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NHẬP MÔN CÔNG NGHỆ PHẦN MỀM

Overview of the Software Development Process

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By completing this session, learners are able to:

1. Understand the characteristics of software projects
2. Gain insight into how software processes are applied in practice
3. Know how to describe a software process

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1. CHARACTERISTICS OF SOFTWARE PROJECTS

Common problems in software projects

- **Underperforming**
  - Software does not function as intended (functionality – feature)
  - Exceeds the estimated budget (cost)
  - Software delivery is delayed (time, schedule)
- **Decision-making challenges**
  - Every software project must strike a balance between three factors: features, cost, and time.
  - Adding new or additional features increases the cost of development, testing, maintenance, and more.

1. CHARACTERISTICS OF SOFTWARE PROJECTS

Reasons for failure

- There is a higher failure rate compared to many other types of projects, especially software development projects.
- Software development is abstract in nature - it cannot be seen or touched.
- Project failure can be attributed to both internal and external causes:
  - Internal causes: Poor planning, poorly defined requirements, and an inadequate project organizational structure.
  - External causes: Issues related to quality and functionality, cost problems, and scheduling issues.

1. CHARACTERISTICS OF SOFTWARE PROJECTS

Statistical data

- 66% of technology projects (based on an analysis of 50,000 projects worldwide) either partially or completely failed (CHAOS 2020, Standish Group).
- 31% of IT projects in the U.S. were completely canceled, and the performance of 53% was considered “troubling” (CHAOS 2020, Standish Group).
- 17% of large IT projects turned out so poorly that they threatened the very existence of the company (According to a McKinsey study, 2020).

1. CHARACTERISTICS OF SOFTWARE PROJECTS

Requirements for the software development team

- Understand what the customer expects from the software
- Understand what the customer's organization expects from the customer
- Understand what both the customer and the user expect from the software

"Client satisaction is a primary measurement of success in a software project"

"Sự hài lòng của khách hàng là thước đo quan trọng nhất trong thành công của dự án phần mềm"

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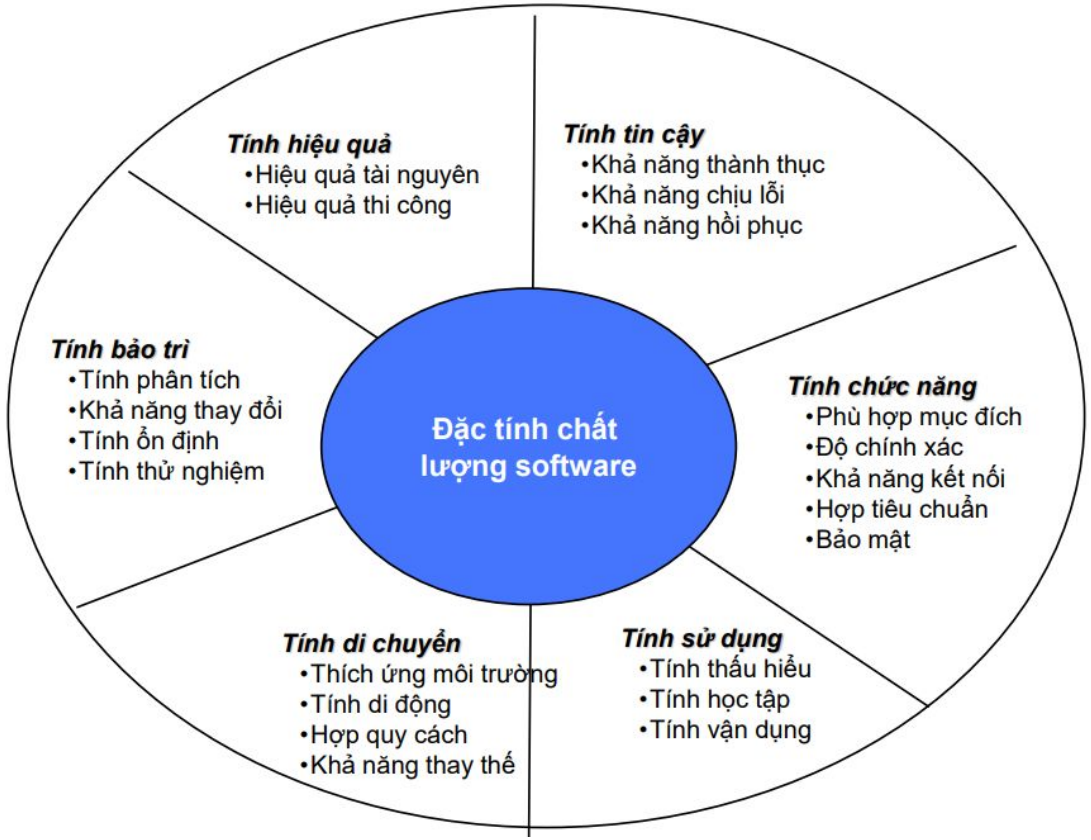
2. SOFTWARE PROCESSES IN PRACTICE

2.1. Software Quality Attributes

- The goal of the software process is to ensure that the final product meets customer requirements and achieves the desired quality standards
- Some observations about the software process:
  - A good process leads to good software
  - A good process minimizes risks
  - A good process brings clarity and makes the project easier to manage
  - A good process enables effective teamwork



Software quality attributes following ISO/IEC JT1/SC2 9126, JIS X0129 - 1994

2. SOFTWARE PROCESSES IN PRACTICE

2.2. Practical Software Quality Control

- Validate requirements
- Verify system and program design
- Test usability
- Test the program
- Acceptance testing
- Debugging and maintenance

These steps may be repeated multiple times during the software development cycle.

Quality control throughout the entire software development process.

2. SOFTWARE PROCESSES IN PRACTICE

2.3. Basic Steps in Software Development

- Requirements Gathering/Feasibility Study
- Requirement Analysis
- Design
- Development
- Testing
- Deployment
- Maintenance

These steps may be repeated multiple times during the software development cycle.

It is essential to distinguish between these steps and to be clear about what you are doing at any given time.

2.4. Software Development Processes in Practice

- In practice, software development processes are often established based on proven and widely used software development models or methodologies.
- Some common software development processes include: the Waterfall model, Agile model, Incremental model, Spiral model, V-Model, DevOps, and Continuous Integration/Continuous Deployment (CI/CD) models.
- These processes are often customized and adapted to fit the specific requirements of a project or organization. They can also be combined or extended to create a unique development process tailored to particular circumstances.

2.4. Software Development Processes in Practice

- There is no perfect development process that fits all situations. Customizing and adapting the process to suit the specific project and development team is essential.

2.4. Software Development Processes in Practice

When applying a software development process in practice, there are several important considerations:

1. Clearly and thoroughly define requirements
2. Continuously review and update requirements
3. Conduct continuous testing
4. Maintain strong communication and feedback
5. Focus on priorities and critical features
6. Manage risks
7. Implement version control
8. Use development support tools
9. Create comprehensive documentation

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3. HOW TO DESCRIBE A SOFTWARE PROCESS

3.1. Methods of Describing a Software Process

- To describe the software development process clearly and understandably, we can use diagrams, flowcharts, symbols, or specific languages.
- These are based on standard notations used in the software development industry.

- Workflow
  - By Workflow
  - Sequence of process steps
  - This is a common way to represent a process
- Dataflow
  - By data flow
  - Centered around a unit of data
- Role/Action
  - By Role or Actor
  - Centered around a single actor

3. HOW TO DESCRIBE A SOFTWARE PROCESS

3.2. Example as a workflow

Step 1: Requirements Gathering

- Objective: Identify requirements from the customer.
- Activities:
  - Survey and document customer requirements
  - Identify necessary features

Example as a workflow

Step 2: Requirement Analysis

- Objective: Analyze requirements and break them down into sub-features.
- Activities:
  - Decompose requirements into smaller features and functions
  - Identify rules/requirements related to these features

SUMMARY AND OUTLOOK

1. The lesson has provided learners with some distinguishing characteristics of software projects, as well as the diversity and flexibility in applying software development processes in practice
2. Following this lesson, learners can explore common software development processes on their own.

NHẬP MÔN CÔNG NGHỆ PHẦN MỀM

Tổng quan về quy trình phát triển phần mềm

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Bài học tiếp theo:

Một số quy trình phát triển phần mềm phổ biến

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