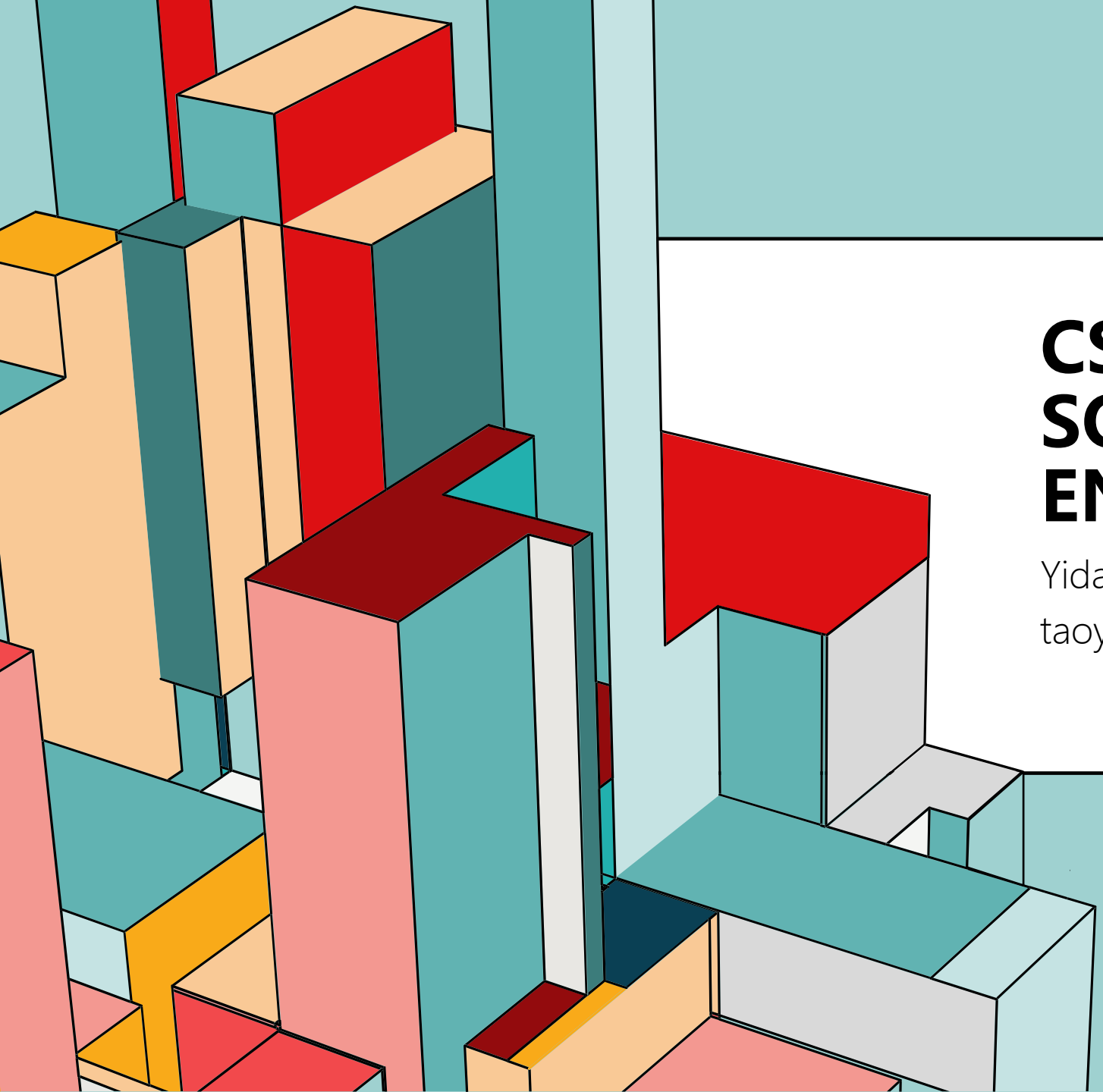

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CS304 SOFTWARE ENGINEERING

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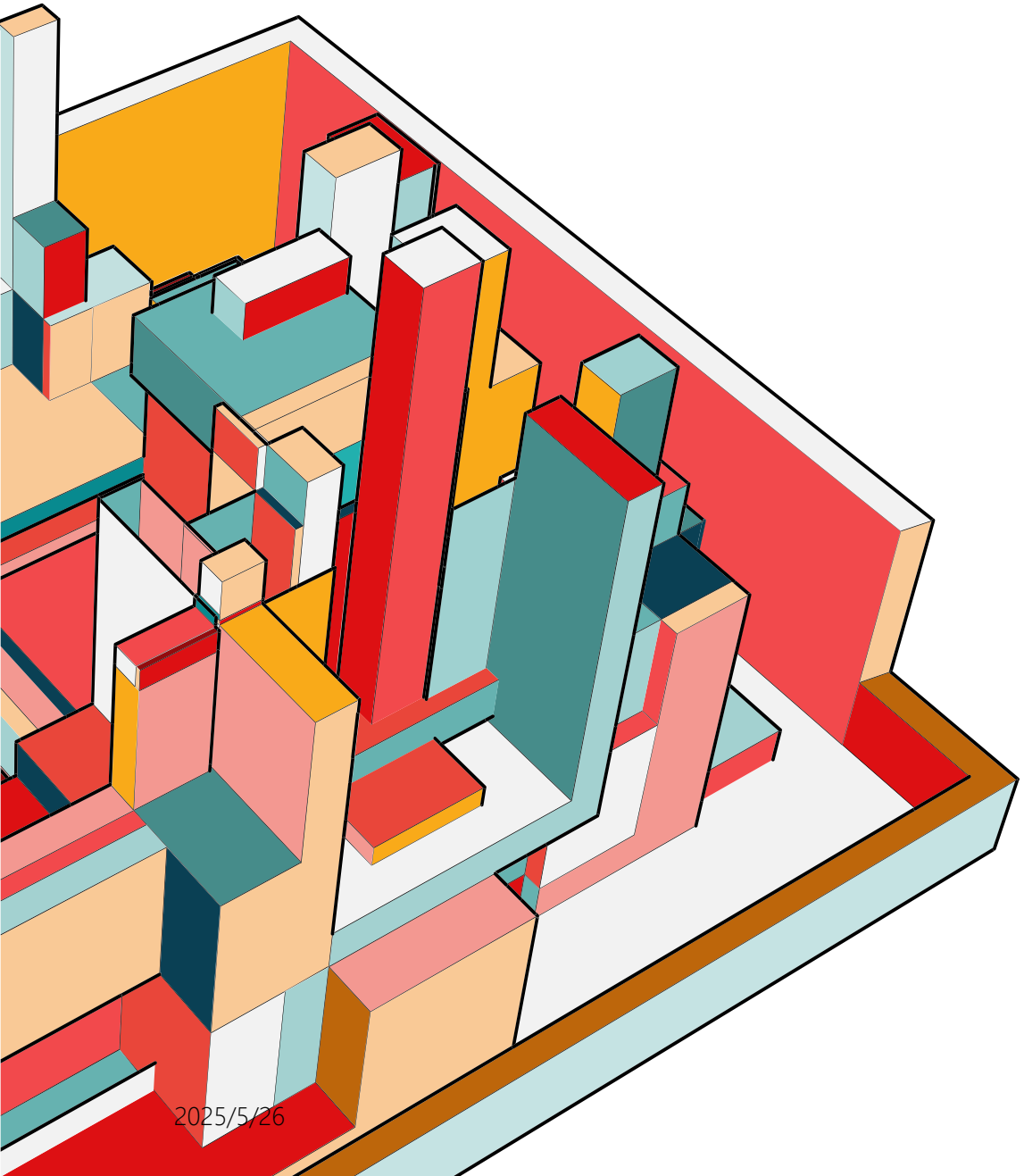

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LECTURE 14

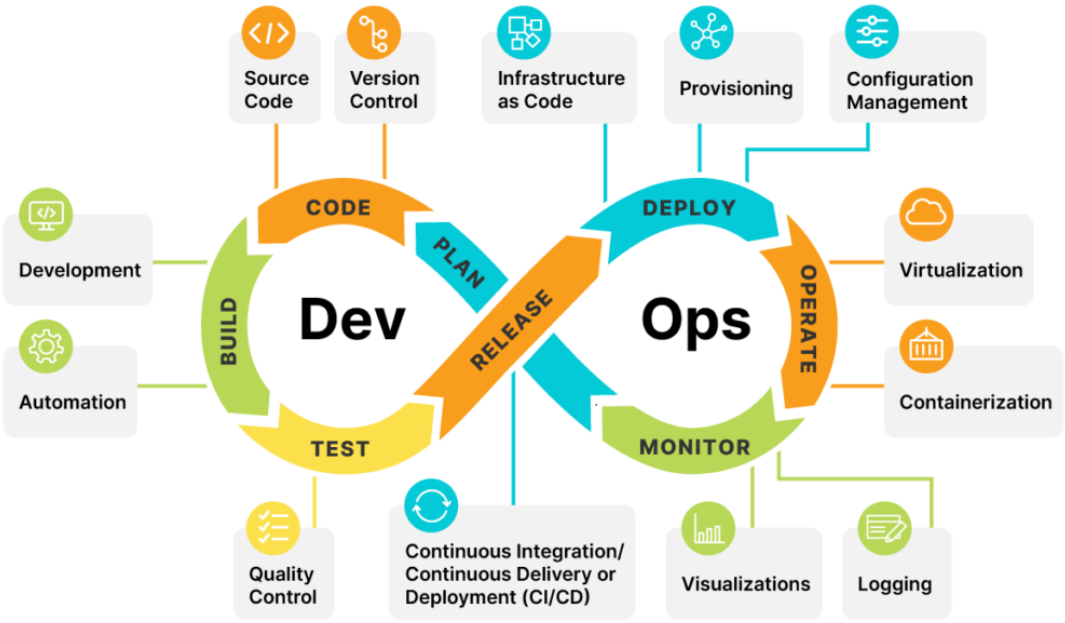
- Course review
- Notes on the final exam

WHAT IS SOFTWARE ENGINEERING?

Software engineering is **programming** integrated over **time, scale, and trade-offs**

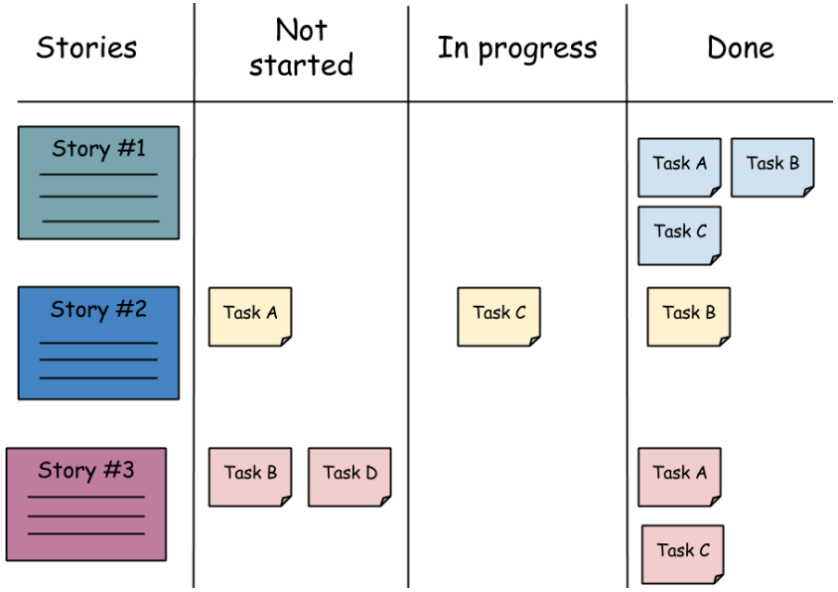
SOFTWARE PROCESS

- Software process models
- Plan-driven process models
- Agile & Scrum
  - Roles, process, artifacts
- DevOps



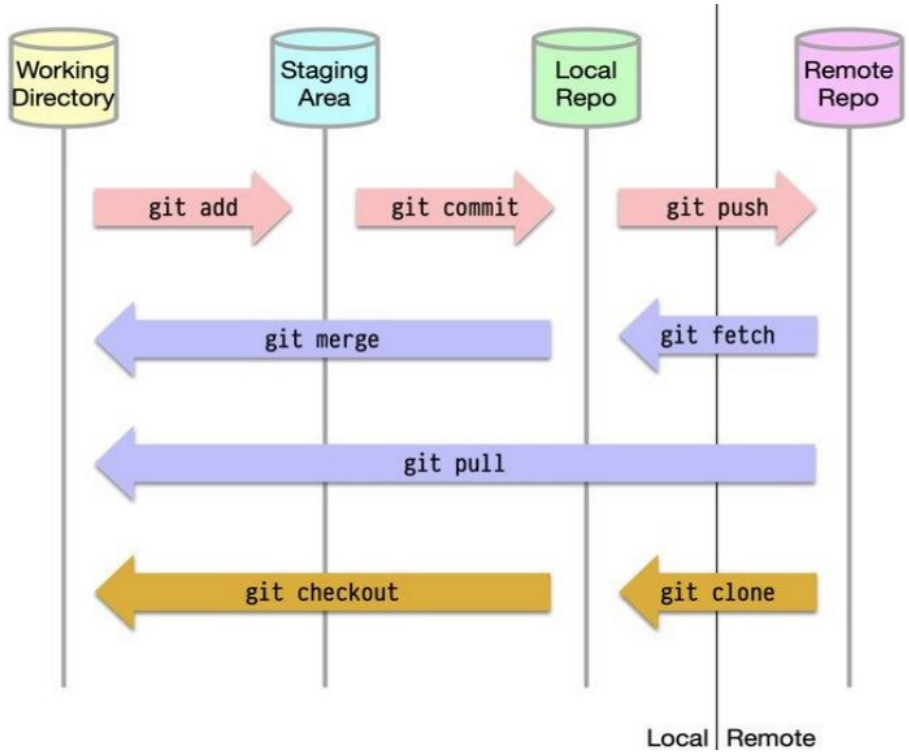
SOFTWARE REQUIREMENTS

- Stakeholders
- Different types of software requirements
  - Business/Users/System requirements
  - Functional vs. non-functional requirements
- User stories in Scrum



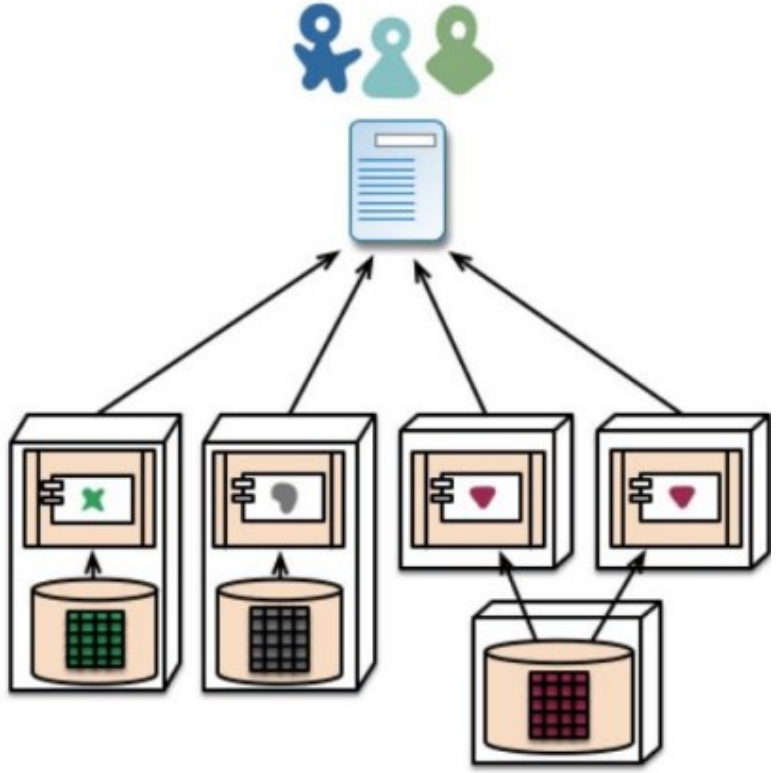
VERSION CONTROL SYSTEMS

- Types of VCSs
- Git architecture
- Git basic commands & concepts
  - Branching, merging, etc.
- GitHub workflows
  - Pull requests, fork, etc.
- Git internals
  - Types of git objects, key-value data store



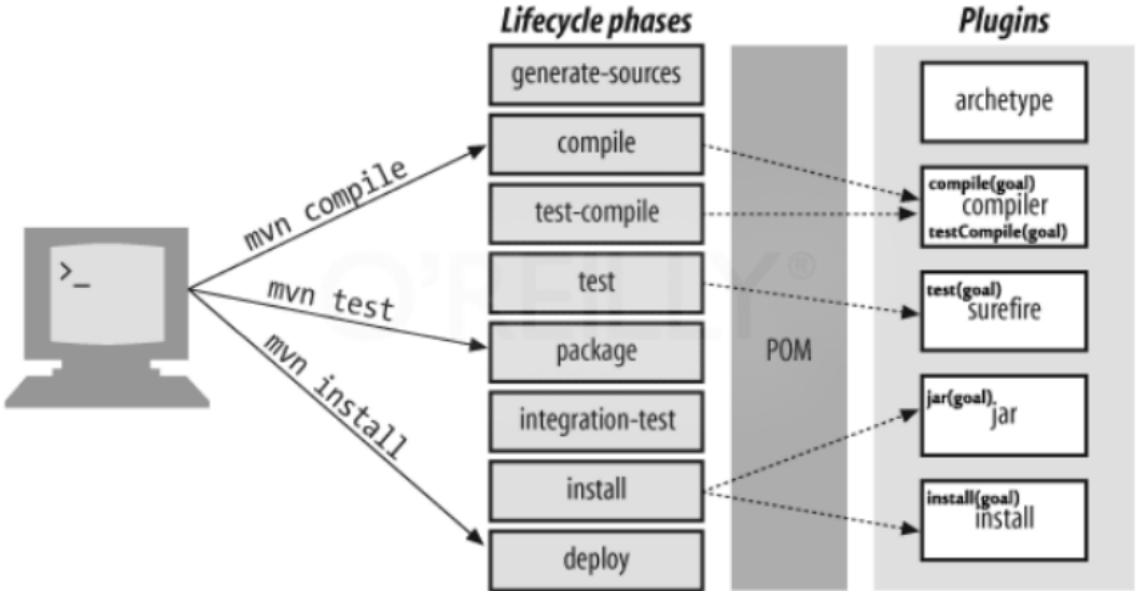
SOFTWARE ARCHITECTURE

- Classic, monolithic architecture
  - Data-flow, OO, layered architecture, etc.
- Service-based, distributed architecture
  - Event-driven, microservice, etc.
- Microservice architecture
  - Motivation
  - Structure
  - Communications
  - Comparisons with monolithic architecture



BUILD SYSTEMS

- Types of build systems
  - Task-based: Maven
  - Artifact-based: Bazel
- Build artifacts
  - Semantic versioning
  - Artifact repo
- Dependency management
  - Different dependency problems

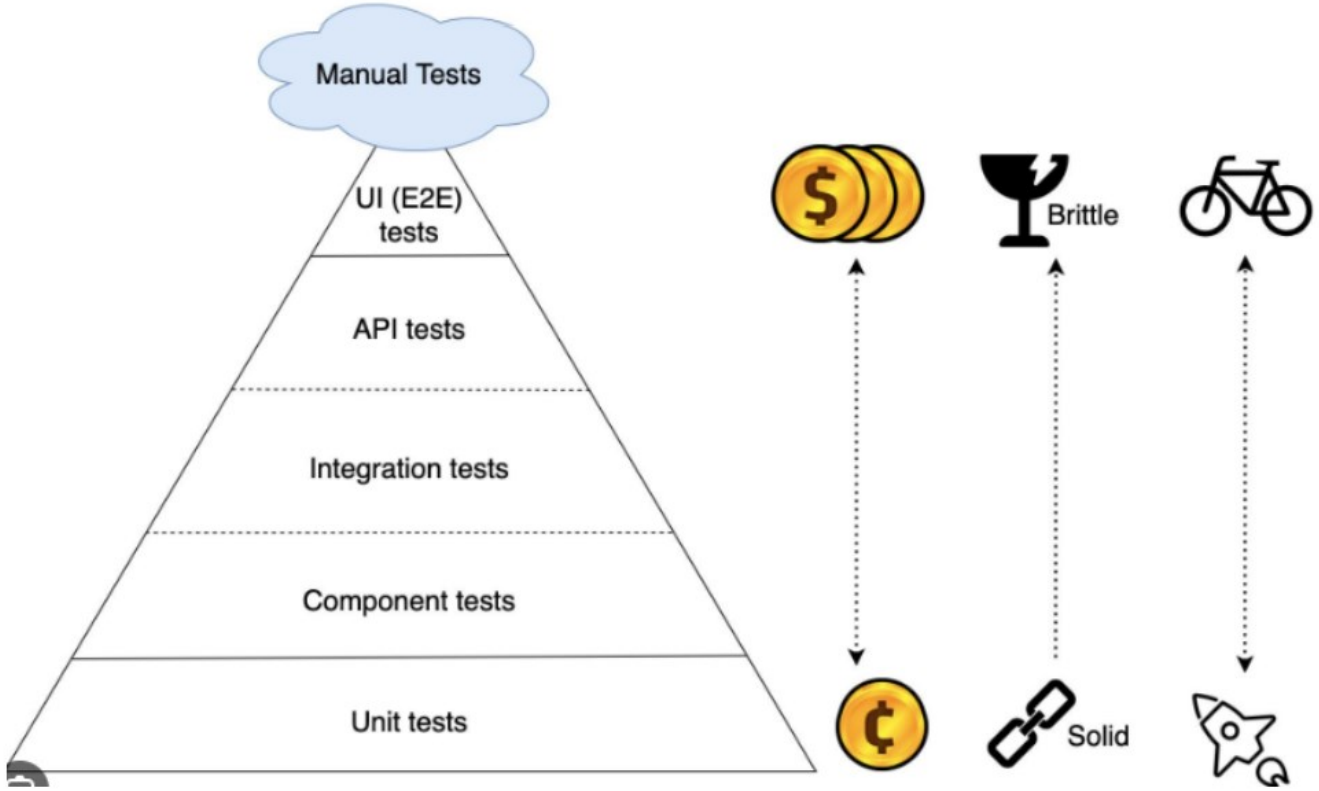


SOFTWARE QUALITY

- Concepts of code quality
- Metrics for code quality
  - LoC, Cyclomatic complexity, OO metrics
  - Implications of the metrics
- Linters
- Concepts of code review

SOFTWARE TESTING

- Testing Concepts & Types
- Whitebox Testing
  - Different coverage criteria
- Blackbox Testing
  - Partition testing/boundary values
- Test Doubles
  - Fakes, stubs, mocks
- Evaluating test cases
  - Metrics
  - Mutation testing, Fuzzing

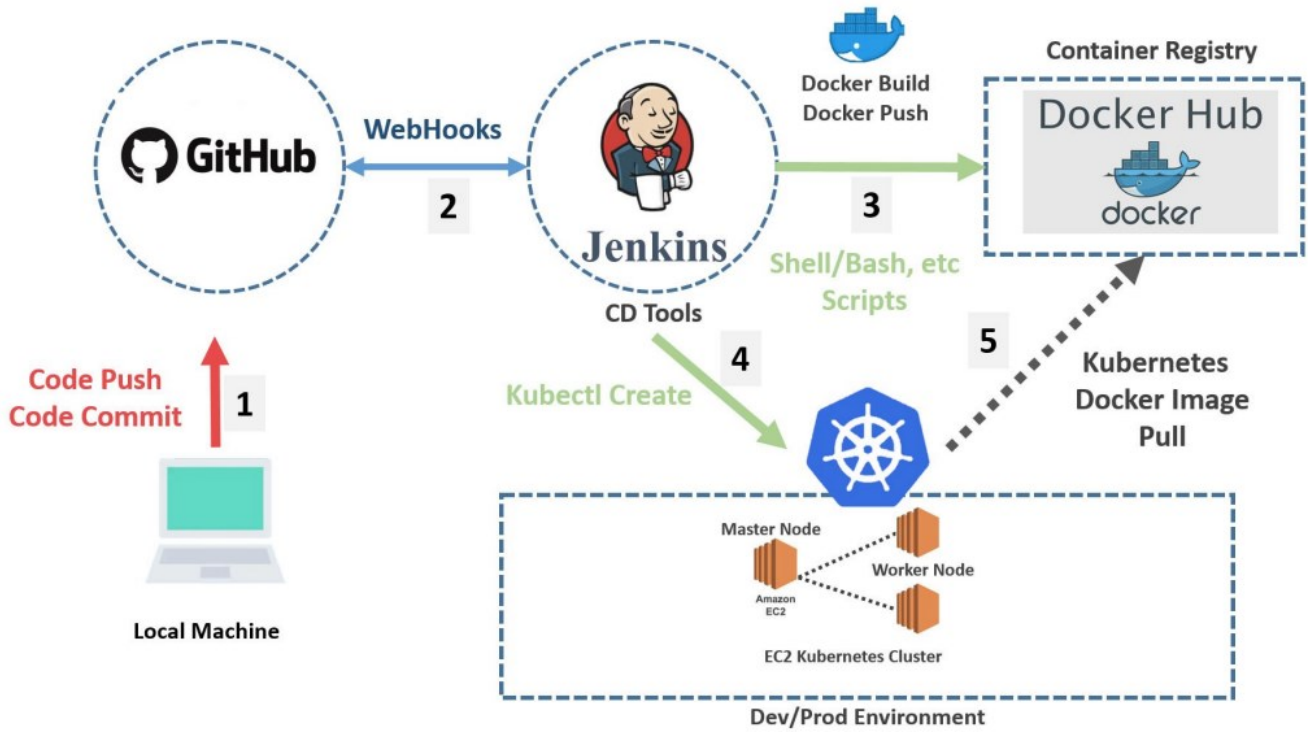


SOFTWARE DOCUMENTATION

- Types of software documentation
- Documentation tools
- Documentation best practices

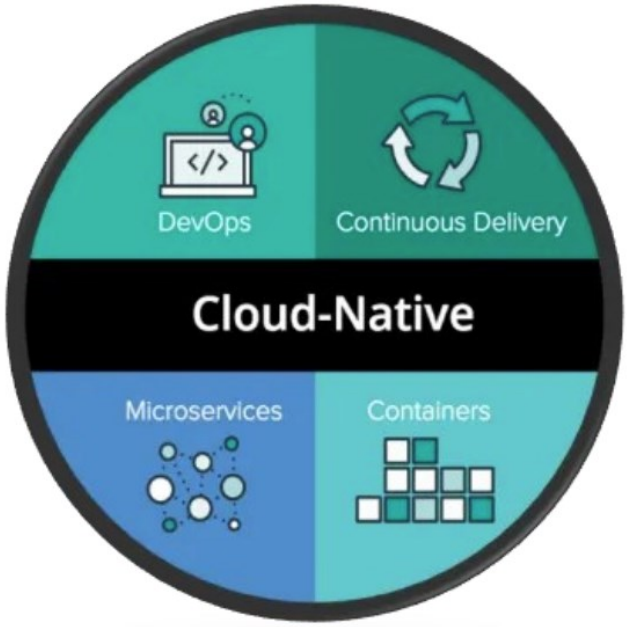
CI/CD

- Continuous integration
- Continuous delivery
- Continuous deployment
- CI/CD Pipelines
- Environments
- Deployment strategy
- Branching strategy



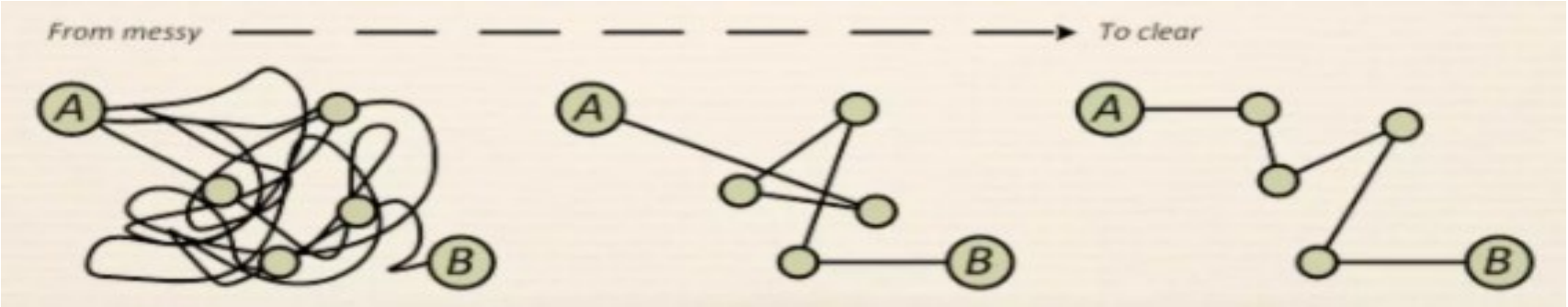
CLOUD-NATIVE APPLICATIONS

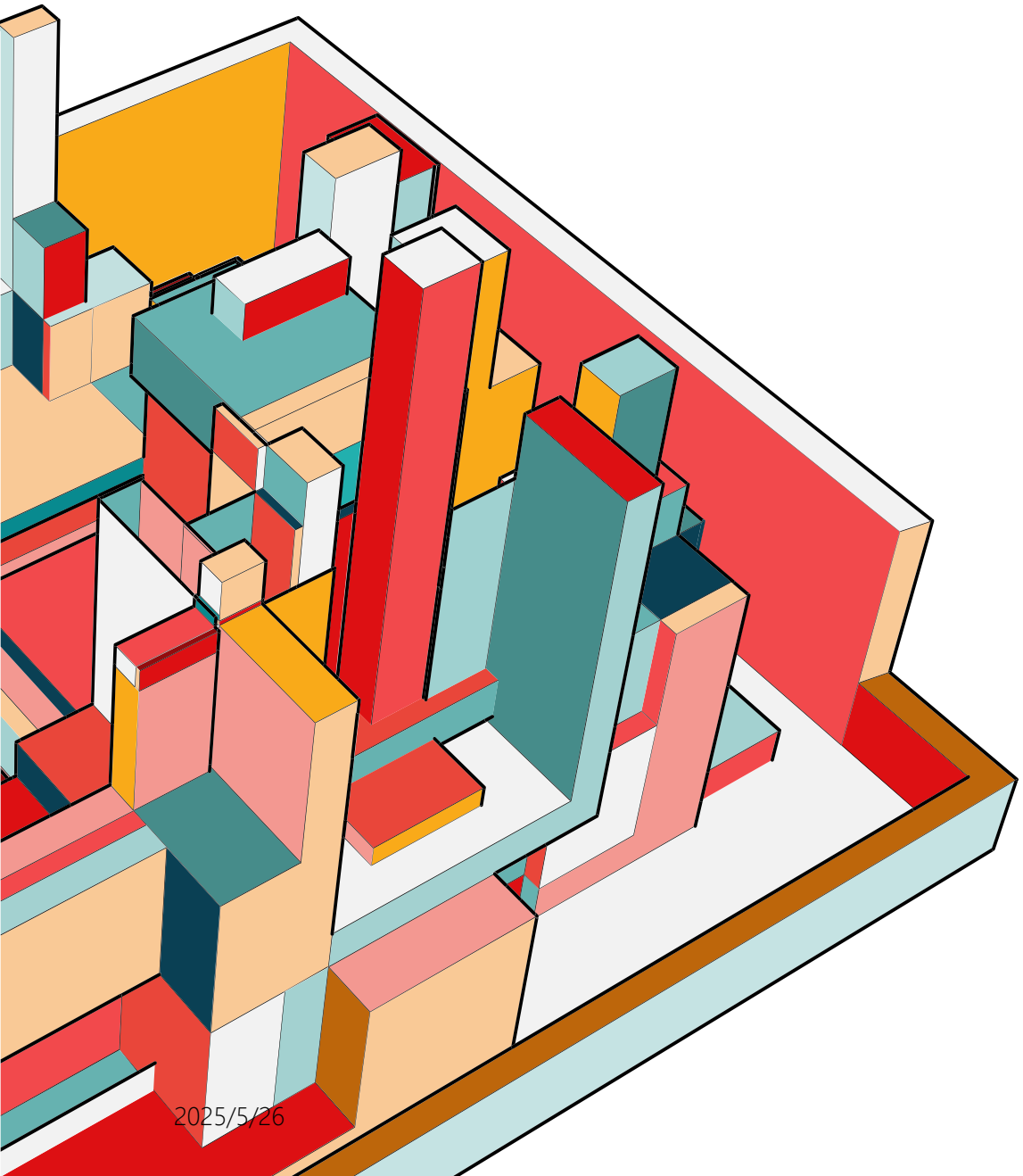
- Infrastructures
- Complexity with deploying at scale
- Deployment patterns
- Docker basics
- Kubernetes basics



SOFTWARE EVOLUTION AND MAINTENANCE

- Software maintenance
  - Metrics & technical debt
  - Code smells & Refactoring
  - Rearchitecting
- Software evolution
  - Legacy systems
  - Modernization
  - Deprecation





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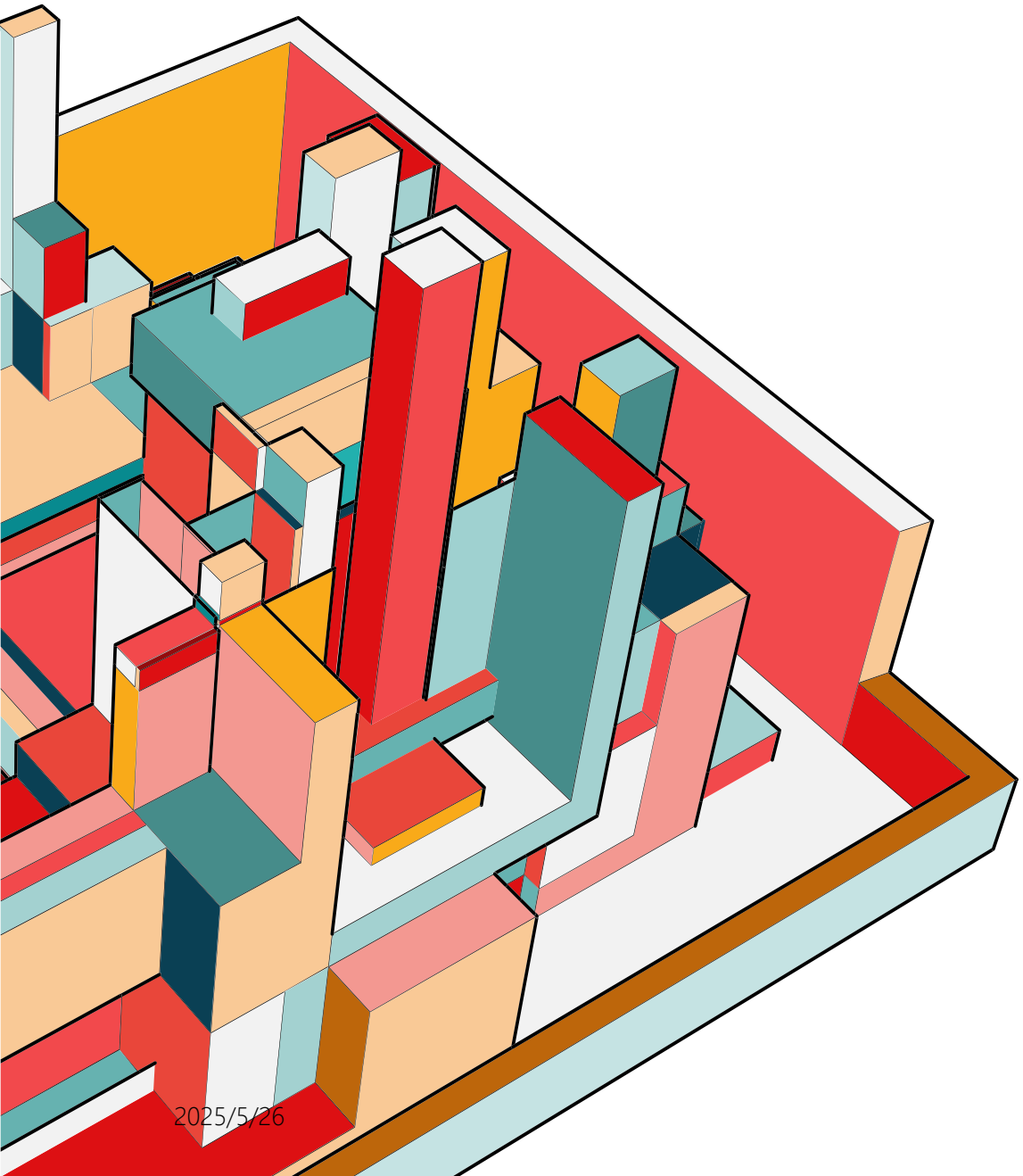
FINAL EXAM

- Closed-book
  (NO cheating paper)
- Weight: 30%
- Scope: Everything from lectures and labs



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FINAL EXAM

- Question types: multiple choices, true or false, fill in the blank, short answers.
- Read the slides
- Review quiz questions (available on BB)

COURSE EVALUATION

1. 网页端：登录教务系统：https://tis.sustech.edu.cn/ -业务办理-评教任务-2025春季学期学生评价任务。系统按课程类型设置评价任务（理论类、实验实践类、体育类、艺术类），如页面上有多个评价任务，请逐一进入并提交评价。

2. 微信端：通过微信进入“南方科技大学”微信企业号--教学质量管理平台，在“我的任务-待评”中填写并提交本学期所选课程的所有听课评价。

操作指南请扫描下方二维码获取：

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THANK YOU!