CSSE 372 Software Project Management:
Software Process Standards and Guests

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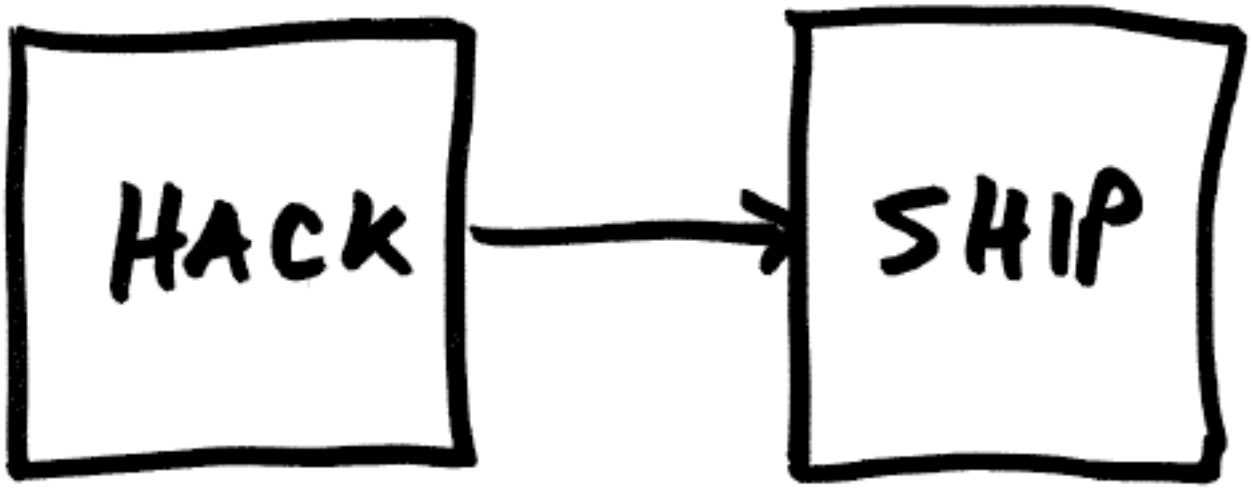
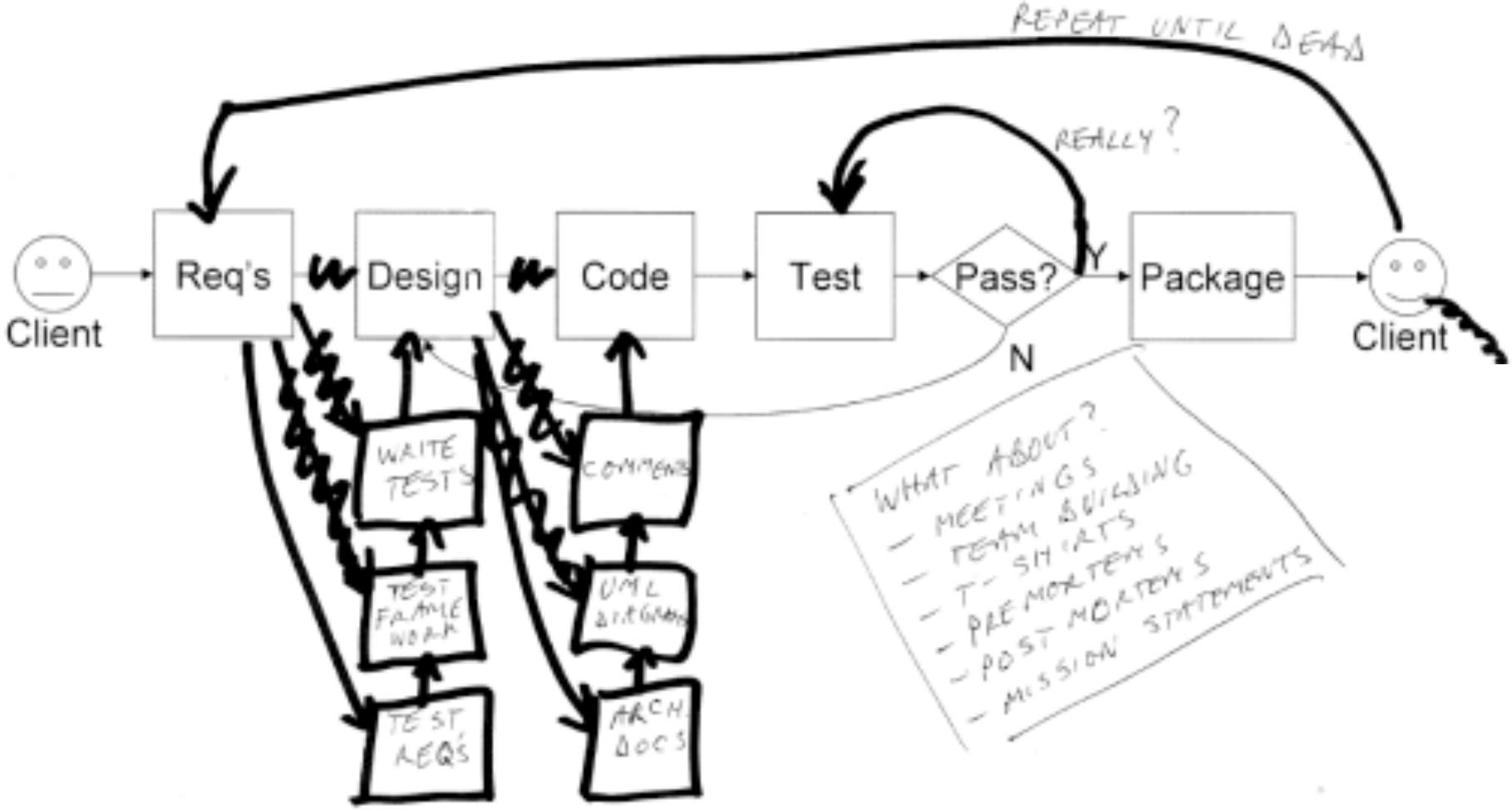
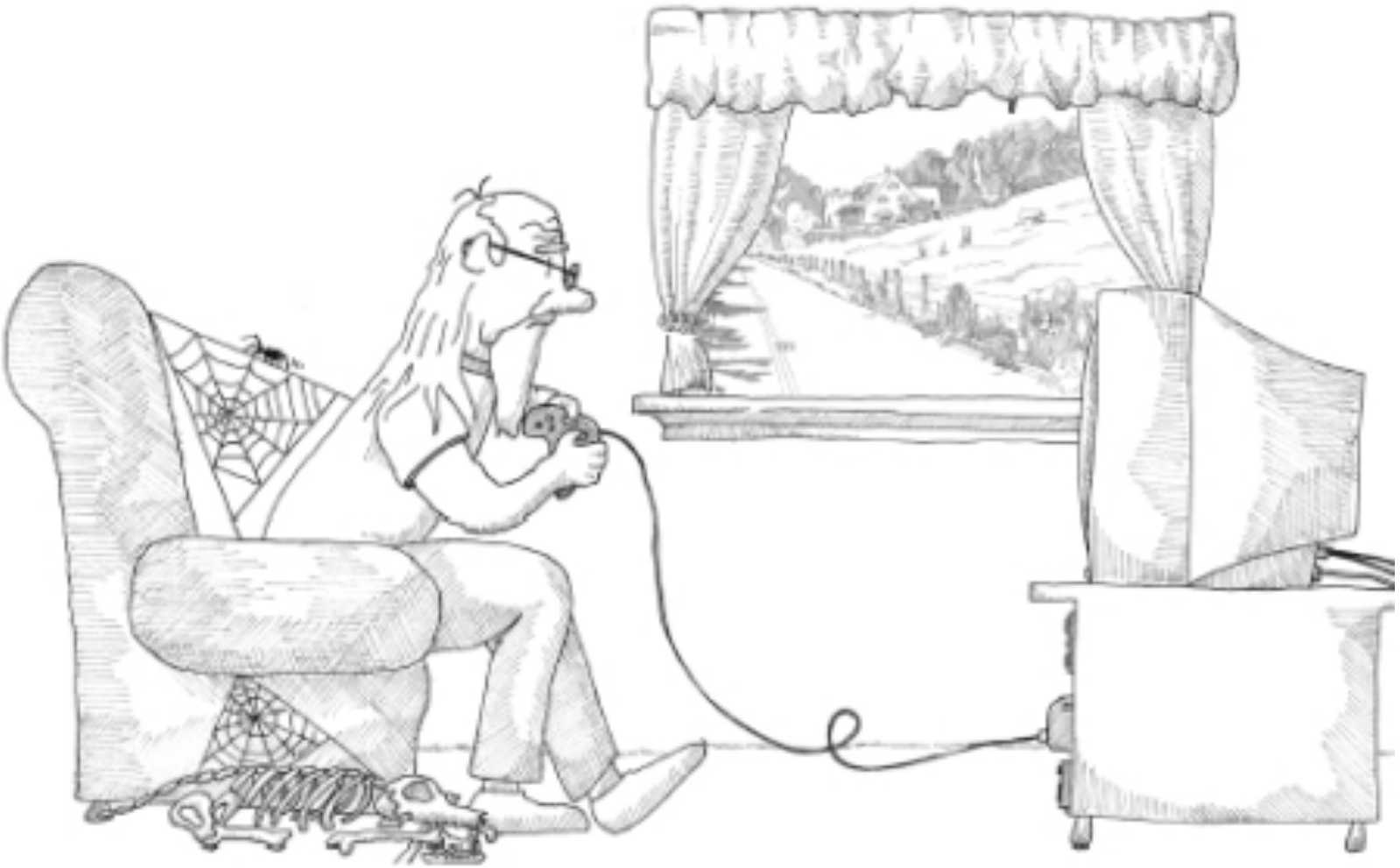
Evolution of Software Process: The Early Days



Evolution of Software Process: Tailored Waterfall…

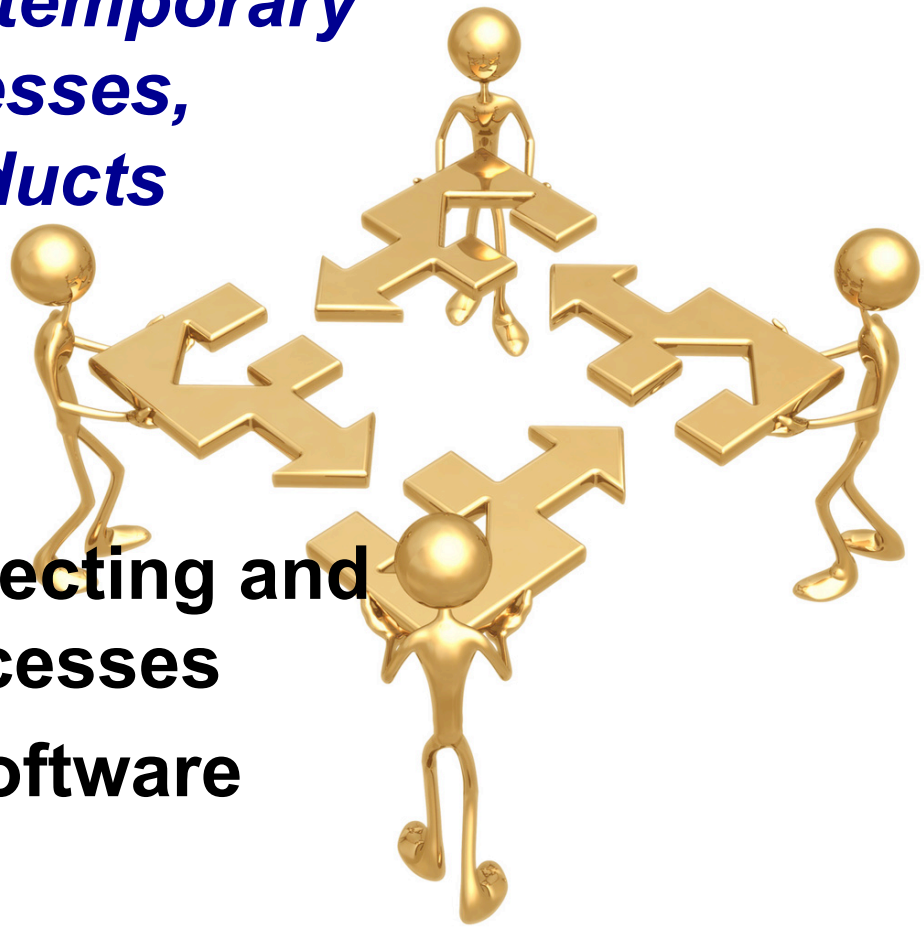


Evolution of Software Process: Game Development Process…



Learning Outcomes: Life Cycle

Explain and employ contemporary software life cycle processes, activities, and work products



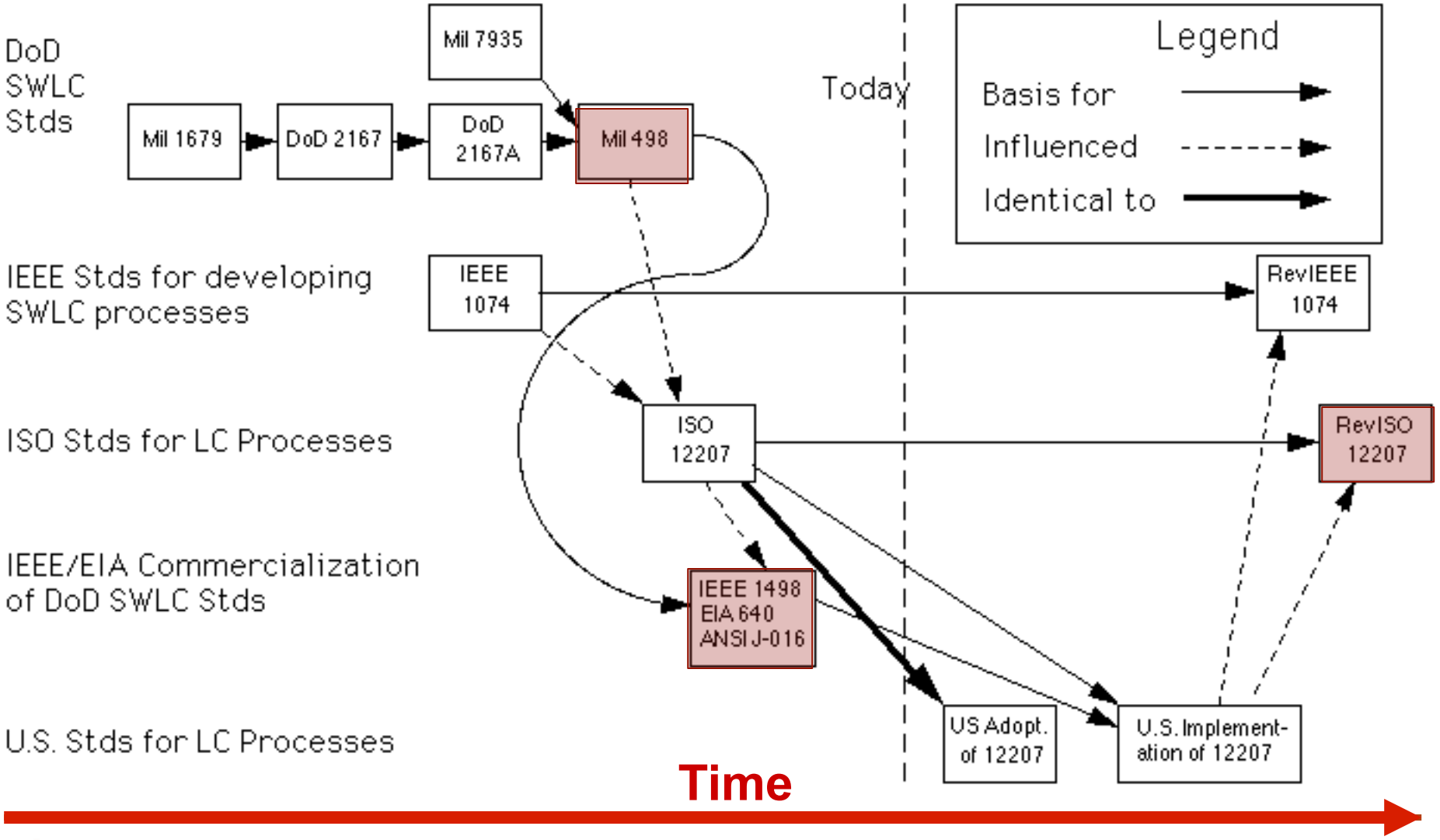
- **Examine software life cycle standards**
- **Outline context for selecting and tailoring software processes**
- **Discuss Cleanroom Software Engineering**

Software Process Standards 1/2

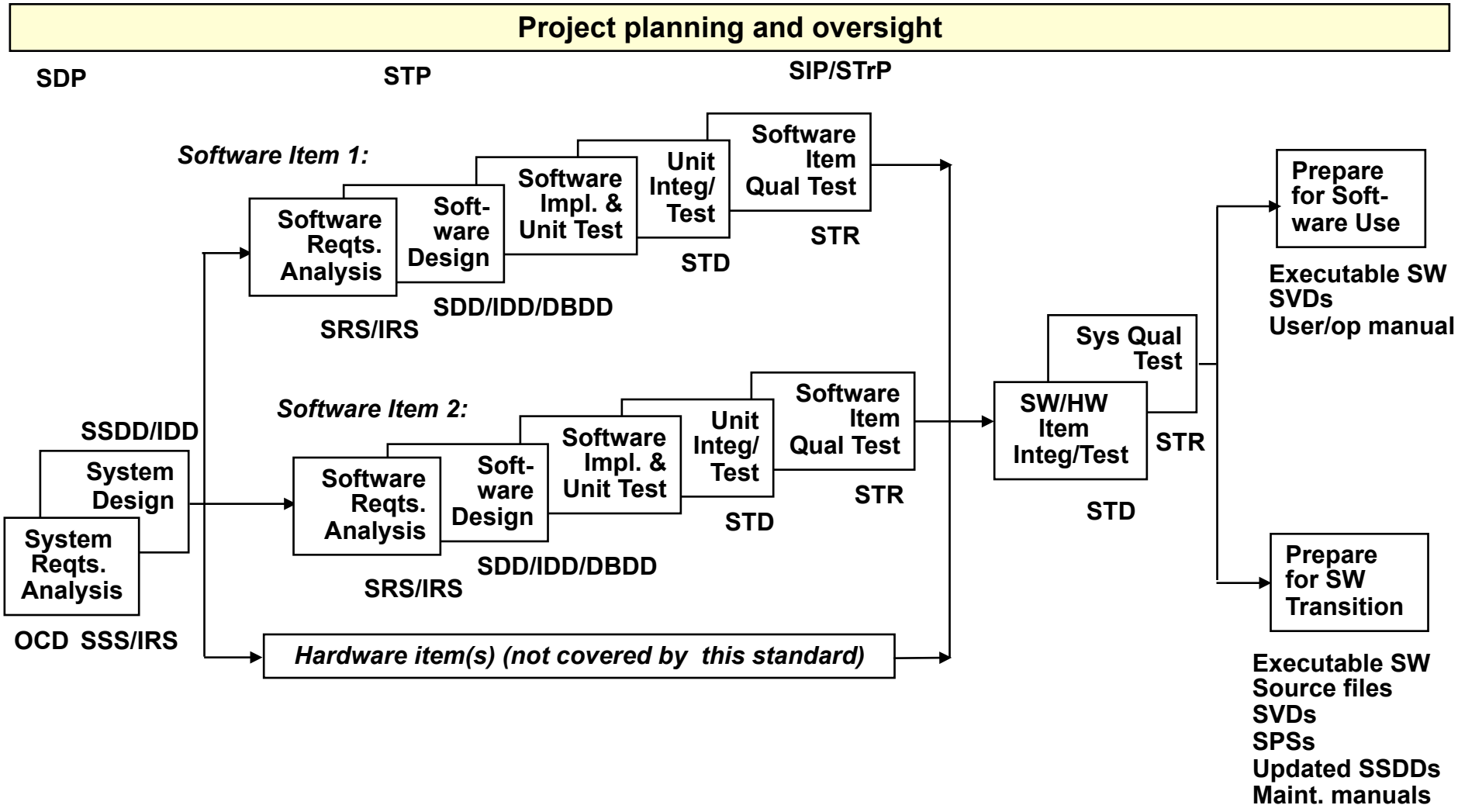
- The wonderful thing about standards is that there are so many to choose from… ☺
- Standards save time and money
  - When leveraged correctly, they simplify the process & management of a software project
- Reasonable starting point
  - Remember to tailor it for your situation…
- Examples:
  - ISO 12207 Software Life Cycle Standard
  - MIL-STD-498/IEEE 1498 – Software Development Life Cycle
  - IEEE Software Related standards
    - http://standards.ieee.org/reading/ieee/std_public/description/se/

Software Process Standards 2/2

Evolution of Software Process Standards



Sample IEEE 1498/MIL-STD-498 Life Cycle



Acronym City...

Planning

- Software Development Plan (SDP)
- Software Test Plan (STP)
- Software Installation Plan (SIP)
- Software Transition Plan STrP)

Concept and Requirements

- Operational Concept Descr. (OCD)
- System/Subsystem Spec. (SSS)
- Interface Requirements Spec. (IRS)
- Software Requirements Spec. (SRS)

Design

- System/Subsys. Design Descr. (SSDD)
- Interface Design Description (IDD)
- Database Design Description (DBDD)
- Software Design Description (SDD)

Qualification Testing

- Software Test Description (STD)
- Software Test Report (STR)

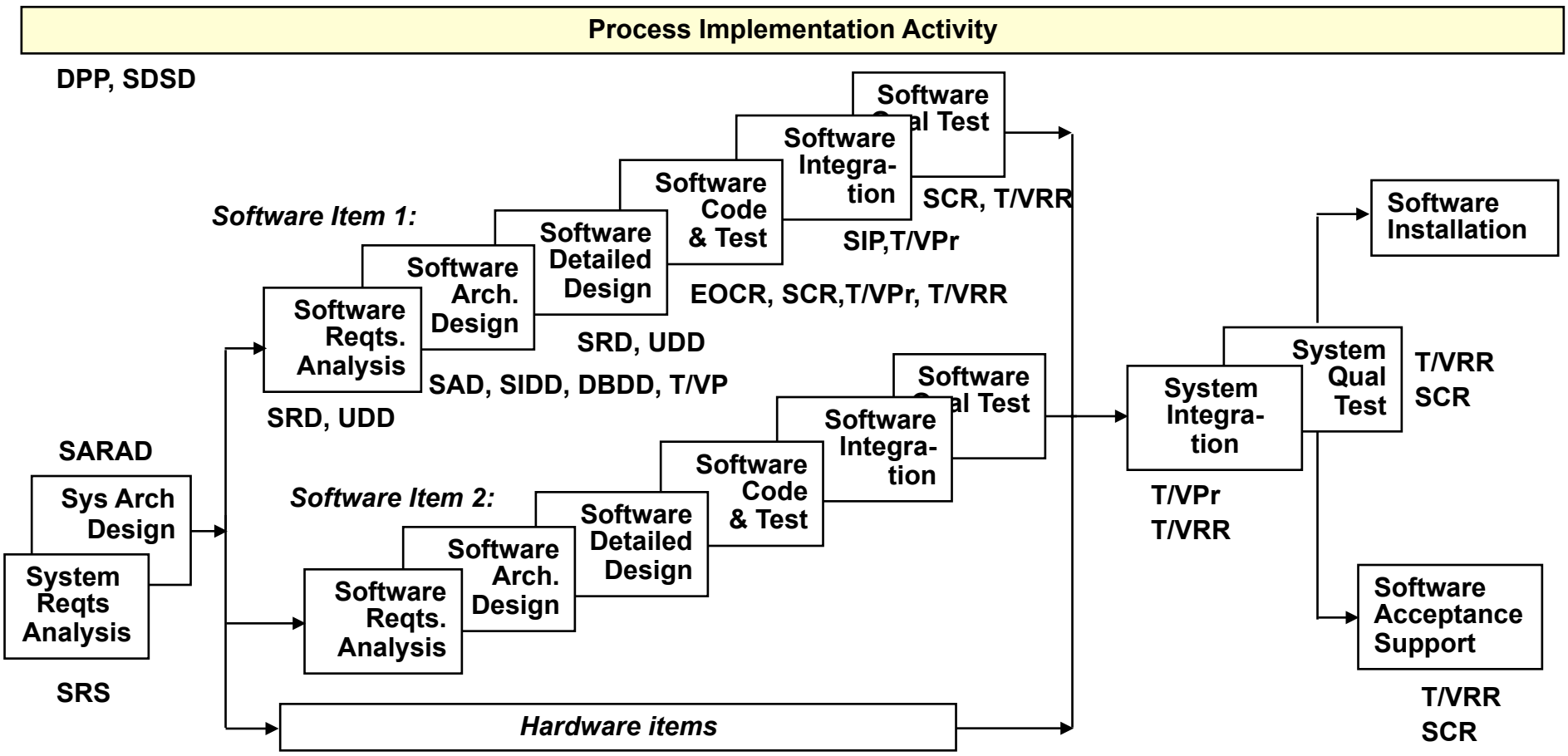
Maintenance

- Software Product Specification (SPS)
- Software Version Description (SVD)
- Computer Programming Manual (CPM)
- Firmware Support Manual (FSM)

User/Operator

- Software User Manual (SUM)
- Software Input/Output Manual (SIOM)
- Software Center Operator Manual (SCOM)
- Computer Operation Manual (COM)

Sample ISO 12207 Development Process



ISO 12207: Tailoring Considerations

- Life cycle activity: Prototyping, maintenance
- Software characteristics:
  Reuse, embedded firmware
- Organizational policies:
  Languages, hardware culture
- Acquisition strategy:
  Contract type, involvement
- Life cycle strategy:
  Waterfall, Evolutionary, Spiral, etc.

ISO 12207: Tailoring Process (12207.0 Annex A)

1. Identify project environment
   - Strategy, activity, requirements
2. Solicit inputs from users, support team, potential bidders
3. Select processes, activities, documentation, and responsibilities
4. Document tailoring decisions and rationale

I wonder… is this me?

I'm speeding because I don't want to forget where I'm going!

Cleanroom Software Engineering: A Precursor to Agile?

- Developed in the 1980's to address software quality – Zero Defect Software
  - Harlan Mills, Alan Hevner, and Richard Linger
- Cleanroom involves integrated use of:
  - Software engineering modeling
  - Program verification
  - Statistical software quality assurance

Cleanroom is a Shift in Practice

From

- ☐ Individual craftsmanship
- ☐ Sequential development
- ☐ Individual unit testing
- ☐ Informal coverage testing
- ☐ Unknown reliability
- ☐ Informal design

To

- ☑ Peer reviewed engineering
- ☑ Incremental development
- ☑ Team correctness verification
- ☑ Statistical usage testing
- ☑ Measured reliability
- ☑ Disciplined engineering specification and design

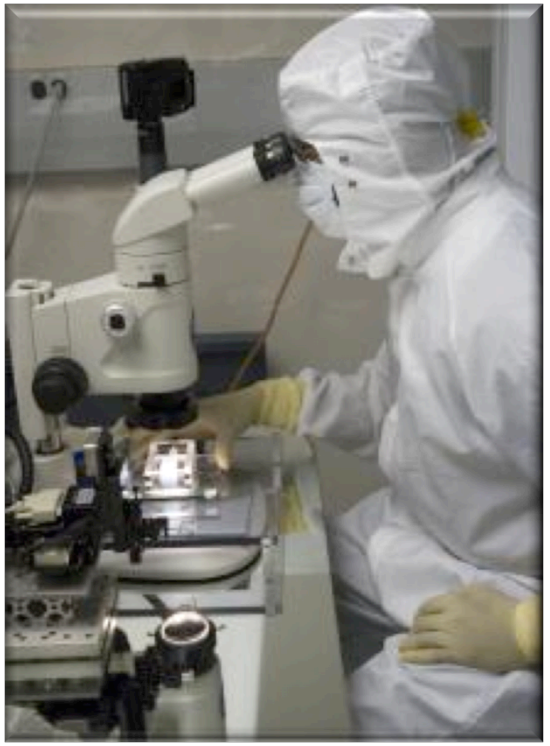
Focuses on defect avoidance rather than defect removal

Cleanroom Principles

- Small teams
  - Independent specification, development, and certification sub-teams
- Incremental development under statistical quality control
  - Performance assessed during each increment
  - Feedback is used for process improvement

Cleanroom Process Teams

- Specification team
  - Develops and maintains the system specification
- Development team
  - Develops and verifies software
  - Software is not compiled or executes during verification
- Certification team
  - Develops set of statistical tests to exercise software after development
  - Reliability growth models used to assess reliability



Likes Them Numbers Crunchy!

- Software development based on mathematical principles
  - Box principle used for specification & design
  - Formal verification used to confirm correctness of implementation of specification
  - Program correctness is verified by team reviews using questionnaires
- Testing based on statistical principles
  - Operational usage profiles needed
  - Test cases randomly generated from usage model
  - Failure data is interpreted using statistical models

Homework and Reading Reminders

- Complete Homework 2 – Play SimSE Game and report results according to assignment
  - Due by 5pm, Tuesday, September 18th, 2012
- Get a Head Start on COCOMO
  - Look over COCOMO-II User Manual and Model Manual
  - Download COCOMO-II Software (from Angel) or get Evaluation Copy of Costar