



# **SOFTWARE DEVELOPMENT PROCESSES**

## **(Quy trình Phát triển Phần mềm)**

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## Software Process

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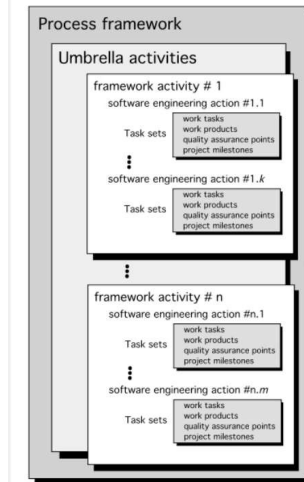
## What is Software Process?

- Process is what binds people, methods and tools
- A process is defined by:
  - Process model (i.e. waterfall, spiral, ...)
  - Methods for performing the activities within each phase (i.e. object-oriented design, test-drive development, formal inspection, ..)
  - Roles and responsibilities of workers
  - Workflows (requirements → design → code → test )

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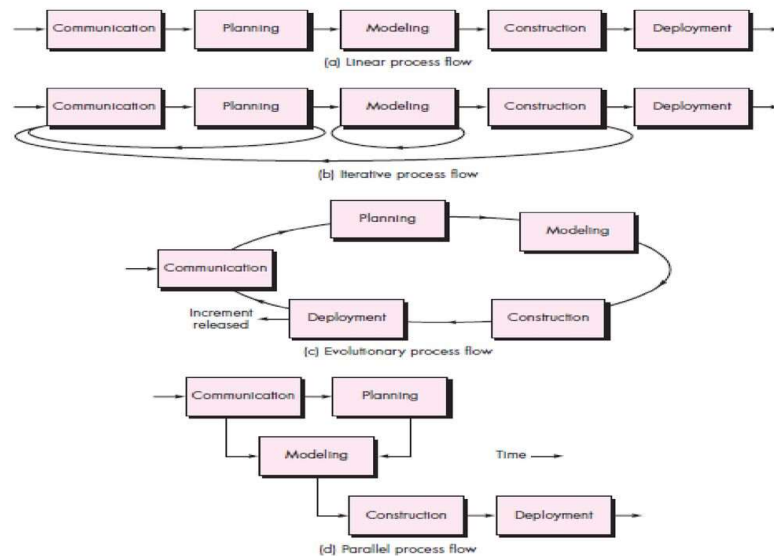
## Process Framework (Khung Quy trình)



- A process framework establishes the foundation for a complete software process by **identifying a small number of framework activities** that are applicable to all software projects, regardless of size or complexity.
- It also includes **a set of umbrella activities** that are applicable across the entire software process.

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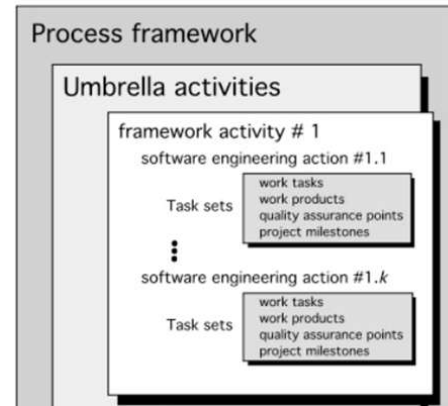
## Process Flow (Luồng Quy trình)



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## Identifying a Task Set

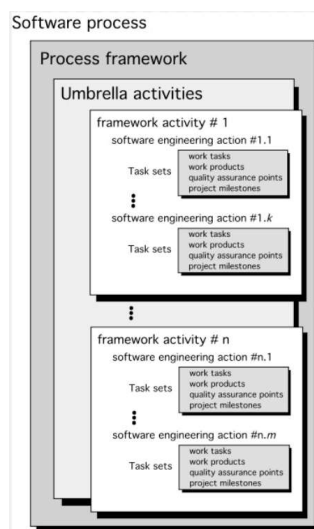
- A task set defines the actual work to be done to accomplish the objectives of a software engineering action.
  - A list of the task to be accomplished
  - A list of the work products to be produced
  - Quality Assurance points (QA Check point)
  - Project milestones (Milestones & deliverables)



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## Umbrella activities (Hoạt động hỗ trợ)



- are a series of steps or procedures followed by a software development team ***to maintain the progress, quality, changes, and risks of complete development tasks.***
- will evolve through the phases of the generic view of software development.
- apply to the entire software project and help the software development team manage and track progress, quality, changes, and risks.

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## Umbrella activities (Hoạt động hỗ trợ)

Consist of different tasks:

- Software project management
- Formal technical reviews
- Software quality assurance
- Software configuration management
- Work product preparation and production
- Reusability management
- Measurement
- Risk management
- ....



Fig: Umbrella Activities in Software Engineering

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## Process Assessment and Improvement

- **A software process assessment (đánh giá quy trình)**
  - is a **disciplined examination** of the software processes used by an organization, based on a process model.
  - includes the **identification and characterization** of current practices, **identifying areas of strengths and weaknesses**, and the **ability of current practices to control or avoid significant causes of poor (software) quality, cost, and schedule**.
  - performed in an open and collaborative environment. They are for the use of the organization to improve its software processes, and the results are confidential to the organization.

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## Process Assessment and Improvement

- **A software assessment (or audit) can be of three types.**
  - A **self-assessment (first-party assessment)** is performed internally by an organization's own personnel.
  - A **second-party assessment** is performed by an external assessment team or the organization is assessed by a customer.
  - A **third-party assessment** is performed by an external party or (e.g., a supplier being assessed by a third party to verify its ability to enter contracts with a customer).

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## Process Assessment and Improvement

- Standard CMMI Assessment Method for Process Improvement (SCAMPI) — provides a five step process assessment model that incorporates five phases: initiating, diagnosing, establishing, acting and learning.
- CMM-Based Appraisal for Internal Process Improvement (CBA IPI) - provides a diagnostic technique for assessing the relative maturity of a software organization; uses the SEI CMM as the basis for the assessment
- SPICE—The SPICE (ISO/IEC15504) standard defines a set of requirements for software process assessment. The intent of the standard is to assist organizations in developing an objective evaluation of the efficacy of any defined software process.
- ISO 9001:2000 for Software—a generic standard that applies to any organization that wants to improve the overall quality of the products, systems, or services that it provides. Therefore, the standard is directly applicable to software organizations and companies.

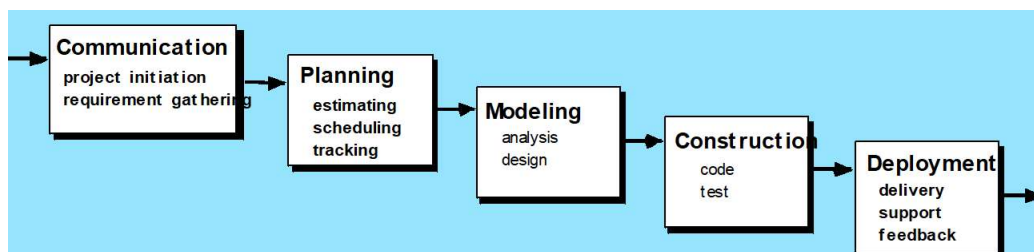
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## 2. Software development model

- Waterfall Model (mô hình thác nước)
- V-Model (Verification and Validation model)
- Incremental Model (mô hình tăng trưởng)
- Rational Unified Process (quy trình RUP)
- Agile software development (phát triển phần mềm theo Agile)

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## Waterfall Model

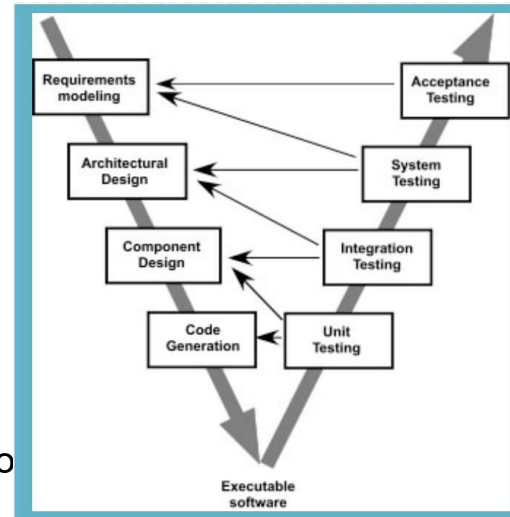


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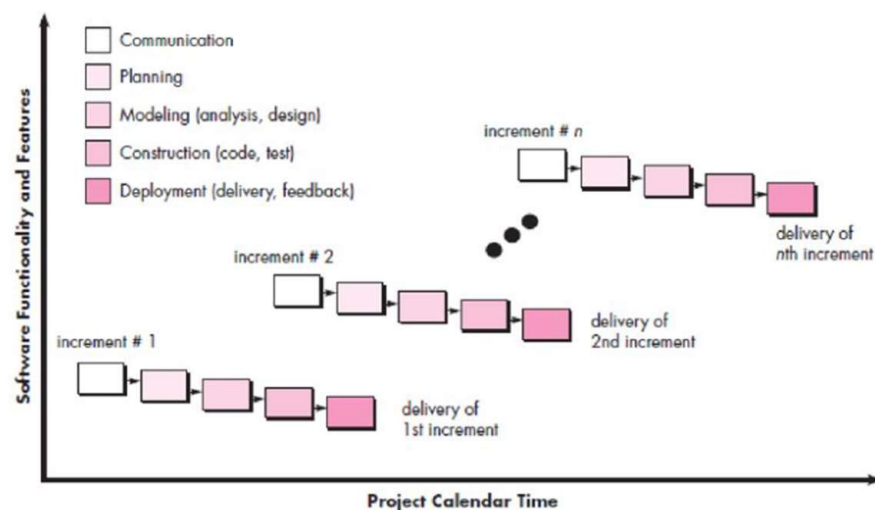
## V-Model (Verification and Validation model)

- Is extension of the waterfall model
- Is based on the association of a testing phase for each corresponding development stage
- This is a highly-disciplined model and the next phase starts only after completion of the previous phase.



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## Incremental Model (mô hình tăng trưởng)

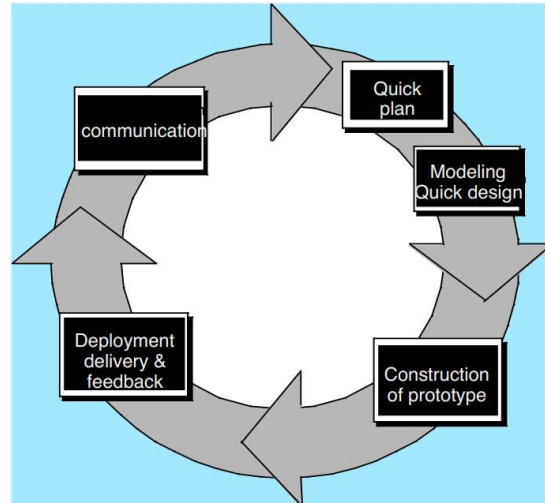


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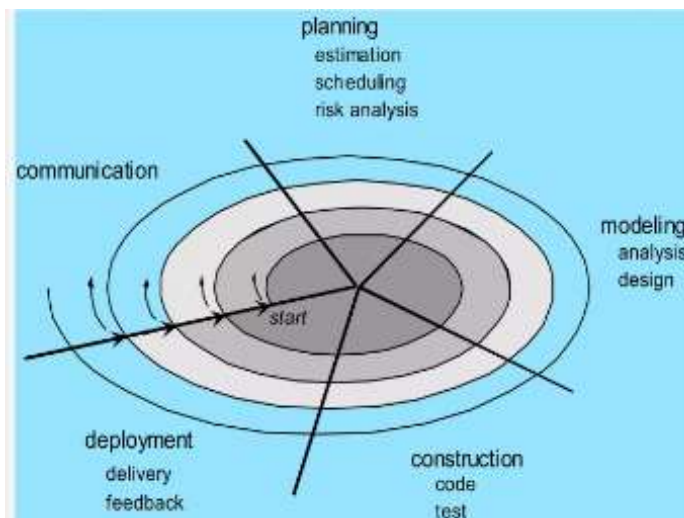
## Evolutionary Models: Prototyping

- Often, a customer defines a set of general objectives for software, but does not identify detailed requirements for functions and features



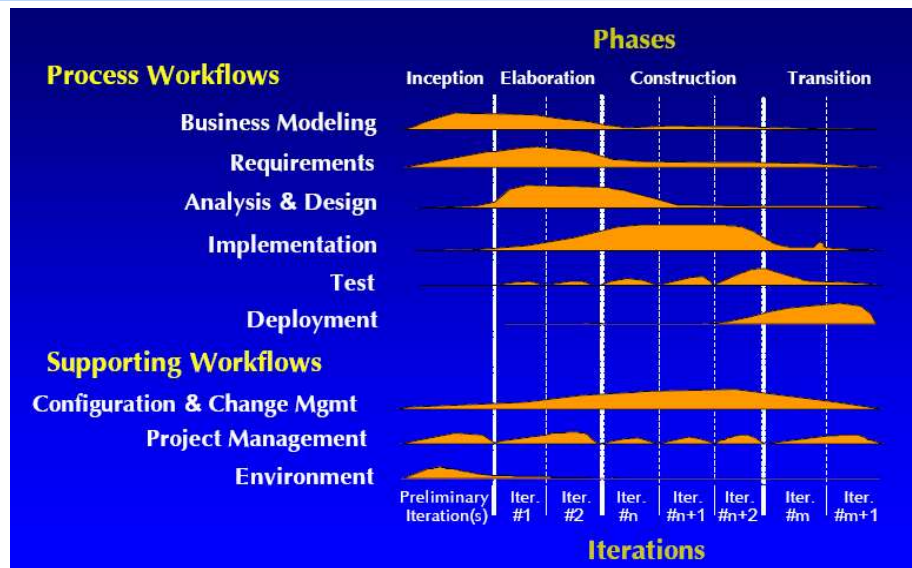
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## Evolutionary Models: Spiral (xoắn ốc)



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## Quy trình Rational Unified Process (RUP)



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## Agile Software Development

- Not a process, it's a philosophy or set of values

Rapid Adaptable  
**AGILE** Quality-driven  
 Cooperative Iterative

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## Agile Manifesto – Bản tuyên ngôn Agile

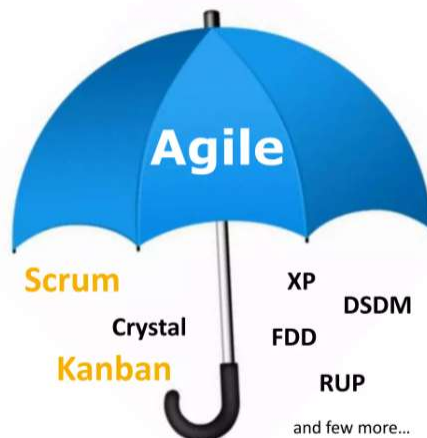
Vào năm 2001, **bản tuyên ngôn Agile** đã được thống nhất và ra đời bởi một nhóm người có uy tín trong phát triển phần mềm:

- **Individuals and interactions over processes and tools:** Cá nhân và sự tương tác hơn là quy trình và công cụ
- **Working software over comprehensive documentation:** Phần mềm chạy tốt hơn là tài liệu đầy đủ
- **Customer collaboration over contract negotiation:** Cộng tác với khách hàng hơn là đàm phán hợp đồng
- **Responding to change over following a plan:** Phản hồi với sự thay đổi hơn là bám theo kế hoạch

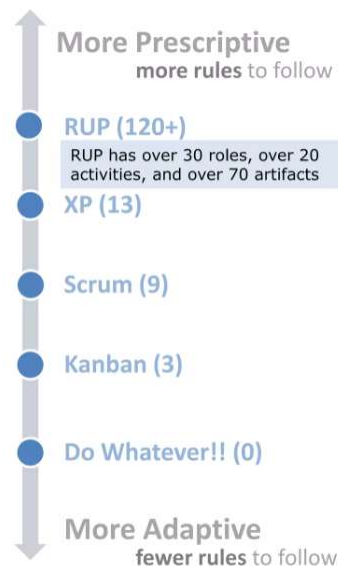
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## Agile Umbrella



Check wikipedia for list of all Agile methods



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## Scrum

A light-weight **agile** process tool

Scrum

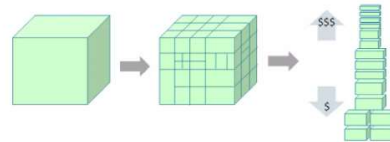
### Split your organization

into small, cross-functional, self-organizing teams.



### Split your work

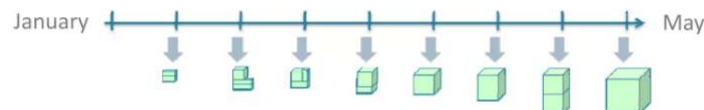
into a list of small, concrete deliverables. Sort the list by priority and estimate the relative effort of each item.



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## Scrum

**Split time** into short fixed-length iterations/ sprints (usually 2 – 4 weeks), with potentially shippable code demonstrated after each iteration.



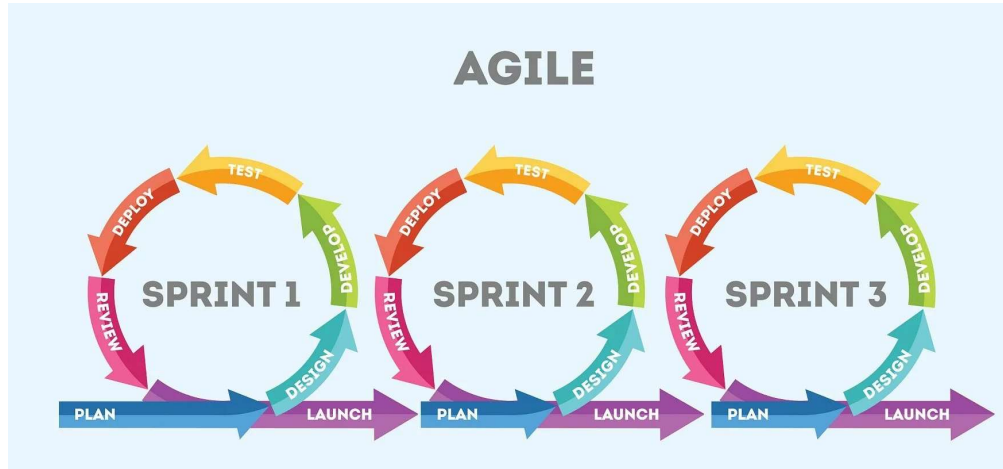
**Optimize the release plan** and update priorities in collaboration with the customer, based on insights gained by inspecting the release after each iteration.

**Optimize the process** by having a retrospective after each iteration.

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## Agile Software Development



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## Process activities

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## Group Homeworks

- Chủ đề 1: Tìm hiểu và trình bày mô hình thác nước (Waterfall Model)
- Chủ đề 2: Tìm hiểu và trình bày mô hình V-Model (Verification and Validation model)
- Chủ đề 3: Tìm hiểu và trình bày mô hình tăng trưởng (Incremental Model)
- Chủ đề 4: Tìm hiểu và trình bày quy trình RUP (Rational Unified Process)
- Chủ đề 5: Tìm hiểu và trình bày phát triển phần mềm theo Agile (Agile software development)