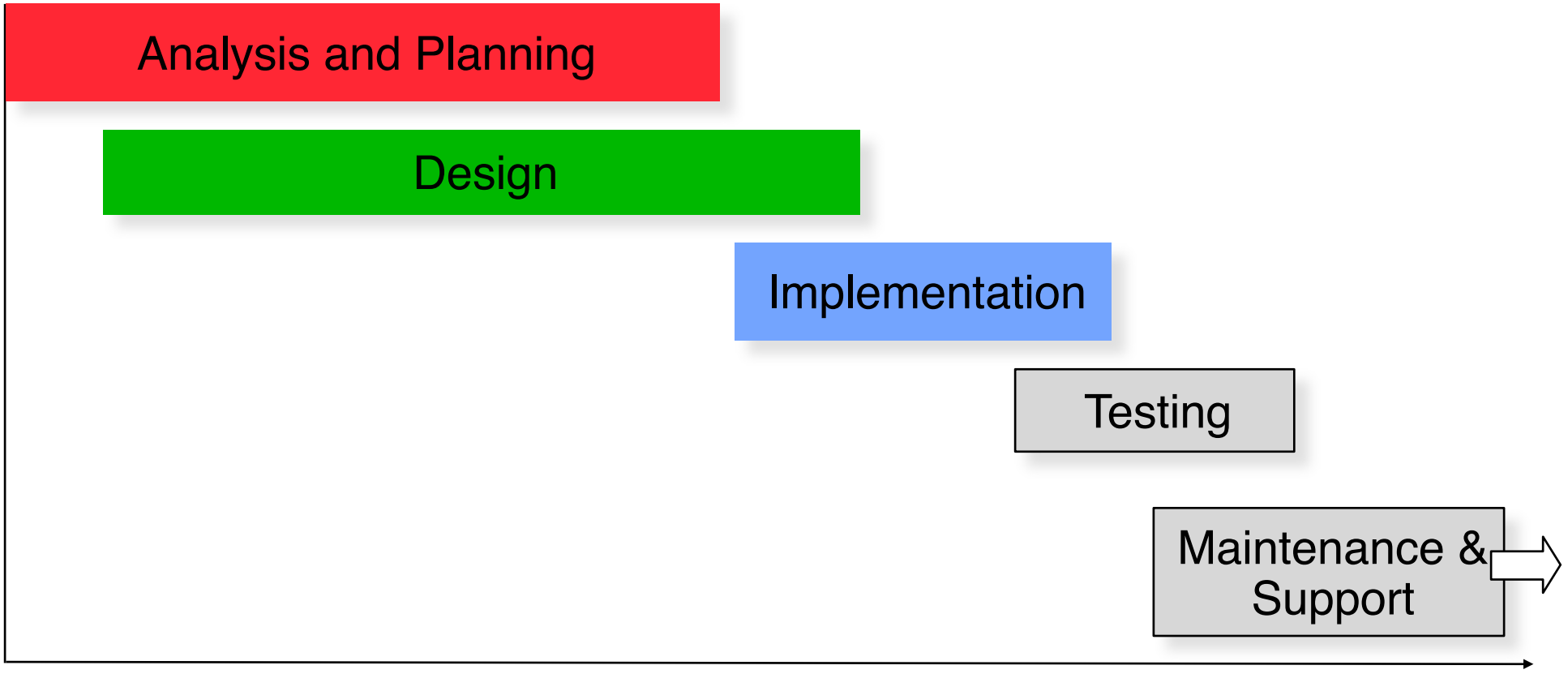
Image: Wikipedia

Actual Practice in Multimedia Industry?

- K. Osswald, 2001: Systematic interviews with companies from the German multimedia (interactive media) sector
  - Out of 3000 enterprises, 30 were selected, 22 took part (the most successful enterprises according to rankings)
- Results regarding the development process:
  - ***More than 80% of the companies apply the "waterfall model"***
    - » Almost always: Large ***overlap*** between neighboring project phases
  - Frequently used: ***Prototyping***
  - More than 80% of the interviewed specialists complained that customers demand ***changes at a very late point in project time***, regarding information architecture and concrete content
  - 18% of the companies were working on the introduction of an iterative incremental process model (similar to the Rational Unified Process)

Waterfall Model in Multimedia Industry

- Roy Strauss: Managing Multimedia Projects, Focal Press 1997
- Waterfall model adapted to multimedia projects
  - Highly consistent with the result of the interviews with German companies



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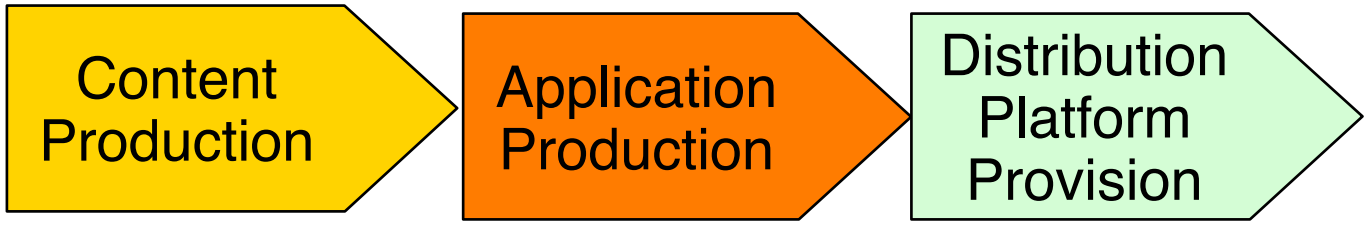
E. England, A. Finney: Project Management for Interactive Media (2nd edition), Addison-Wesley 1998

Multimedia Development

- Scope: Interactive multimedia applications, including distributed applications
- Typically carried out by “multimedia agencies” (Multimedia-Agenturen)
  - Main target distribution media:
    - » Web presentations (HTML, JavaScript, Flash, Silverlight, …)
    - » Movie clips distributed via (Social) Web, TV, cinema
    - » CD/DVD
- Position in the value chain:



- Media industry
- Traditional industry (e-commerce)

- Multimedia agencies
- System integrators

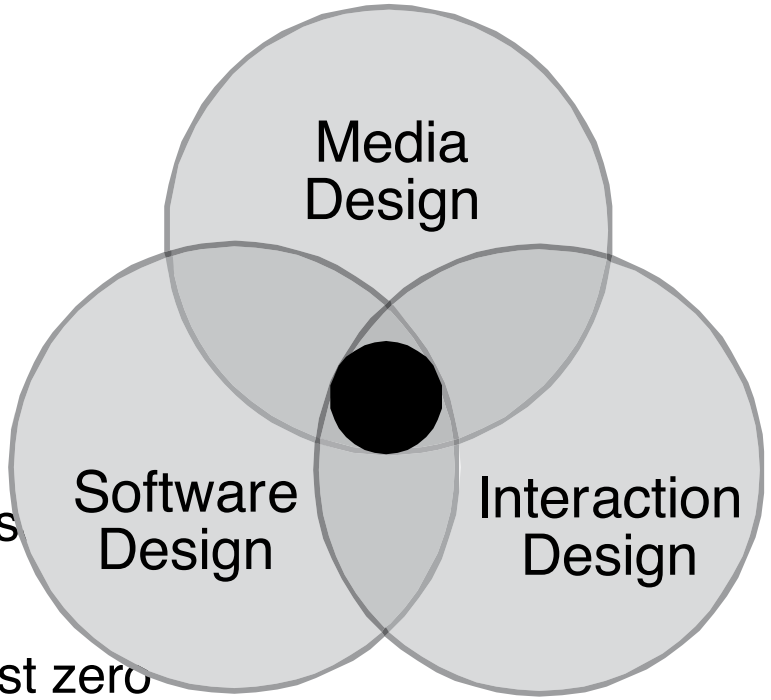
- ISPs (Internet Service Provider)
- Web portals, social Web

Multimedia Development Team

- Executive Producer
- Producer
- Production assistant
- Creative director
- Interactive designer
- Instructional designer
- Industrial designer
- Project manager
- Copywriter/editor
- Content specialist
- Researcher
- Artistic Director
- Graphic designers
- Sound engineer
- TV crew
- Photographer
- File-transfer/network manager
- Programmer

A mixture of roles known from movie production & roles known from software projects

The Design Dilemma



There are at least three different kinds of *design* involved in a multimedia project:

Software Design

- » Software architecture, standard frameworks, des
- » Extremely complex, specialists available
- » Intersection with media design specialists: almost zero

Media Design

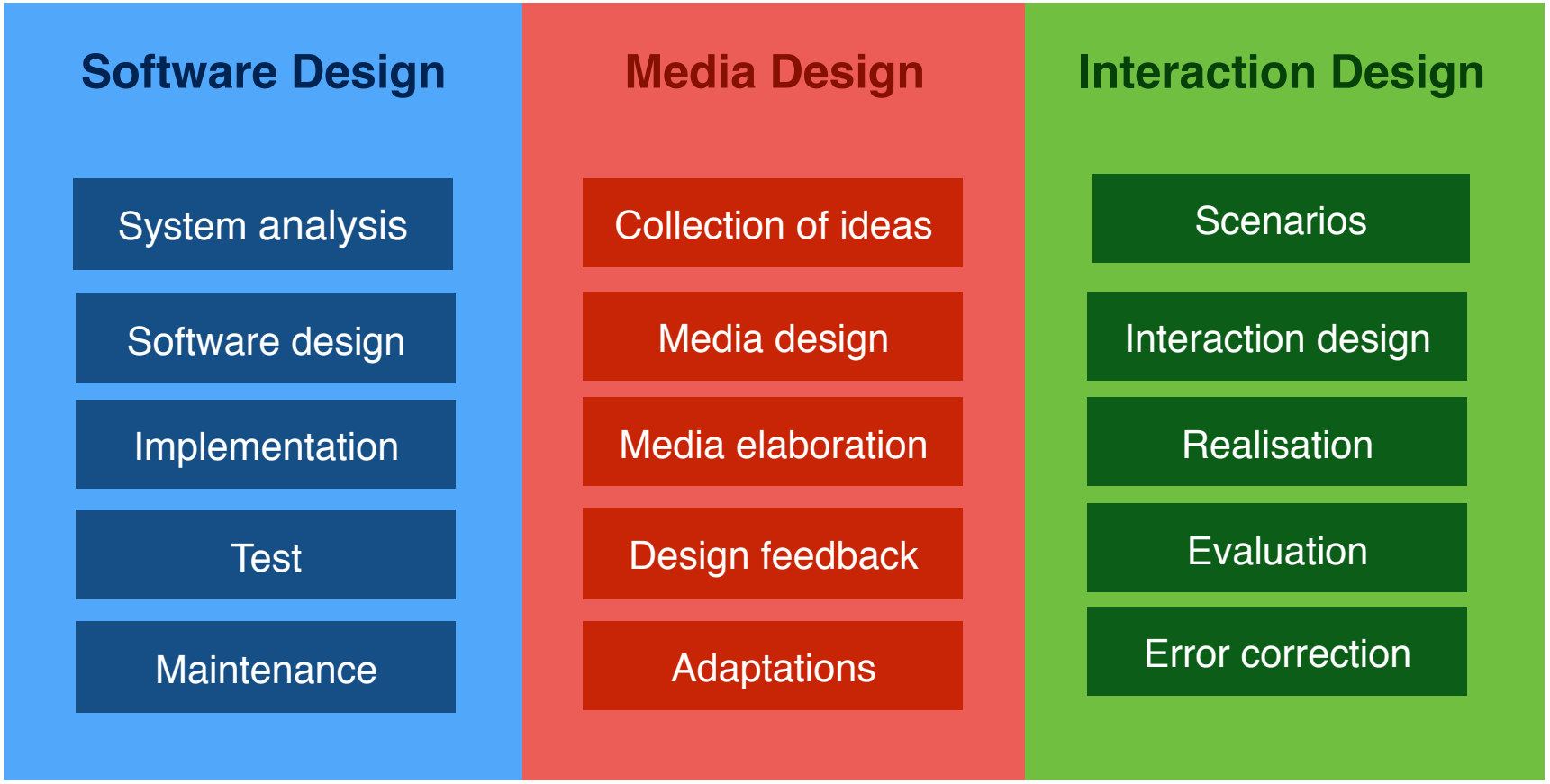
- » Visual Design (still image & video), Audio Design
- » Extremely complex, specialists available

Interaction Design, Experience Design

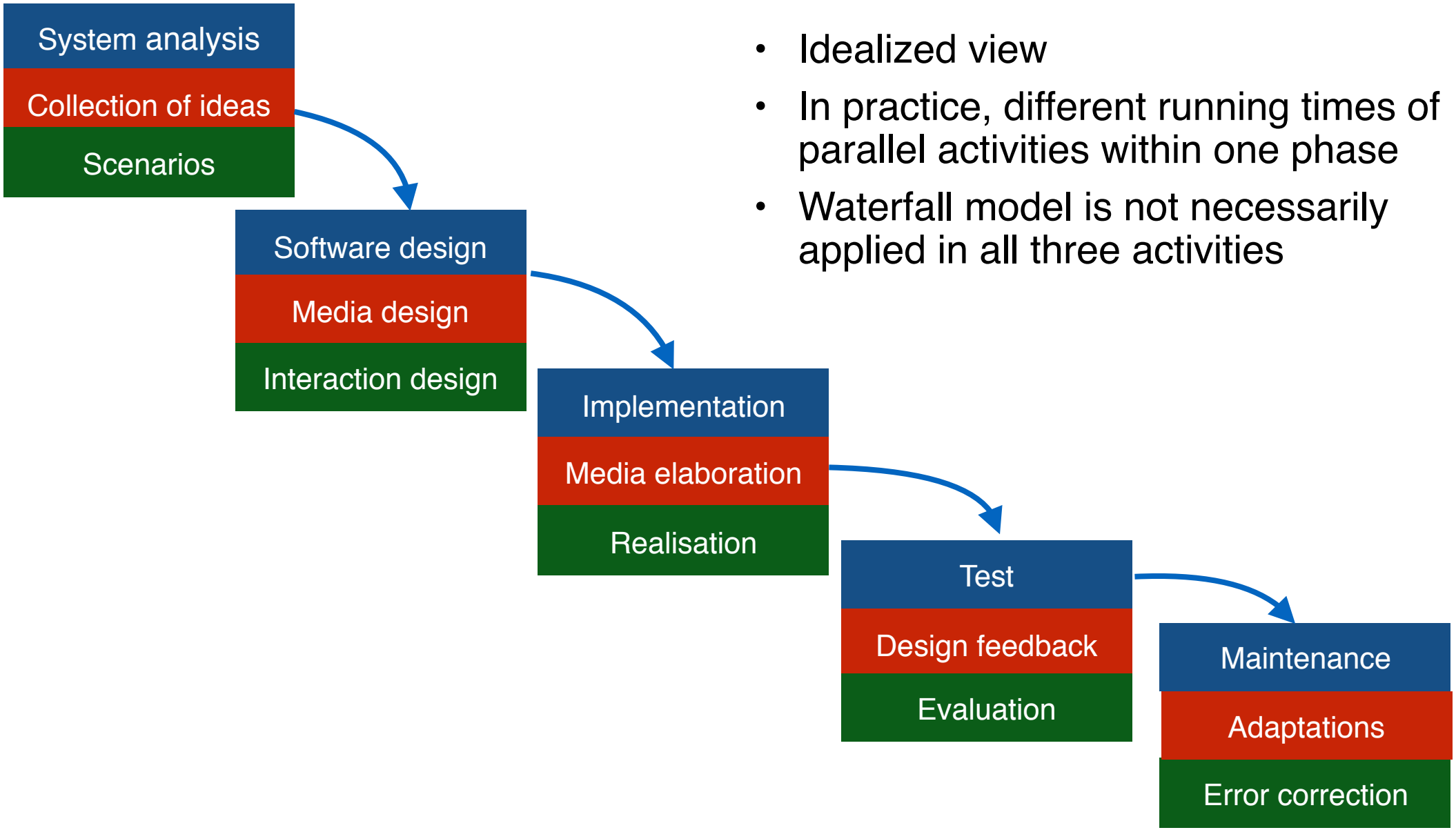
- » Man-machine interaction, usability, accessibility
- » Complex, but only a few specialists available
- » Intersection mostly *either* with Media Design *or* with Software Design specialists

Three Parallel Tracks of Work

- ***Similar activities*** exist for each phase in all three “design tracks”

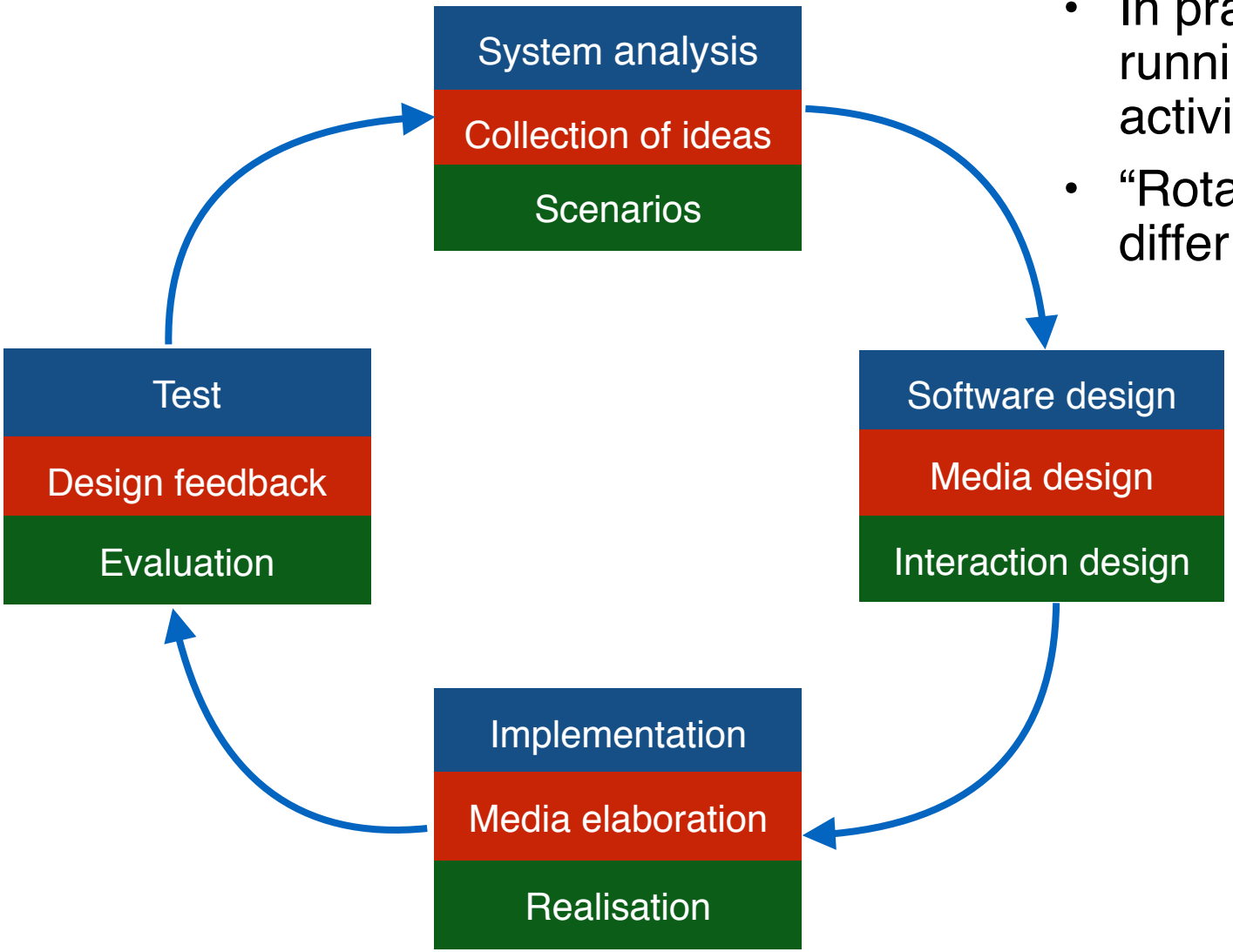


Three-Track Waterfall



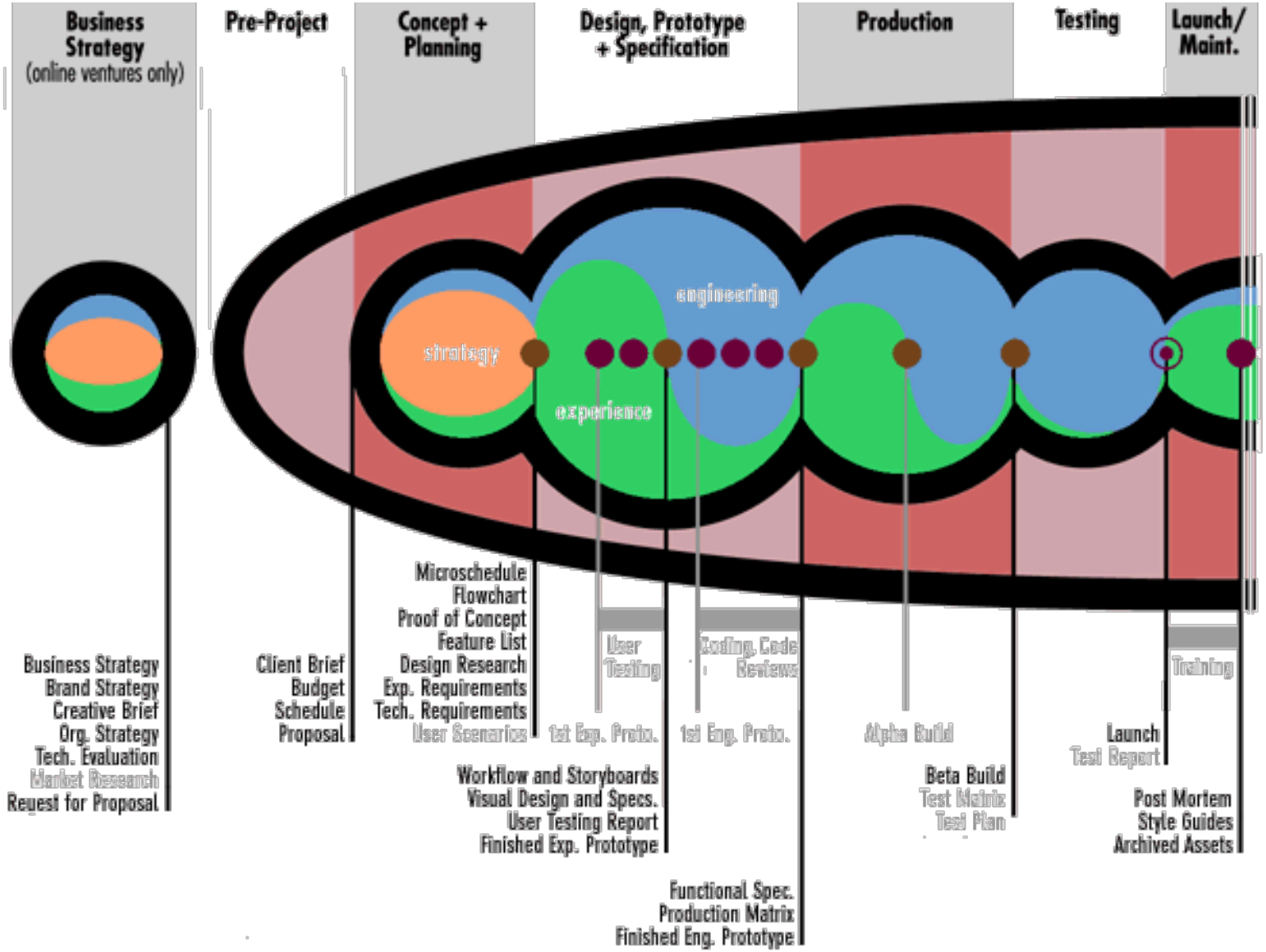
- Idealized view
- In practice, different running times of parallel activities within one phase
- Waterfall model is not necessarily applied in all three activities

Three-Track Iterative Development



- In practice, different running times of parallel activities within one phase
- “Rotation speed” may differ between “tracks”

Nathan Shedroff: Interweaving Experience Design and Engineering



- Nathan Shedroff: Multimedia Demystified, Random House 1994(!)
- See: www.nathan.com/thoughts/process/

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(Since this source is in German, the following slides are in German language as well.)

Schlüsselbegriff: Konzept

„*Konzept:* 1. [stichwortartiger] Entwurf, erste Fassung einer Rede oder einer Schrift. 2. Plan, Programm“
(Duden-Fremdwörterbuch, 1994)

- Konzeption = Erstellen eines Konzepts:
  - Aufbauend auf nur wenigen Grundinformationen
  - Kernaspekte einer konkreten Anwendung festlegen und veranschaulichen
  - Beschreibung aller Komponenten, die für die Realisierung notwendig sind
- Formalisierung:
  - Konzept kann „in den Köpfen“ der beteiligten Mitarbeiter existieren
  - Konzept kann detailliert, z.B. als Antwort auf eine Ausschreibung, ausgearbeitet sein
- Erfolgreiche Konzeption ist nur im Zusammenspiel der verschiedenen Design-Arten möglich!

Nicht-technische Tätigkeitsfelder in Multimedia-Projekten

- Konzeption
  - Hoch kreative Tätigkeit
  - Grobkonzept entwickeln und Umsetzung in Feinkonzept betreuen
  - Typische Aufgabe für ein interdisziplinäres Team
- (Medien-)Design
  - Gestalterische Umsetzung der Anwendung in Bild und Ton
  - Durch moderne Interaktionstechnologien Grenze zum Interaktions- und Softwaredesign verschwimmend
- Redaktion
  - Verfassen und Zusammenstellen von Content-Bestandteilen
  - Content-Akquisition, Lizensierung
- Information Broking
  - Recherche von spezifischen Fragestellungen in Datenbanken und Bibliotheken

Technische Tätigkeitsfelder in Multimedia-Projekten

- Projektmanagement
  - Koordination und Abwicklung einer Produktion
  - Management und Controlling
  - Schnittstelle zwischen Kunde und Produktionsteam
  - Häufig auch intensiv an der Konzeption beteiligt

- Programmierung
  - Umsetzung der Konzepte in Programmiersprachen und Autorensystemen
  - Klassischer (und eher für Großunternehmen geeigneter) Ansatz:
    - » Technische Spezialisten erst in späten Projektphasen beteiligt
  - Trend:
    - » Technische und grafische Sichtweisen möglichst früh in die Konzeptarbeit integrieren (Osswald S. 29)

SMART-Modell

- Rahmenwerk zur Vorgehensplanung bei Multimedia-Projekten
  (Kerstin Osswald 2003)

- **S**kalierbar
- **M**ultimedia
- **A**ufgabenplanung
- **R**essourcenplanung
- **T**ool

- Iterative Entwicklungsmethode, am Rational Unified Process orientiert

SMART: Phasen

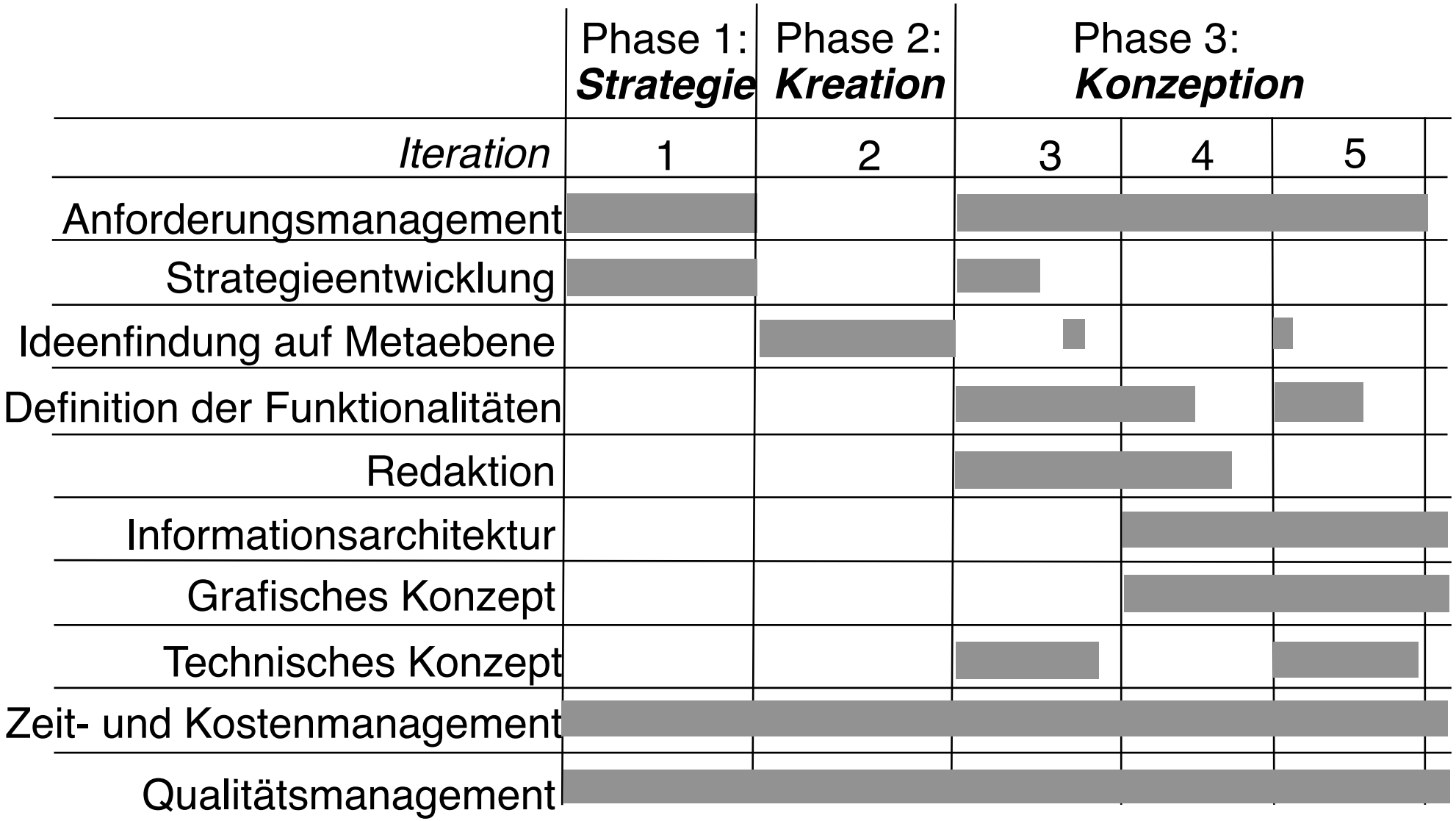
- Idee der Trennung von Grob- und Feinentwurf wegen laufender Änderungswünsche nicht realisierbar
- Bessere Trennung: Ziele, kreative Idee, Erarbeitung von Inhalten
- ***Strategie:***
  - Abstraktion, Zerkleinerung
  - Definition des (über die Projektlaufzeit stabilen!) Problems
  - Strukturierung, Hypothesenbildung
- ***Kreation:***
  - Produktion möglichst vieler verwertbarer Ideen (unabhängig vom Kunden!)
  - Entwicklung einer interdisziplinären Vision für den Projektverlauf
- ***Konzeption:***
  - Kritische Prüfung entstandener Ideen
  - Disziplinübergreifende Ausarbeitung von ausgewählten Ideen

SMART: Workflows

- Anforderungsmanagement
- Strategieentwicklung
- Ideenfindung auf Metaebene
- Definition der Funktionalitäten
- Redaktion
- Informationsarchitektur
- Grafisches Konzept
- Technisches Konzept
- Zeit- und Kostenmanagement
- Qualitätsmanagement

(prinzipiell anpassbar an spezifische Gegebenheiten)

SMART: Zuordnung Workflows – Phasen



Beispielhaft, aber typisch!

SMART: Typische Rollen (Auswahl)

- Art Director:
  - Überwacht Konzeption und Gestaltung, erstellt Interaktionskonzepte
  - Arbeitet eng zusammen mit Screendesigner, Konzepter, Softwareentw.
- Creative Director:
  - Überwacht die Stimmigkeit aller Konzepte und hinterfragt Entscheidungen
  - Inhaltliche Verantwortung für kreative Arbeit, sorgt für innovativen Input
- Screendesigner:
  - Entwickelt „Masterscreen“-Beschreibung und „Look and Feel“
  - Erstellt visuelle Konzepte und grafische Content-Elemente
  - Setzt Corporate Design des Kunden um
- Frontend/Backend Programmierer:
  - Frontend: Clientseitige Programmierung, meist Dialogdummies
  - Backend: Anwendungslogik, Datenbankanbindung, Middleware

SMART: Artefakte (1)

- Angebot
- Anwendungsfallprotokoll
- Anwendungsfallübersicht
- Benchmark-Analyse
- Benutzerprofil
- Brand Bible
- Change Request
- Containerprofil
- Content Management Plan
- Contentogramm
- Content Writing Styleguide
- Creative Brief
- Datenbankarchitektur
- Designvorschlag
- Modulprofil
- Moodboard/Komposition/Skizze
- Navigationskonzept
- Phasenplan
- Production Board
- Prototyp
- Programmierspezifikation
- Rebriefing/Strategic Brief
- Risikoanalyse
- Screenverzeichnis
- Seitengrundraster
- Seitentypdefinition
- Site Map
- Storyboard/Drehbuch
- Dialogdummy
- Dienstleistermotivation

SMART: Artefakte (2)

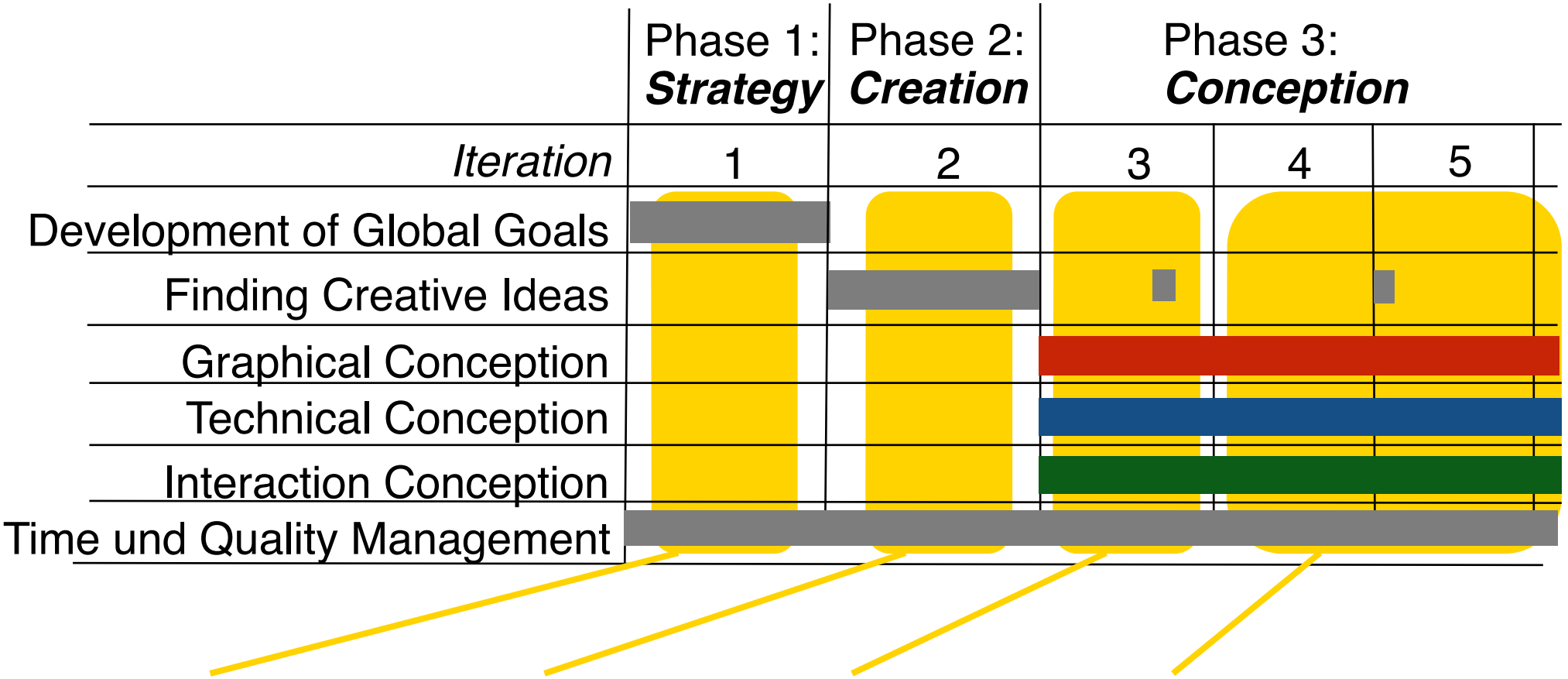
- Erfolgsmatrix
- Feasibility-Analyse
- Flussdiagramm
- Funktionsspezifikation
- Geschäftszieltabelle
- Graphical Strategic Brief
- Interactive Media Storyboard
- Investitionsempfehlung
- Iterationsplan
- Kostenvoranschlag
- Mission Statement
- Mitarbeitermotivation
- Szenario
- Technical Strategic Brief
- Technischer Überblick
- Technische Spezifikation
- Usability-Analyse
- Vision
- Visual Design Styleguide
- Zieldefinition

SMART-Konfiguration

- Für eine Organisation bzw. ein Projekt werden festgelegt:
- Welche Artefakte werden benötigt?
  - Abhängig von Anwendungsgebiet und Komplexität in den verschiedenen Aspekten
  - Beispiele von Projektcharakteristika: Statisch/Dynamisch/Prozesse/ Bewegtbild
- Welche Rollen werden benötigt?
  - Jedes Artefakt ist (fest definiert) mit bestimmten Qualifikationen zu seiner Herstellung verknüpft.
- Definition der Zuordnung von Workflows zu Phasen
  - Anpassung des beispielhaften Basis-Modells (siehe oben)
  - Berücksichtigung der zu erstellenden Artefakte

- ... Für Details siehe Osswald 2003!

A Simple Multimedia Development Process Based on SMART



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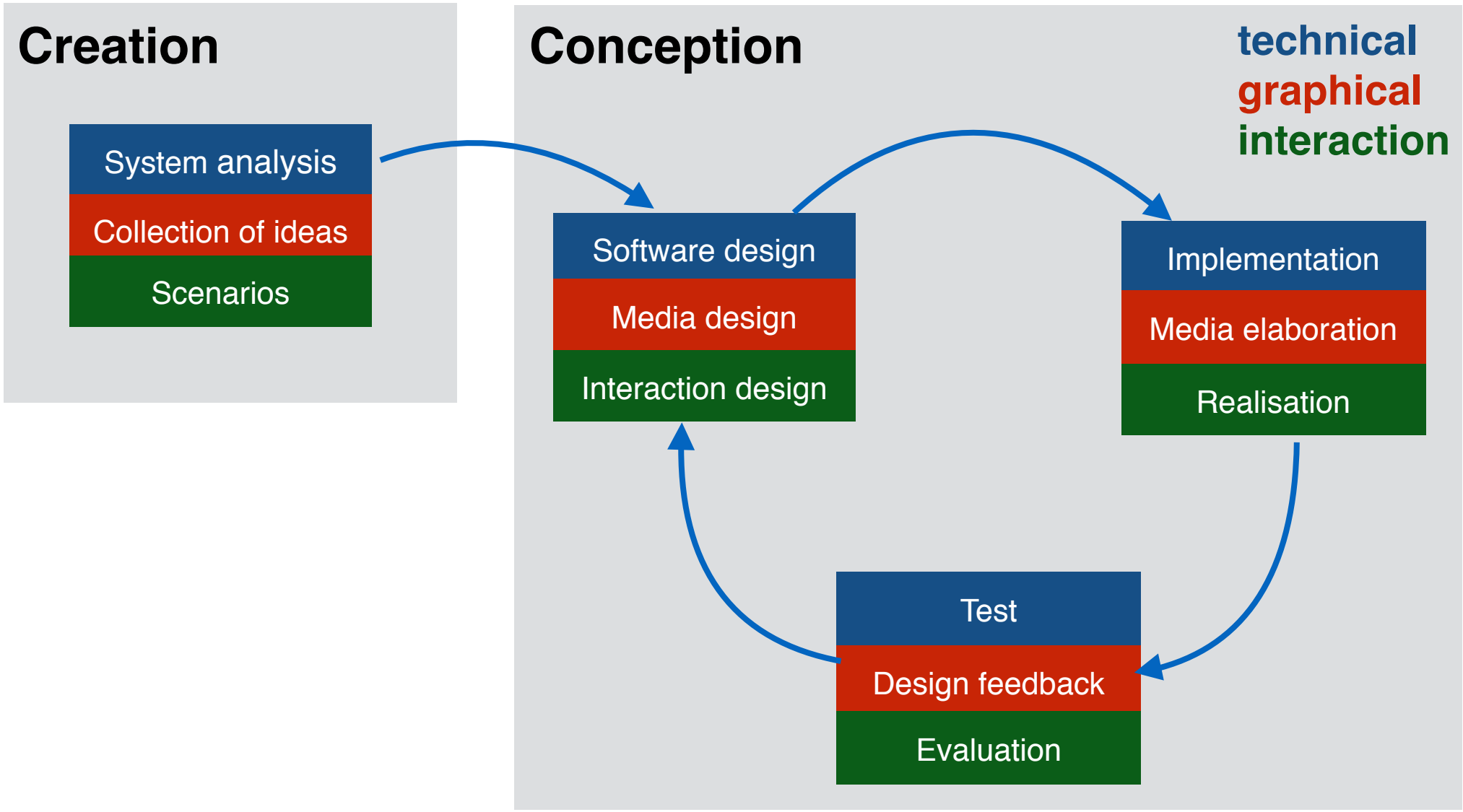
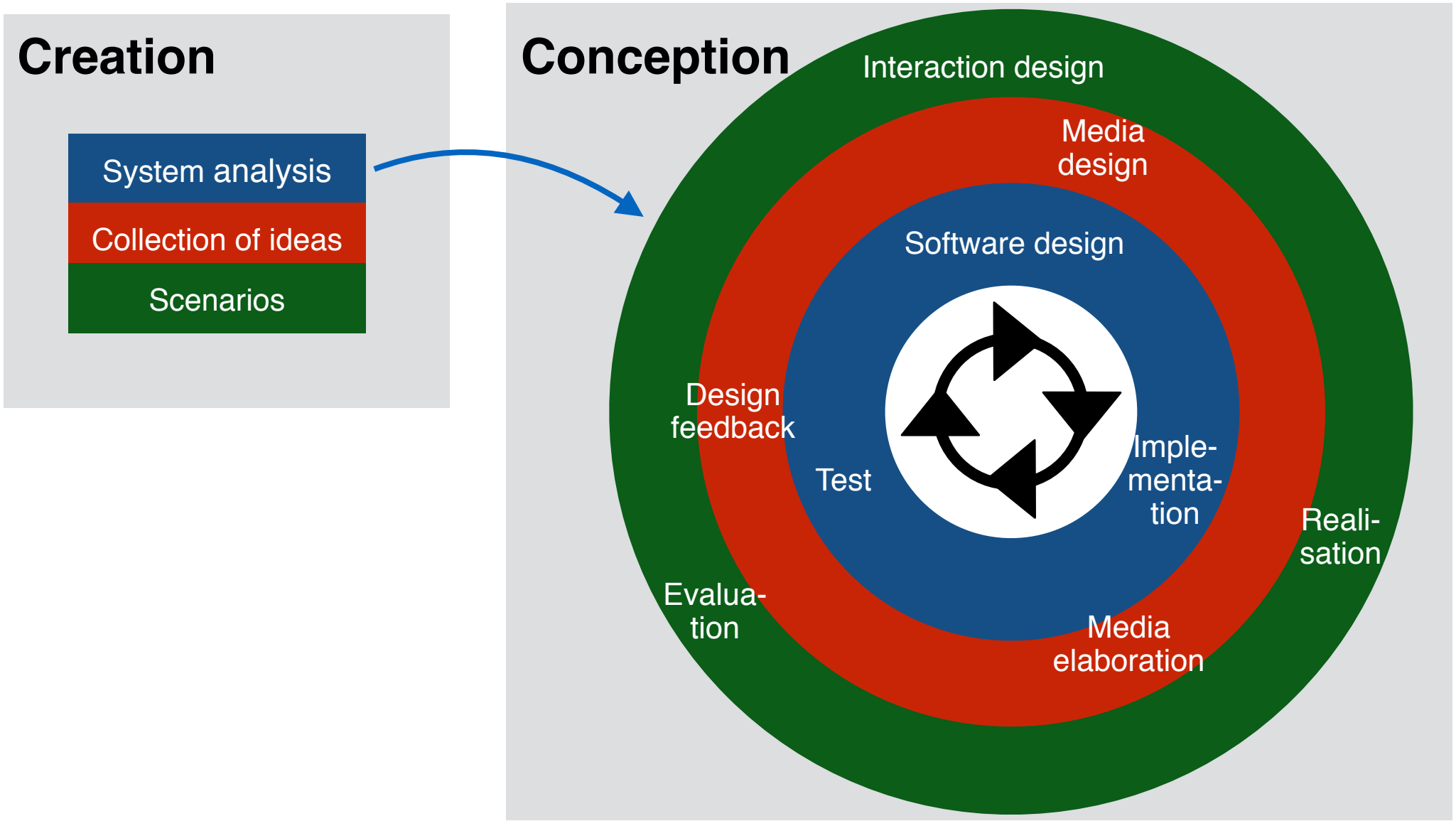
Three-Track Iteration Consolidated with SMART Approach (1)

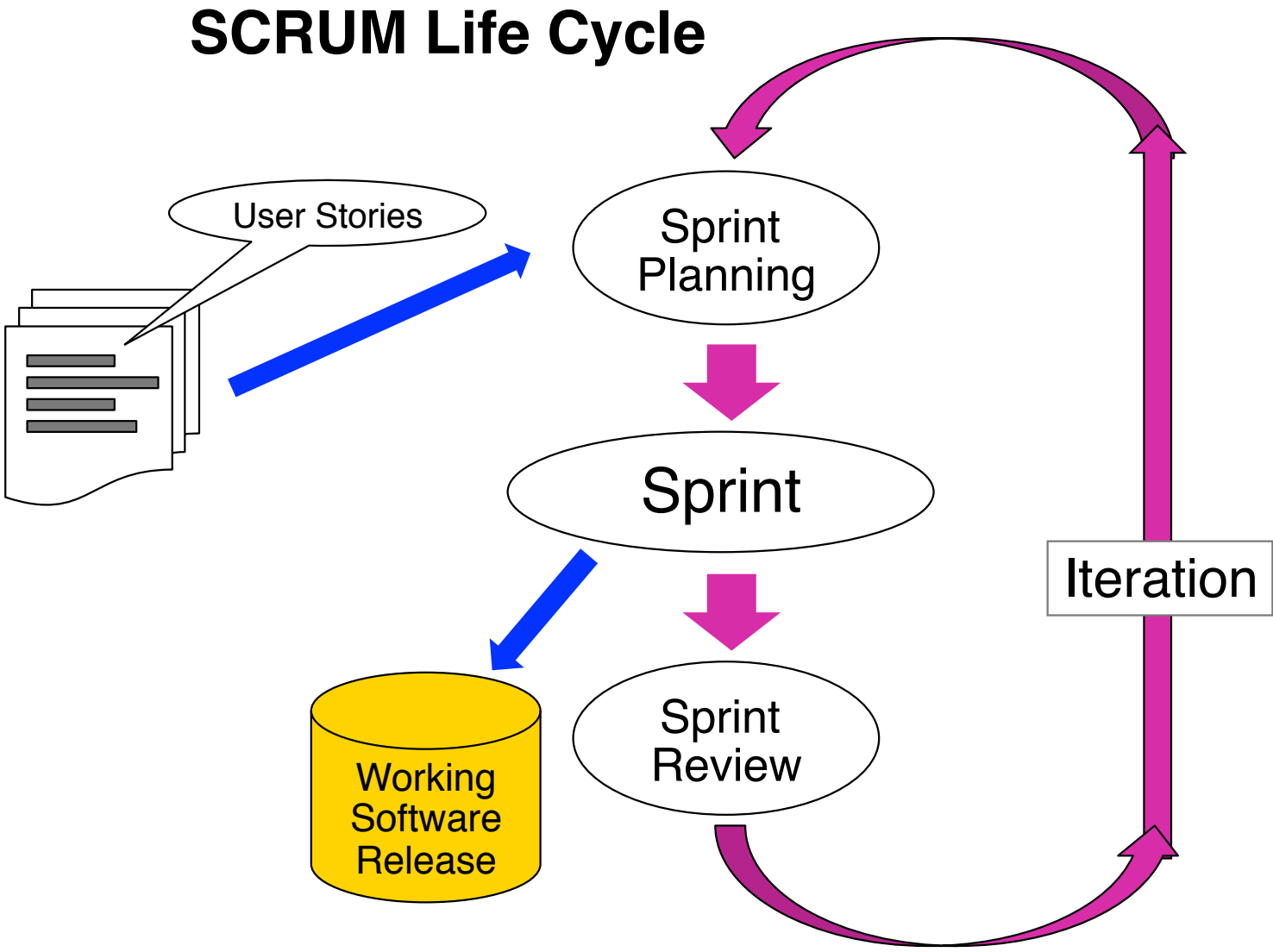


Three-Track Iteration Consolidated with SMART Approach (2)



From Iterative to Agile Development

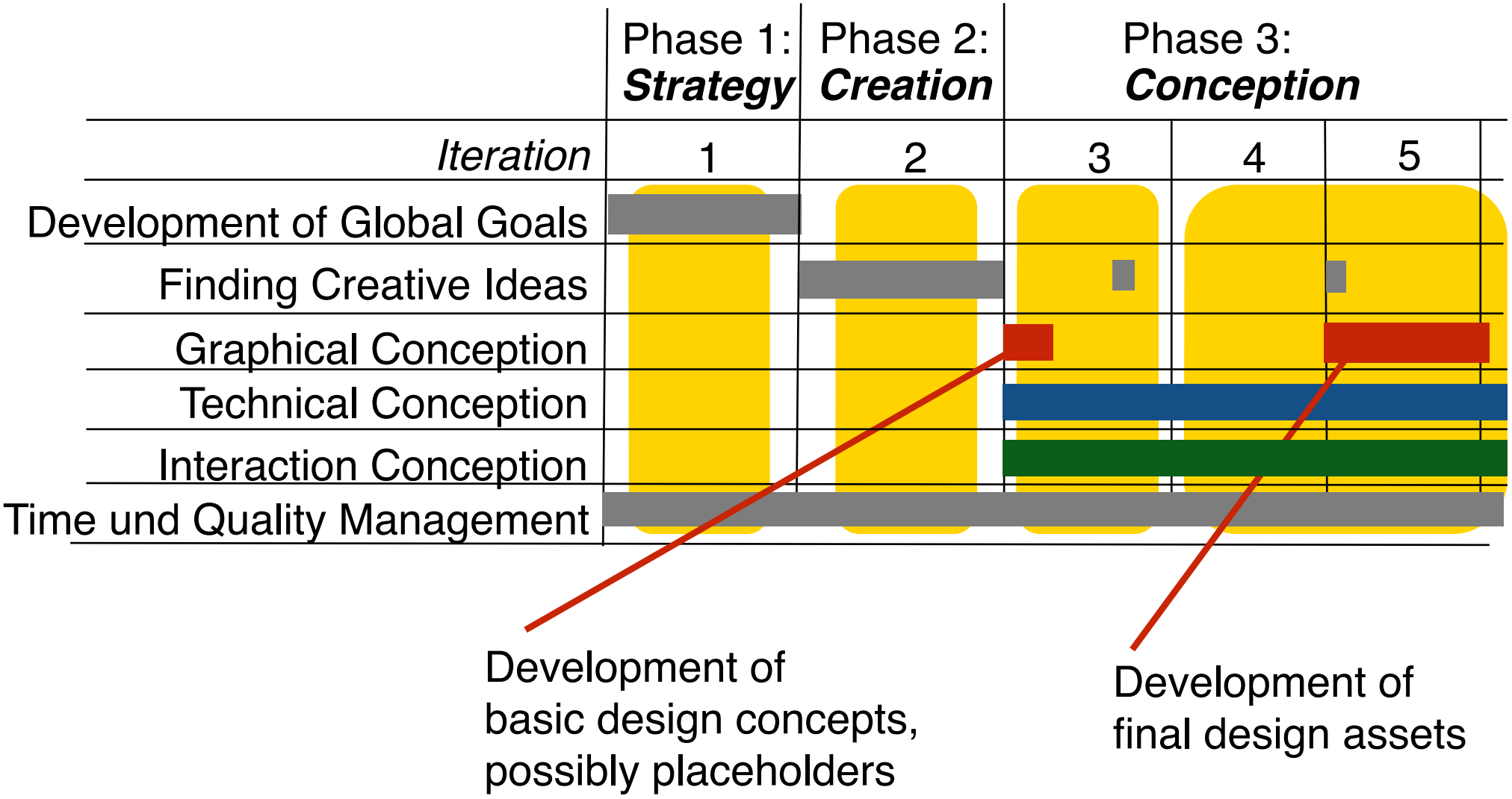
- *"Agile"* methods completely rely on ***incremental*** product development
- Can be applied well to multimedia projects
- See "Blockpraktikum"!



Media Asset Update Problem

- Media assets:
  audio, video, photography, external graphical work
- Examples for changes:
  - Introduction of new corporate design
  - Change to different location in scenes
  - Change to different language
  - Change of device brand
- Some already produced media assets are difficult to change or cannot be changed at all!
- Other media assets (modular vector graphics) are as easy to change as program code

Avoiding Media Asset Updates



Multimedia Testing Problem

- Testing of multimedia interaction
  (animations, interactive controls, visual/auditive feedback)
- Examples:
  - Testing an interactive game
  - Testing sound feedback (sound mix)
- Testing involves using interface channels (graphics card, sound card, operating system)
- Testing involves human activity
- Fully automatic testing is difficult to achieve

How To Choose a Development Process?

- How big is the project?
  - Really big project means waterfall style
  - Radically incremental process works only with small projects
- How is the mix of design activities?
  - Bigger scope of design activities means additional dependencies
- How alterable are the design artifacts?
  - Unalterable design artifacts mean waterfall style (at least for parts of project)
- How stable are the requirements?
  - Unstable requirements mean radically iterative / agile development
- How easy is it to test intermediate products (prototypes)?
  - The better/automated the test, the better the chances for radically iterative development (agile development)