CSE 403
Software Engineering Professional Practice

Lecture 3
Software Security & Development Methodologies

2025

Overview of today's lecture

- Software Security terminologies
- Software development methodologies used in the Industry
- Difference between traditional and modern development approach
- Choosing the appropriate methodologies for projects

Software Security

- hacking, cracking
- social engineering, phishing attacks
- passcodes, passwords, SSO
- brute-force attacks, dictionary attacks
- biometrics
- multi-factor authentication, password managers
- ethical hacking
- (distributed) denial-of-service attacks
- viruses, worms, botnets
- SQL injection attacks
- port-scanning
- proxies, firewalls
- automatic updates
- closed-source, open-source software

Software Security

- buffer-overflow attacks
- secure deletion
- hashing, salting
- secret-key, public-key encryption, digital signatures
- full-disk encryption, ransomware
- cookies, sessions, incognito mode
- anonymization, de-identification
- verification
- operating systems, app stores

3. Software Development Methodologies

Waterfall

- Linear and sequential approach
- Phases:

  Requirements → Design → Implementation → Testing → Deployment → Maintenance
- It is easy to manage but not flexible to changes

Agile Methodology

- Iterative and incremental
- Emphasizes collaboration, customer feedback, and flexibility
- Delivers working software in short cycles (sprints or iterations)

Scrum

- Framework with defined roles and ceremonies
- Roles:
  - Product Owner
  - Scrum Master
  - Development Team
- Events:
  - Sprint Planning
  - Daily Scrum
  - Sprint Review
  - Sprint Retrospective

Differences Between Traditional and Modern Approaches

Feature	Traditional (e.g., Waterfall)	Modern (e.g., Agile, Scrum)
Approach	Linear and sequential	iterative and adaptive
Requirements	Fixed upfront	Evolving throughout
Flexibility	Low	High
Customer Involvement	Minimal after planning	Continuous
Delivery	End of project	Continuous/incremental
Risk Management	At project milestones	Ongoing

Choosing Appropriate Methodologies for Projects

Factors to Consider:

- Project size and complexity
- Stakeholder involvement
- Risk level
- Team size and expertise
- Time and budget constraints
- Requirement stability

Choosing Appropriate Methodology for Projects

Use Waterfall when:

- Requirements are well-defined and unlikely to change
- Projects require high levels of documentation and control

Use Agile or Scrum when:

- Requirements are expected to evolve
- Fast delivery and customer feedback are essential

Choosing Appropriate Methodologies for Projects

Factors to Consider:

- Project size and complexity
- Stakeholder involvement
- Risk level
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- Time and budget constraints
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