

Unified Process

Lecture 7
14 September

Rubab Jaffar
rubab.jaffar@nu.edu.pk

Software Design and Analysis CS-324



Today's Outline

- Unified Process (UP)
- UP characteristics
- Unified Process Model

Process

Defines Who is doing What, When to do it, and How to reach a certain goal.



- Workers, the 'who'
- Activities, the 'how'
- Artifacts, the 'what'
- Workflows, the 'when'

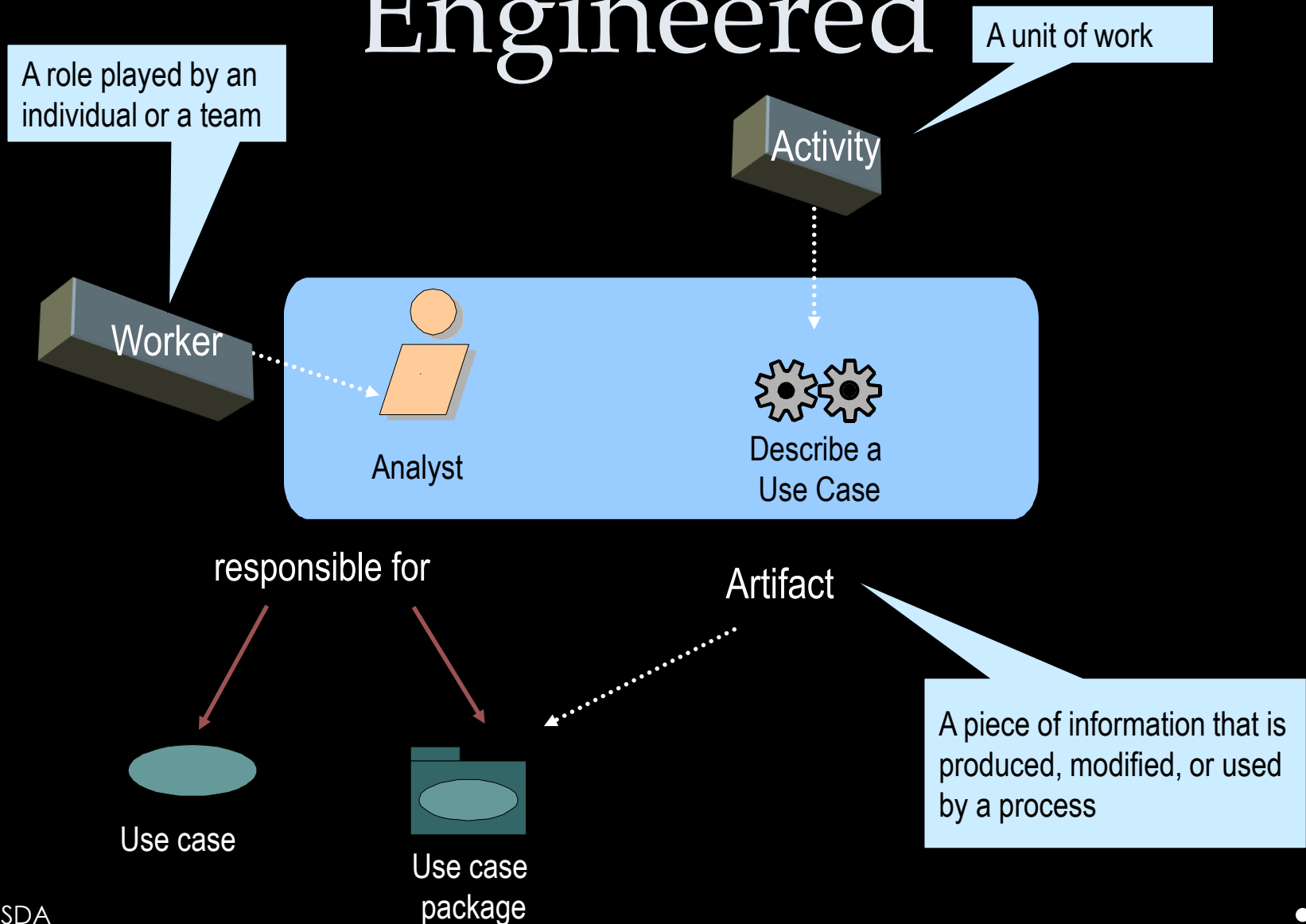
Unified Process Model

- A process model that was created 1997 to give a framework for Object-oriented Software Engineering
- Iterative, incremental model to adapt to specific project needs
- Risk driven development
- Combining spiral and evolutionary models
- **2D process : phases and workflows**
- **Utilizes Miller's Law**

Unified Process

- The Unified Process is not simply a process, but rather an extensible framework which should be customized for specific organizations or projects.
- The Rational Unified Process is, similarly, a customizable framework. As a result, it is often impossible to say whether a refinement of the process was derived from UP or from RUP, and so the names tend to be used interchangeably.

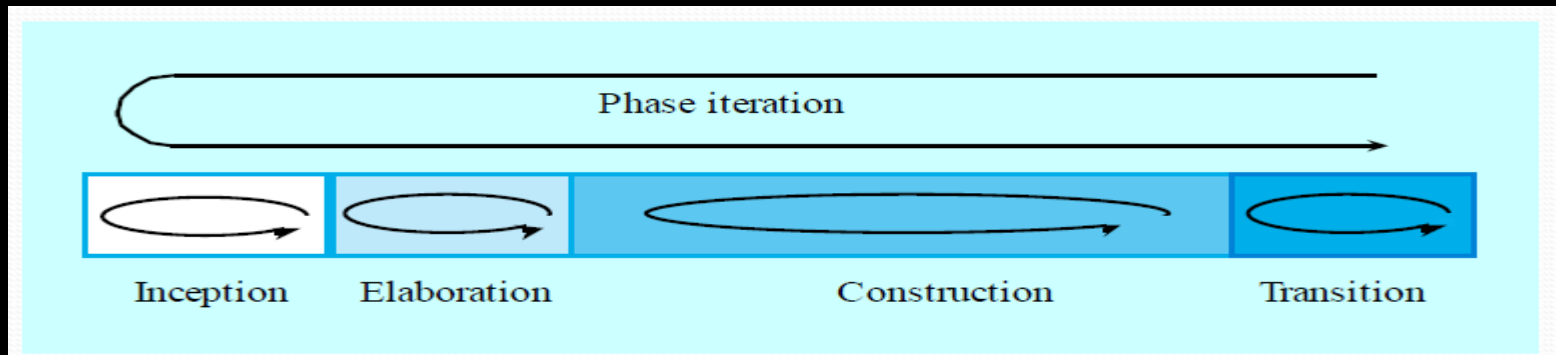
The Unified Process is Engineered



Building Blocks of UP

- All aspects of the Rational Unified Process are based on a set of building blocks, which are used to describe what should be produced, who is in charge of producing it, how production will take place, and when production is complete.
- These four building blocks are:
 - **Workers**, the 'Who': The behavior and responsibilities of an individual, or a group of individuals together as a team, working on any activity in order to produce artifacts.
 - **Activities**, the 'How': A unit of work that a worker is to perform. Activities should have a clear purpose, typically by creating or updating artifacts.
 - **Artifacts**, the 'What': An artifact represents any tangible output that emerges from the process; anything from new code functions to documents to additional life cycle models.
 - **Workflows**, the 'When': Represents a diagrammed sequence of activities, in order to produce observable value and artifacts.

Basic Characteristics of Unified Process



- Object-oriented
- Use-case driven
- Architecture centric
- Risk focused
- Iteration and incrementation

UP Characteristics

- **Object-oriented**
 - Utilizes object oriented technologies.
 - Classes are extracted during OOA and designed during OOD.
- **Use-case driven**
 - Utilizes use case model to describe complete functionality of the system
 - This practice reinforces the fundamental notion that a system must conform to the needs of the users, instead of your users conforming to the system.

UP Characteristics

Architecture centric

- Focus core architecture in the early iterations
- In earliest iterations, get high valued requirements
- View of the whole design with the important characteristics made more visible
- Expressed with class diagram

Risk-focused:

- The Unified Process requires the project team to focus on addressing the most critical risks early in the project life cycle. The deliverables of each iteration, especially in the Elaboration phase, must be selected in order to ensure that the greatest risks are addressed first.

UP Characteristics

Iterative and incremental

- Way to divide the work
- Iterations are steps in the process, and increments are growth of the product
- The basic software development process is iterative
 - Each successive version is intended to be closer to its target than its predecessor

Unified Process Model

- Integrating two seemingly contradicting insights:
 - Definitive activities and deliverables as in the Waterfall Model.
 - Iterative and incremental processes.
- A project is split into several *phases*:
 - Each phase is split into several *iterations*. (2 to 6 weeks)
 - Each iteration consists of the traditional process activities, known as *workflow*.
- Each workflow places *different* emphasis on the activities depending on the current iteration.
- Risk analysis is performed in each iteration.

Unified Process Phases



- Inception
 - Establish the business case for the system, define risks, obtain 10% of the requirements, estimate next phase effort.
- Elaboration
 - Develop an understanding of the problem domain and the system architecture, risk significant portions may be coded/tested, 80% major requirements identified.
- Construction
 - System design, programming and testing. Building the remaining system in short iterations.
- Transition
 - Deploy the system in its operating environment. Deliver releases for feedback and deployment.

Unified Process – Inception Activities

Inception

Project Initiation

- Start with an idea

- Specify the end-product vision

- Analyze the project to assess scope

- Work the business case for the project including overall costs and schedule, and known risks

- Identify Stakeholders

- Obtain funding

Unified Process – Elaboration Activities

Elaboration

- The goal of the elaboration phase is to baseline the most significant requirements.
- **Elaboration Essential Activities**
 - Analyze the problem domain.
 - Refine the Vision to understand the most critical Use Cases
 - Create and baseline iteration plans for construction phase.
 - Refine component architecture and decide build/buy/reuse
 - Develop a project plan and schedule.
 - Mitigate high-risk elements identified in the previous phase.

Unified Process – Construction Activities

Construction

- The goal of the construction phase is to clarify the remaining requirements and complete the development of the first operational quality version of the software product.
- Construction Essential Activities
 - Complete component development and testing (Integrate all remaining components and features into the product)
 - Assure resource management control and process optimization

Unified Process – Transition Objectives

Transition

- Deploy the system in its operating environment. Deliver releases for feedback and deployment.
- The focus of the Transition Phase is to ensure that software is available for its end users and meets their needs.
- Transition Objectives
 - Assess deployment baselines against acceptance criteria
- Primary deliverable
 - Final product onto a production platform
- Other deliverables
 - All the artifacts (final versions)
 - Completed manual

Six best “must” UP practices

1. Time-boxed iterations
2. Strive for cohesive architecture and reuse existing components: e.g.
 1. core architecture developed by small, co-located team
 2. then early team members divide into sub-project leaders
3. Continuously verify quality: test early & often, and realistically by integrating all software at each iteration

Six best “must” UP practices

4. Visual modeling: prior to programming, do at least some visual modeling to explore creative design ideas
5. Manage requirements: find, organize, and track requirements through skillful means
6. Manage change:
 - disciplined configuration management protocol, version control,
 - change request protocol
 - baselined releases at iteration ends

Unified Process

Workflows (6 core workflows)

- Business Modeling Workflow: During this workflow, the business context (scope) of the project should be outlined.
- Requirements Workflow: Used to define all potential requirements of the project, throughout the software development life cycle.
- Analysis & Design Workflow: Once the requirements workflow is complete, the analysis and design phase takes those requirements and transforms them into a design that can be properly implemented.
- Implementation Workflow: This is where the majority of actual coding takes place, implementing and organizing all the code into layers that make up the whole of the system.
- Test Workflow: Testing of all kinds takes place within this workflow.
- Deployment Workflow: Finally, the deployment workflow constitutes the entire delivery and release process, ensuring that the software reaches the customer as expected.

Unified Process Workflows

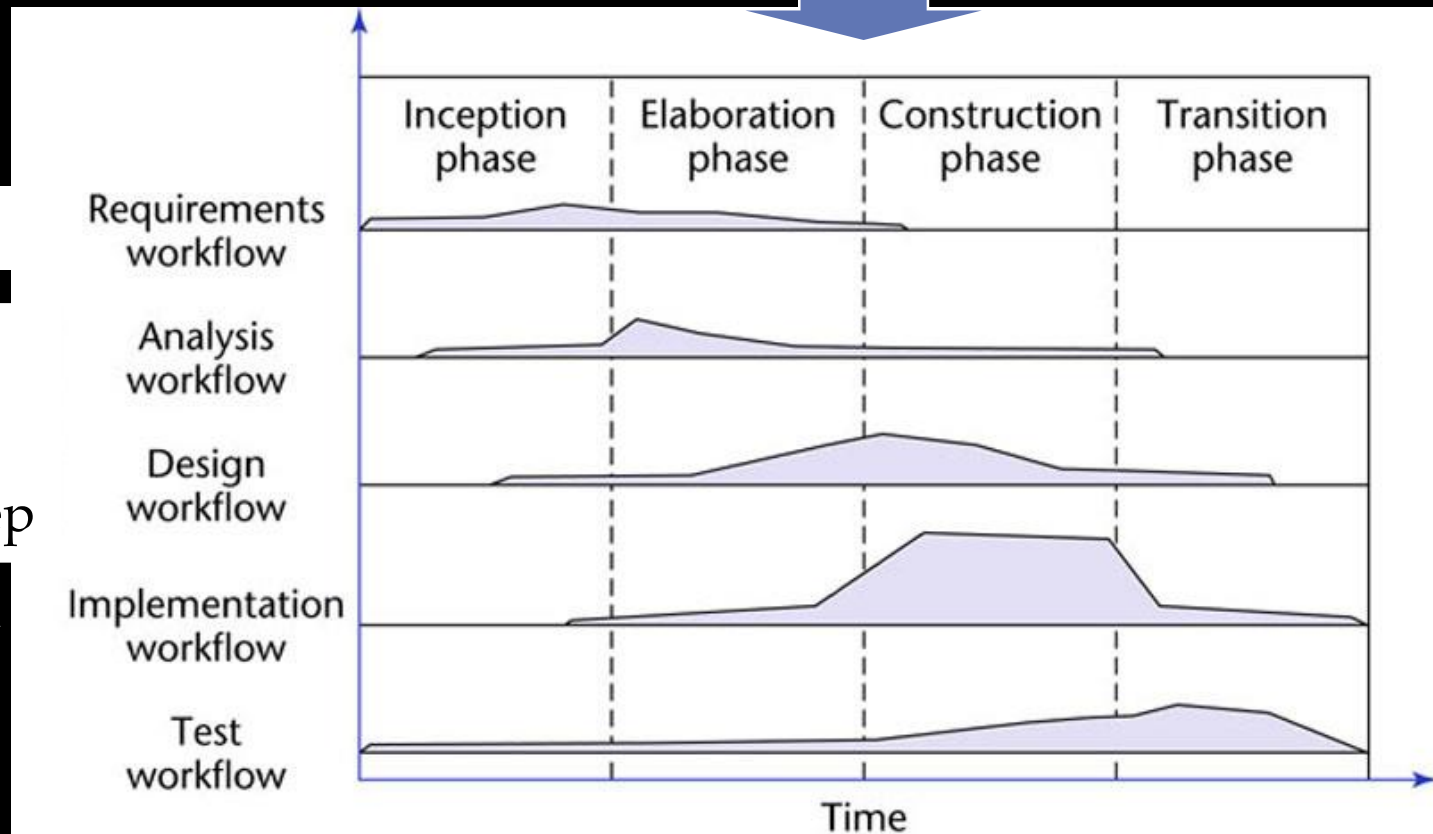
(3 core supporting workflows)

- Project Management Workflow: Where all activities dealing with project management take place, from pushing design objectives to managing risk to overcoming delivery constraints.
- Configuration & Change Management Workflow: Used to describe the various artifacts produced by the development team, ideally ensuring that there is minimal overlap or wasted efforts performing similar activities that result in identical or conflicting artifacts.
- Environment Workflow: Finally, this workflow handles the setup and management of all software development environments throughout the team, including the processes, as well as the tools, that are to be used throughout the software development life cycle.

The Phases/Workflows of the Unified Process

- Phase is Business context of a step

Workflow is
Technical
context of a step



Case Study: Applying the Rational Unified Process: A Web Service Sample

- http://www.differnet.com/crose/CR_Files/CRose-RUPSample/RUPSample-CR1.pdf



That is all