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What Is Object-Orientation?

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DEVELOPMENT PROCESS & ACTIVITY ANALYSIS APPROACH

In This Lecture You Will Learn:

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- About the Unified Software Development Process
- How phases relate to workflows in an iterative life cycle
- An approach to system development
- Major activities in the development process

Unified Software Development Process

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- Developed by the team that created UML
- Embodies best practice in system development
- Adopts an iterative approach with four main phases
- Different tasks are captured in a series of workflows

Best Practice

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- Iterative and incremental development
- Component-based development
- Requirements-driven development
- Configurability
- Architecture-centrism
- Visual modelling techniques

Four Phases

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- Inception
- Elaboration
- Construction
- Transition

Phases, Workflows and Iterations

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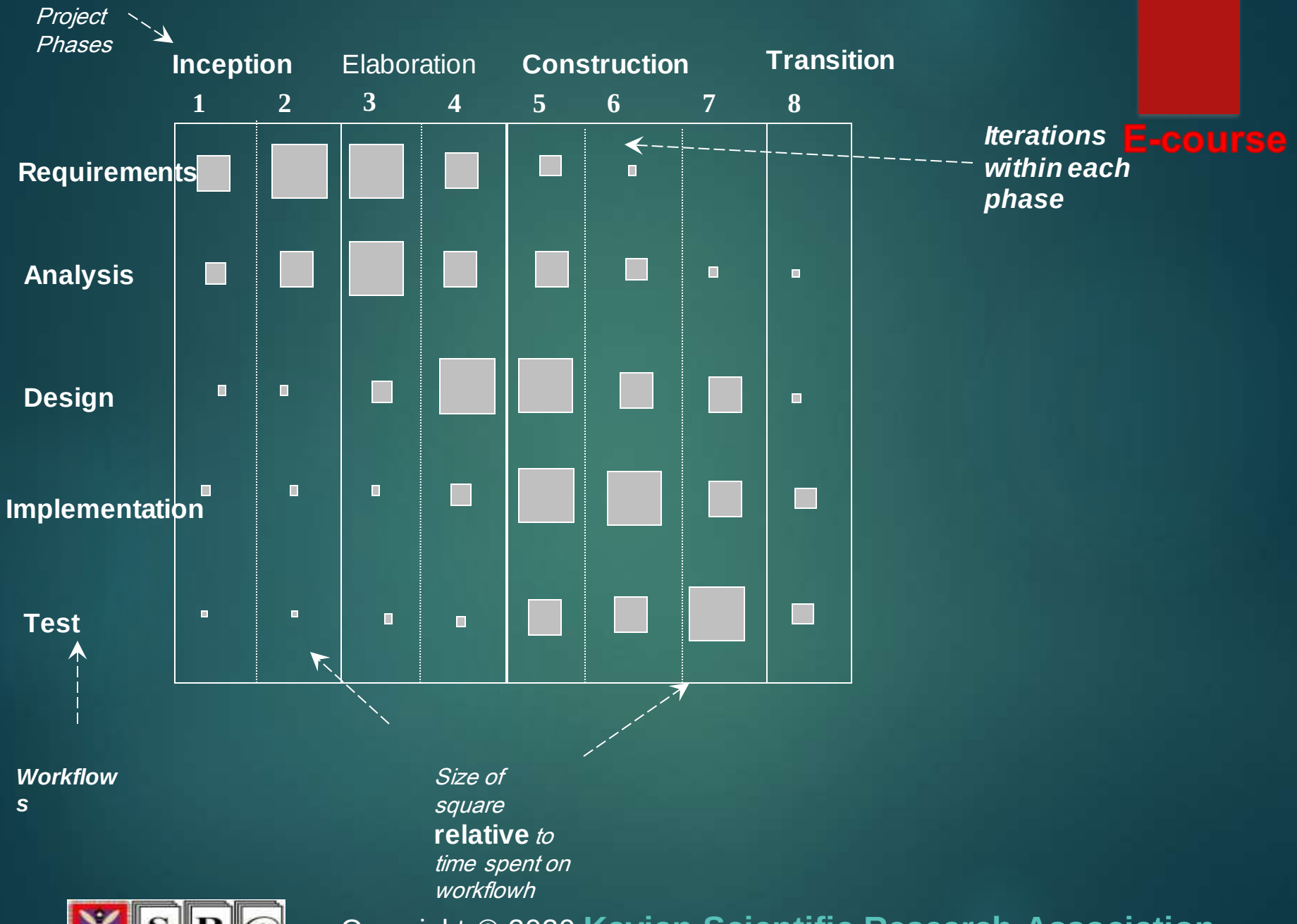
- Within each phase activities are grouped into workflows
- The balance of effort spent in each workflow varies from phase to phase
- Within phases there may be more than one iteration



Difference from Waterfall Life Cycle

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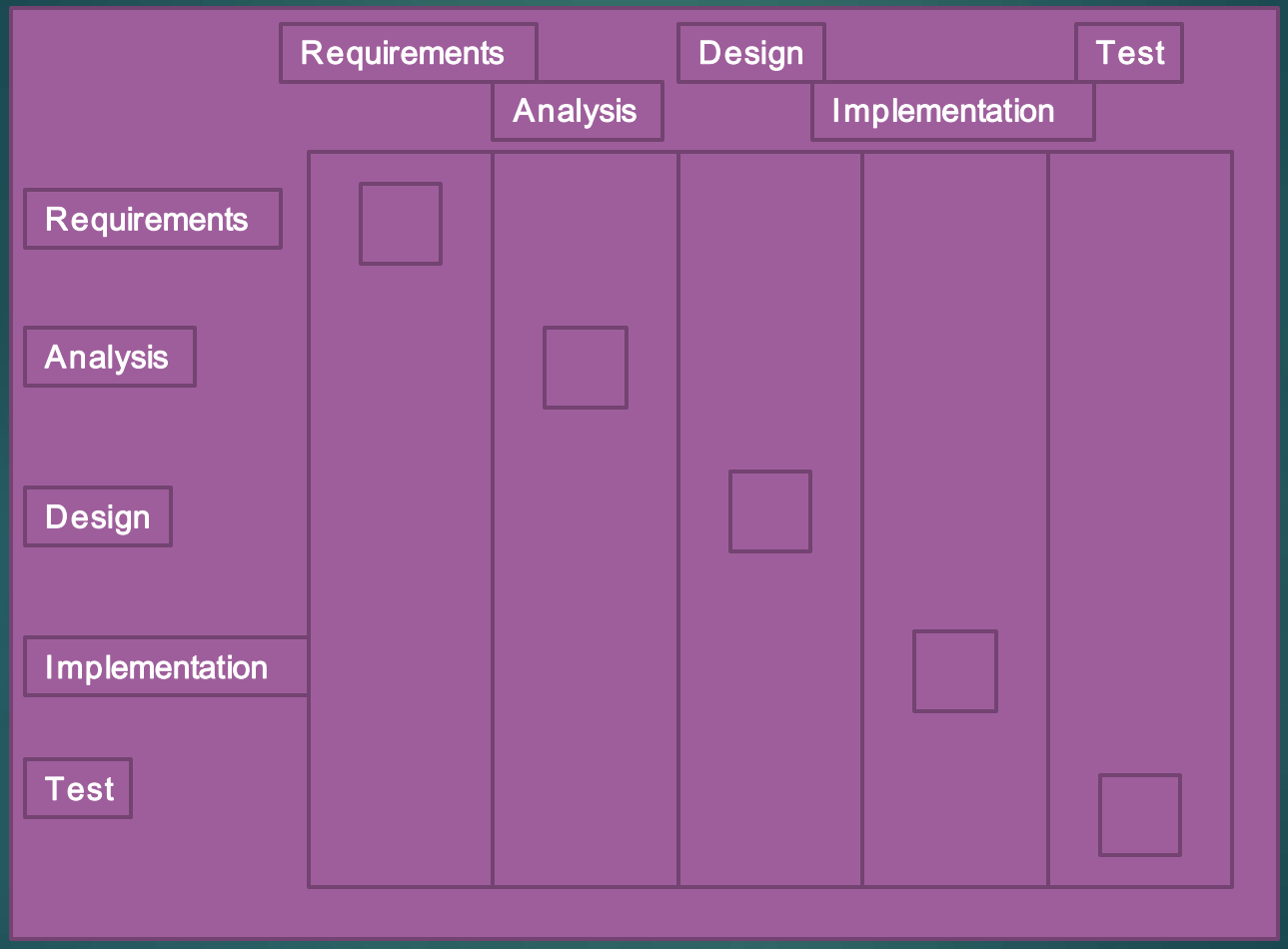
- In a waterfall life cycle project the phases and the workflows are linked together
- In the Requirements phase, only Requirements workflow activities are carried out
- All Requirements activity should be completed before work starts on Analysis
- In an iterative life cycle project it is recognised that some Requirements work will be happening alongside Analysis work



Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Requirements Capture and Modelling	Requirements Elicitation Use Case Modelling Architectural Modelling Prototyping	Use Case Model Requirements List Initial Architecture Prototypes Glossary

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Requirements Analysis	Communication Diagrams Class and Object Modelling Analysis Modelling	Analysis Models

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
System Design	Deployment Modelling Component Modelling Package Modelling Architectural Modelling Design Patterns	Overview Design and Implementation Architecture

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Class Design	Class and Object Modelling Interaction Modelling State Modelling Design Patterns	Design Models

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
User Interface Design	Class and Object Modelling Interaction Modelling State Modelling Package Modelling Prototyping Design Patterns	Design Models with Interface Specification

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Data Management Design	Class and Object Modelling Interaction Modelling State Modelling Package Modelling Design Patterns	Design Models with Database Specification

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Construction	Programming Component Re-use Database DDL Programming Idioms Manual Writing	Constructed System Documentation

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Testing	Programming Test Planning and Design Testing	Test Plans Test Cases Tested System

Major Activities of the Development Process

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Activity	Techniques	Key Deliverables
Implementation	Planning Training Data Conversion	Installed System

A Case Study: Applying the Activity Analysis Approach

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- This case study describes the development of a mail order system by applying the Activity Analysis Approach (A^3).
- Throughout this case study, we will show the main steps and the artifacts produced in A^3 in one iteration of the development process.
- Typically, due to the complexity of modern systems, several iterations are necessary in order to elicit and model all the requirements specified.

Activity Analysis Approach

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- Activity Analysis Approach has four distinct workflows: business modeling, requirement, analysis and design.
- In the business modeling workflow, develop activity diagrams to model the operation of the organization.
- In the requirement workflow, identify the scope of the system and develop the use case models of the target system.
- In the analysis workflow, analyze the use case descriptions to create domain class diagrams and system-level sequence diagrams.
- Finally, in the design workflow, we develop low-level collaboration, state and sequence diagrams to model the realization of the use cases.

Business Modeling - Domain Analysis (Workflow)

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- The business modeling starts with information gathering about the business processes of an organization.

- The goal is to identify the candidate activities which are targets for computerization. The developer can collect the information through the following ways:
  - Interviews with users
  - Questionnaires
  - Documents describing the business procedures
  - Domain experts
  - Standards and terminologies in the business domain

Business Modeling - Domain Analysis (Workflow) (cont'd)

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Problem Statement (workflow)

The chief executive officer of a mail order company is interested in computerizing its business process. The major business activities of the company can be briefly described as follows:

- The company aims to provide high quality mail order services to all registered members of the company.
- An individual or a company can register to become a member by filling the registration form and sending it to the customer service department.

Business Modeling - Domain Analysis (Workflow) (cont'd)

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- A member can order items by filling an order form and sending it to the customer service department. The customer service department will verify the membership and forward the order to the sales department. If the order can be processed through existing stock, the sales department will process the order and issue delivery notes to the inventory department. Otherwise, the sales department will issue a purchase order to the supplier. When all items are available, the inventory department delivers the items to the member, and the accounts department issues an invoice to the member.
- When the accounts department receives an invoice from a supplier, it verifies that the items in the purchase order have been received, and issues payment to the supplier.

Business Modeling - Business Process Analysis

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- Apply the elaborator(Problem_Statement[workflow], Swimlane_Activity_Diagram) manipulator to develop an activity diagram.

Business Modeling - Business Process Analysis (cont'd)

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For your action:

Prepare a Swimlane Activity Diagram

Business Modeling - Determining the System Scope

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- The developer can then discuss with the stakeholders of the system and decide on the business activities that are required to be computerized.

- Let's assume that the developer and the stakeholders have agreed to computerize the business activities related to membership, sales, ordering and inventory control of the mail order company.

- We can now proceed with the requirements workflow (the next workflow of the Activity Analysis Approach).

Requirements

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- In this workflow, we start with a set of activities that we wish to computerize and prepare a more detailed (use case level) problem statement.

- We then conduct a textual analysis on this problem statement to identify the actors and use cases. By elaborating on the use cases, the use case descriptions can be used as the input to the analysis workflow.

References

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- Jacobson, Booch and Rumbaugh (1999)
- Kruchten (2004)
- Chapter 21 of Bennett, McRobb and Farmer includes more detail about the Unified Process

(For full bibliographic details, see Bennett, McRobb and Farmer)

WE FOCUS ON KNOWLEDGE-BASED ON EDUCATION

KSRA of Empowerment is a global non-profit organization committed to bringing empowerment through education by utilizing innovative mobile technology and educational research from experts and scientists. KSRA emerged in 2012 as a catalytic force to reach the hard to reach populations worldwide through Learning management system & E-learning & mobile learning.

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