ĐẠI HỌC BÁCH KHOA HÀ NỘI
HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

Nhóm chuyên môn Nhập môn Công nghệ phần mềm

NHẬP MÔN CÔNG NGHỆ PHẦN MỀM

Overview of the Software life cycle

CONTENTS

GOALS

By completing this session, learners are able to:

1. Understand some concepts related to the software development life cycle
2. Understand the **stages** in the software development process
3. Some important notes in the software development process

CONTENTS

1. SOME RELATED CONCEPTS

1.1. Software life cycle

- The software life cycle is the period from when the software is created until it is retired (from its inception to meet requirements, through operation and maintenance, to the point when it is no longer used and eventually discarded)
- The software process (software life cycle) is divided into main phases: analysis, design, implementation, testing, and maintenance. The representation of these phases may vary depending on the specific model

1. SOME RELATED CONCEPTS

1.1. Software life cycle

- Every software product has a life cycle.
- The life cycle is often quite long - some software products have 'existed' for 30 years.
- The life cycle may be shortened due to technological advancements.
- In practice, the concept of the software life cycle is now rarely mentioned. In software engineering, the concept of the software development life cycle is more commonly referred to

1. SOME RELATED CONCEPTS

1.2. Software Development Life Cycle

- Tên tiếng Anh: Software Development Life Cycle - SDLC
- The Software Development Lifecycle (SDLC) is the cost- and time-related process used by development teams to design and build software.
- The goal of the SDLC is to minimize project risks through upfront planning, ensuring that the software meets customer expectations during production and beyond.
- This approach outlines a series of steps that divide the software development process into tasks that can be assigned, completed, and measured.

1. SOME RELATED CONCEPTS

1.2. Software Development Life Cycle

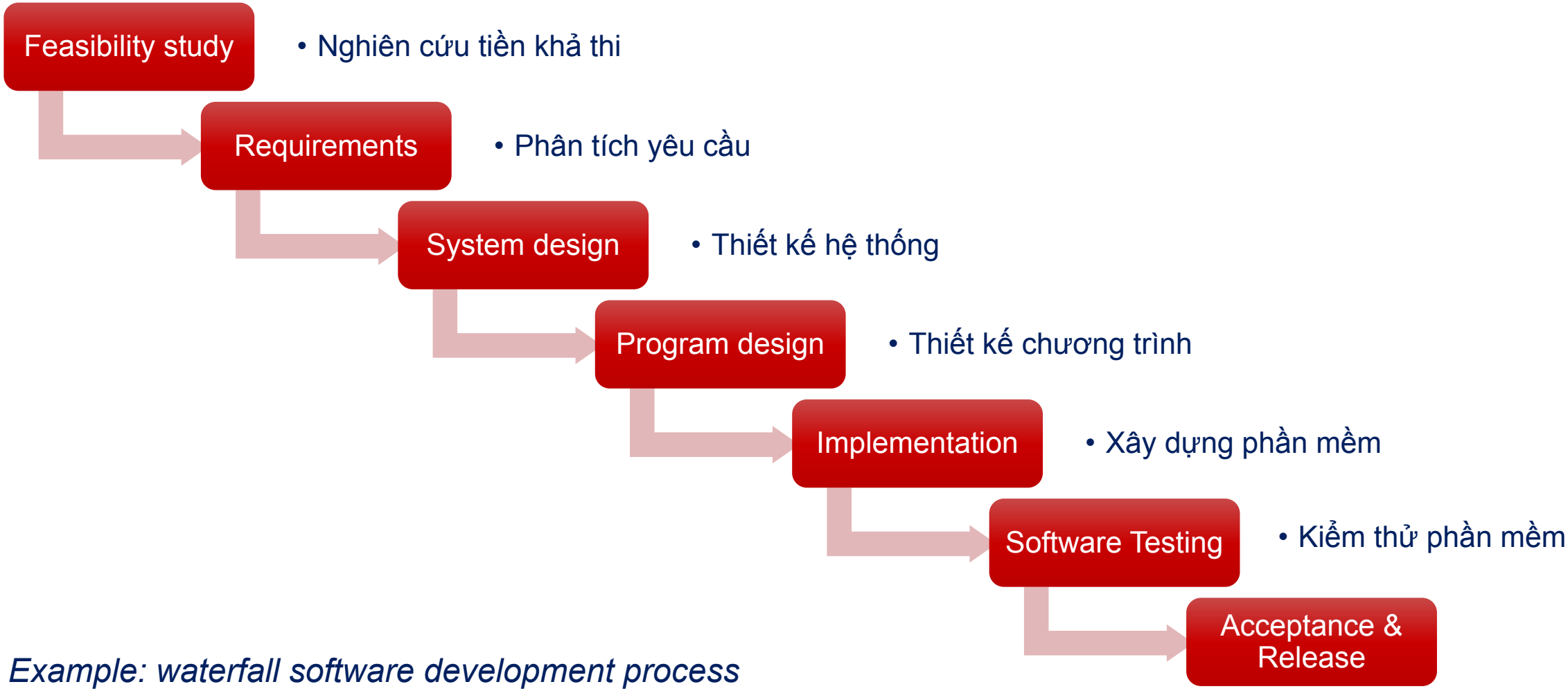
Some benefits of applying a process to the SDLC include:

- Improved visibility and management throughout the development process for all stakeholders
- More effective estimation, planning, and scheduling
- Better risk management and cost estimation
- Delivery of more systematic software and greater customer satisfaction

CONTENTS

2. The stages in the software development process

2.1. Steps in the Software Development Process



Example: waterfall software development process

2. The stages in the software development process

2.1. Steps in the Software Development Process

- The Software Development Lifecycle (SDLC) outlines several essential steps and tasks for building a software application.
- The development process goes through multiple phases as developers add new features and fix bugs in the software.
- Details of the SDLC process may vary depending on the team and the specific software development model being applied.
- However, it generally includes five main steps: requirements analysis, design, development or coding, software testing, and maintenance.

2. The stages in the software development process

2.2. Detailed Analysis of the Steps in the Process

- **Requirements**
  - Identify customer needs and product constraints.
  - This phase often includes tasks such as cost-benefit analysis, scheduling, estimation, and resource allocation. The development team gathers requirements from various stakeholders, including customers, internal and external experts, and managers, to produce a software requirements specification document.
- **Design:** Software engineers analyze the requirements and determine the most appropriate solutions for building the software. For example, they may consider integrating existing modules, selecting technologies and development tools, and determining the best way to integrate the new software into the existing IT infrastructure.

2. The stages in the software development process

2.2. Detailed Analysis of the Steps in the Process

- **Development – Coding**: In the implementation phase, the development team codes the product. They analyze the requirements to break down the work into smaller coding tasks that can be completed daily to achieve the final outcome.
  - When software is being developed, the coding and testing usually occur on a separate copy of the software, not the version accessed by end users. The software used by the customer is called the production version, while the other copies are known as build environments or test environments.
- Having separate build and deployment environments ensures that customers can continue using the software even while it is being modified or upgraded.

2. The stages in the software development process

2.2. Detailed Analysis of the Steps in the Process

- **Testing – VerificationKiểm tra - kiểm thử:** The development team combines automated and manual testing processes to check the software for bugs. Quality analysis includes identifying errors and verifying whether the software meets customer requirements. The testing phase often runs in parallel with the development phase.
- **Maintenance:** During the maintenance phase, among other tasks, the team fixes bugs, addresses customer issues, and manages changes to the software. Additionally, the team monitors user experience, security, and overall system performance to identify new ways to improve the existing software.

CONTENTS

3. IMPORTANT NOTES

3.1. Security issues in the software development process

- In a typical software development process, security testing is a separate process from the software development life cycle (SDLC). The security team detects vulnerabilities only after the software is built. This leads to a large number of undetected bugs as well as increased security risks.
- Today, security is an integral part of the software development life cycle. This issue can address security concerns in the SDLC through DevSecOps approaches and conduct security assessments throughout the entire SDLC process.

3. IMPORTANT NOTES

3.1. Security issues in the software development process

- DevSecOps is a method that integrates security testing at every stage of the software development process. This approach includes tools and processes that encourage collaboration between developers, security experts, and operations teams to build software capable of withstanding modern threats.
- DevSecOps stands for development, security, and operations: defining the different roles and responsibilities of software teams when building software applications.
- In addition, it should be noted that security assurance activities such as code review, architectural analysis, and penetration testing are essential parts of software product development.

3. IMPORTANT NOTES

3.2. Differences between SDLC and some related terms

System Development Lifecycle

- A system typically includes multiple hardware and software components working together to perform complex functions.
- The software development lifecycle focuses solely on software components. In contrast, the system development process is a broader set that involves configuring and managing software, hardware, people, and processes that together form a complete system. This process may include tasks such as organizational training and change management policies, which fall outside the scope of software development.

3. IMPORTANT NOTES

3.2. Differences between SDLC and some related terms

Application Lifecycle Management

- Application Lifecycle Management (ALM) refers to the creation and maintenance of software applications until they are no longer needed. It involves multiple processes, tools, and people working together to manage all aspects of the life cycle, such as ideation, design and development, testing, deployment, support, and eventual retirement.
- SDLC provides a more detailed description of the application development phase. It is a part of ALM. ALM encompasses the entire lifecycle of an application and goes beyond SDLC. In fact, ALM can include multiple SDLCs within the life cycle of a single application.

SUMMARY AND OUTLOOK

1. The lesson has provided learners with **some basic concepts** of the software development life cycle, as well as the **key stages** and **important notes** within it.
2. Following this lesson, learners can further explore the steps in the software development process through the assigned reading

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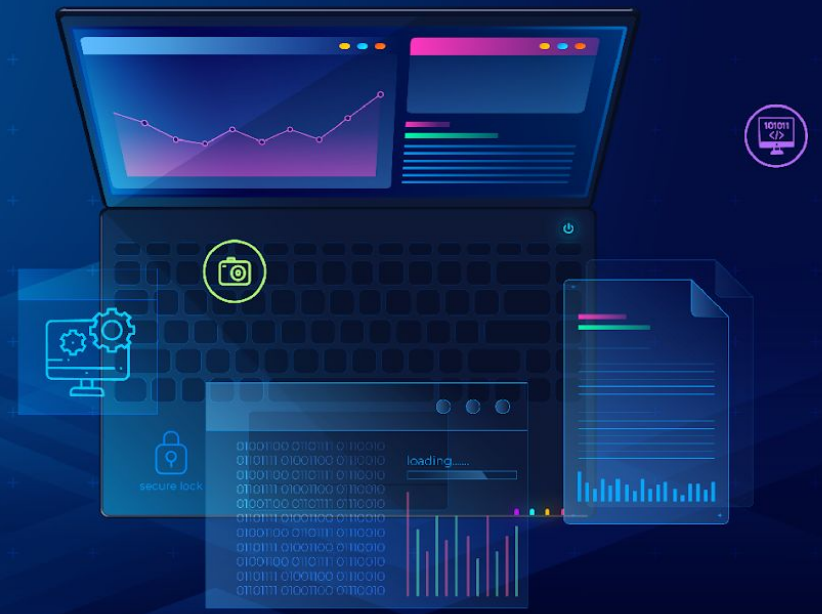
Tổng quan vòng đời phần mềm

Biên soạn:
TS. Nguyễn Nhất Hải
Trình bày:
TS. Nguyễn Nhất Hải



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Bài học tiếp theo:

Tổng quan về quy trình phát triển phần mềm

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