SOFTWARE ENGINEERING
TEST
REQUIREMENTS ELICITATION

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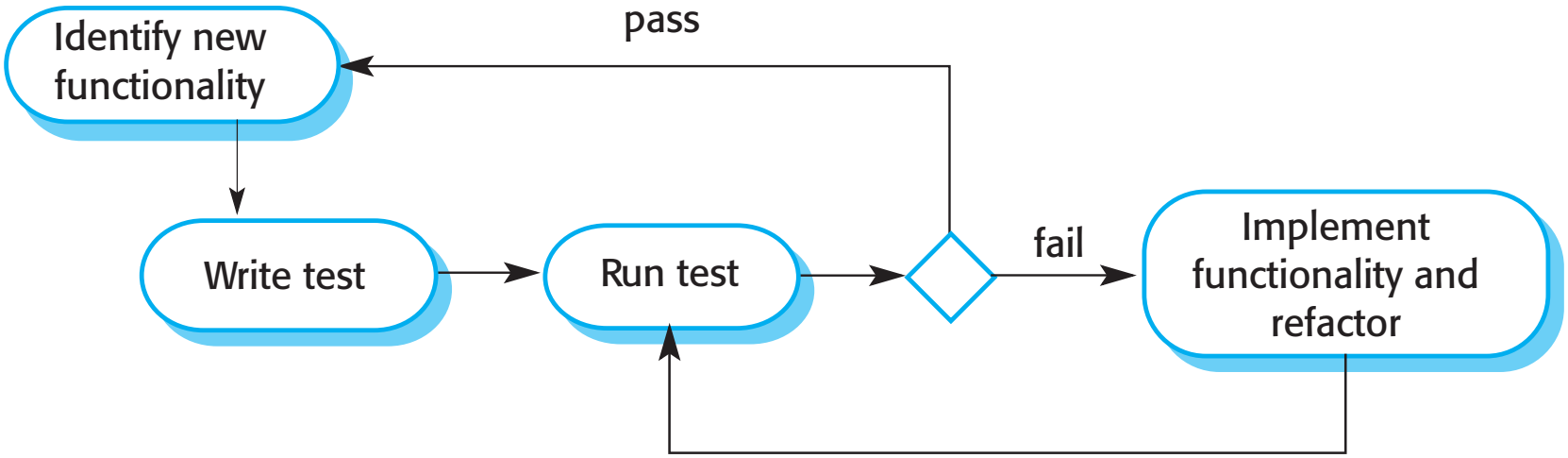
TESTING PROCESSES

Test-driven development

- Test-driven development (TDD) is an approach to program development in which you inter-leave testing and code development.
- Tests are written before code and ‘passing’ the tests is the critical driver of development.
- You develop code incrementally, along with a test for that increment. You don’t move on to the next increment until the code that you have developed passes its test.
- TDD was introduced as part of agile methods such as Extreme Programming. However, it can also be used in plan-driven development processes.

Test-driven development



TDD process activities

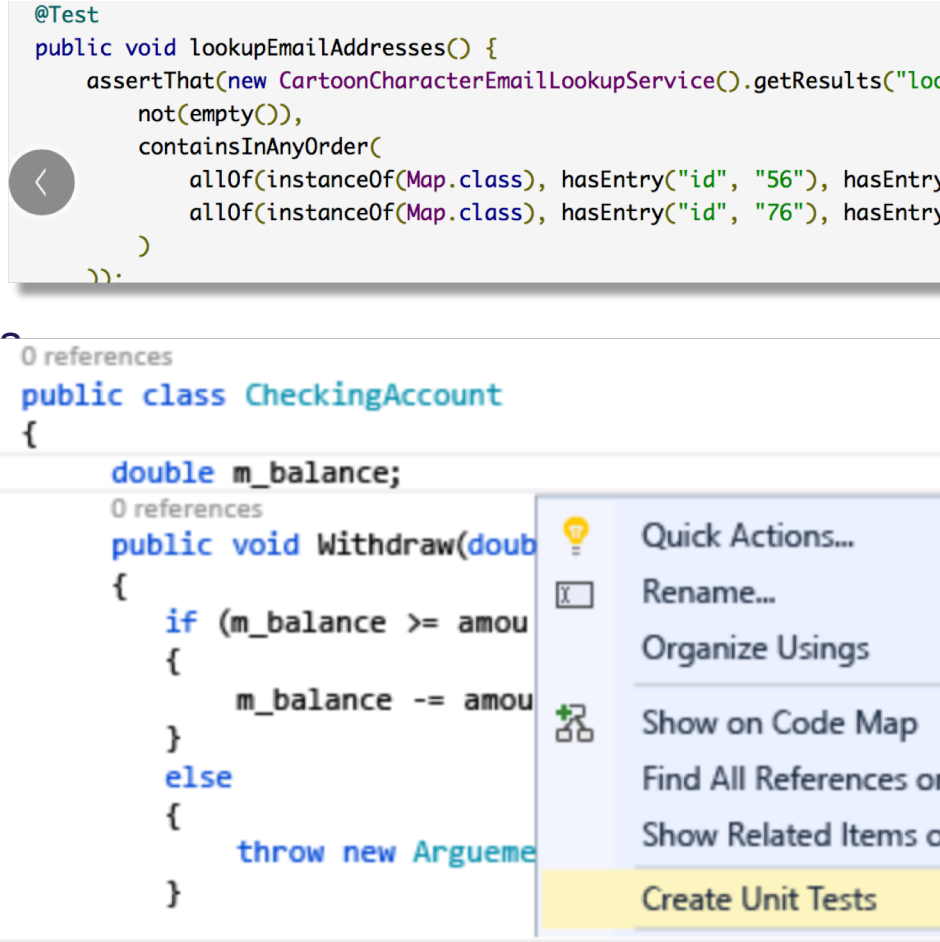
- Start by identifying the increment of functionality that is required. This should normally be small and implementable in a few lines of code.
- Write a test for this functionality and implement this as an automated test.
- Run the test, along with all other tests that have been implemented. Initially, you have not implemented the functionality so the new test will fail.
- Implement the functionality and re-run the test.
- Once all tests run successfully, you move on to implementing the next chunk of functionality.

Benefits of test-driven development

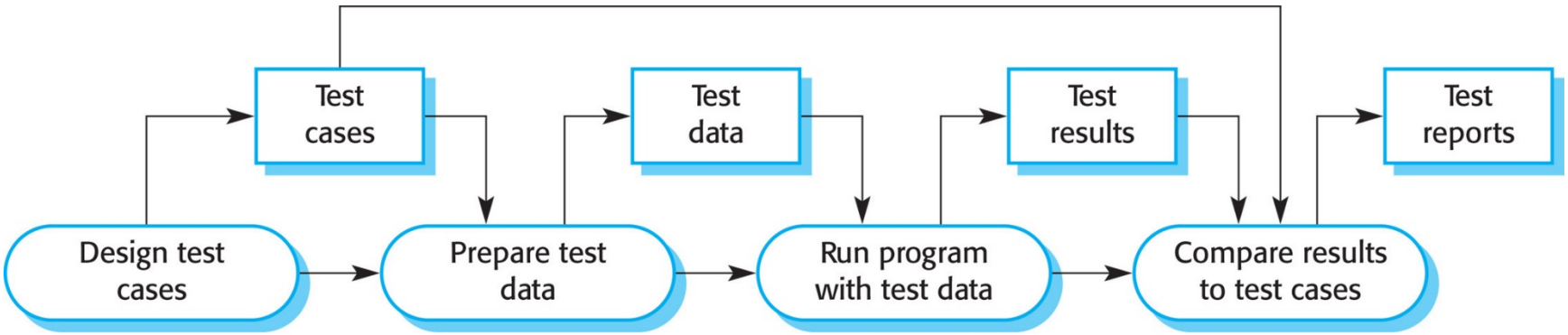
- Code coverage
  - Every code segment that you write has at least one associated test so all code written has at least one test.
- Regression testing
  - A regression test suite is developed incrementally as a program is developed.
- Simplified debugging
  - When a test fails, it should be obvious where the problem lies. The newly written code needs to be checked and modified.
- System documentation
  - The tests themselves are a form of documentation that describe what the code should be doing.

Regression testing, requires frameworks

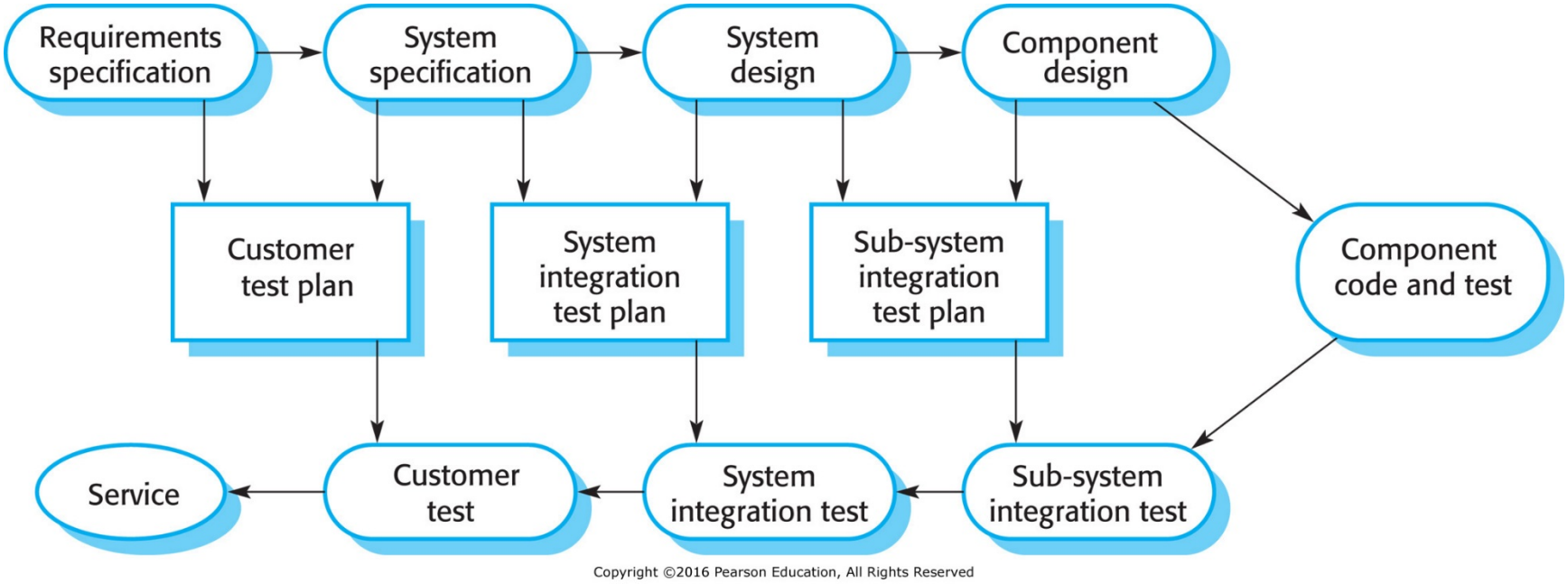
- Regression testing is testing the system to check that changes have not ‘broken’ previously working code.
- In a manual testing process, regression testing is expensive but, with automated regression testing, it is simple and straightforward. All tests are rerun every time a change is made to the program.



Plan-Driven Testing

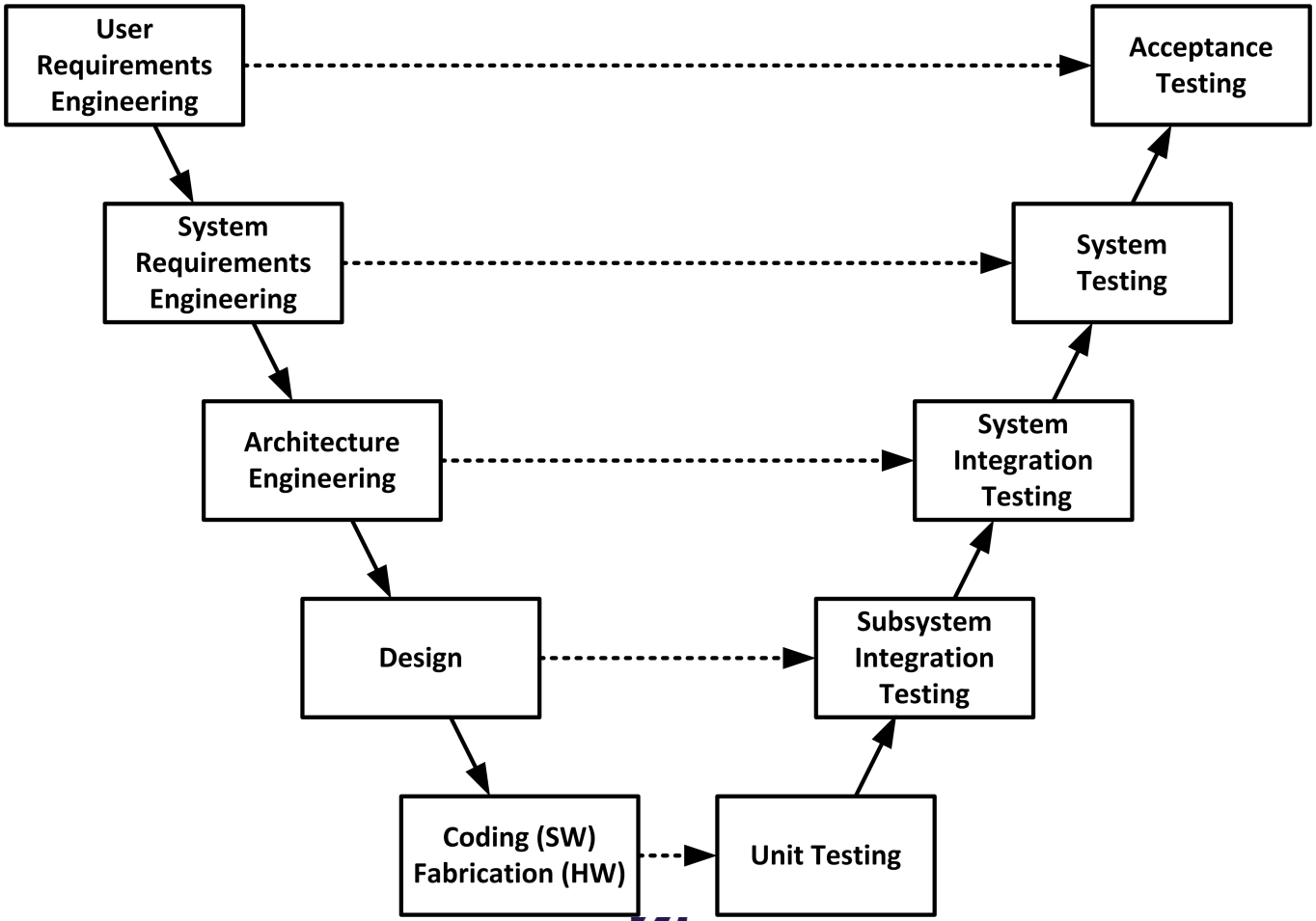


Plan-Driven: V Model



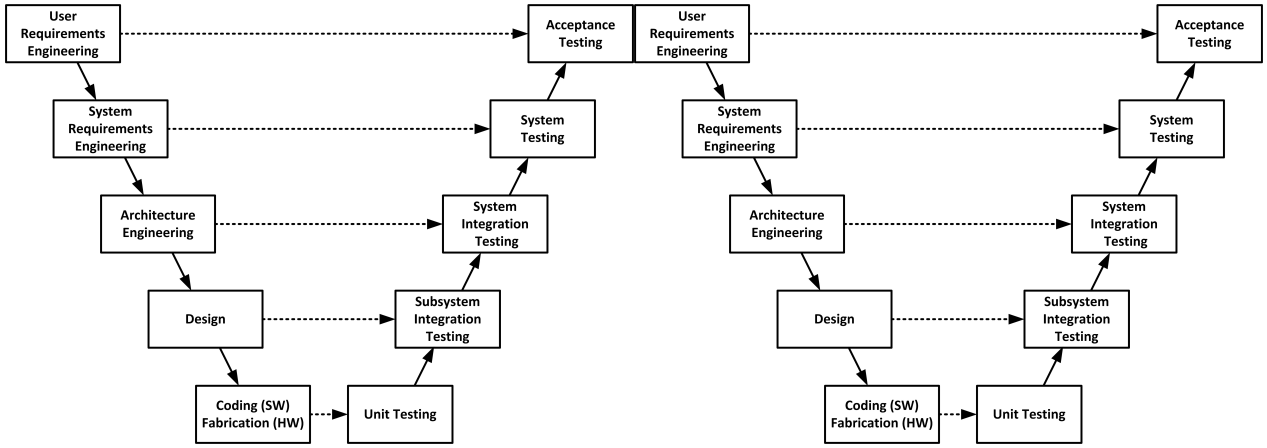
Source:
Sommerville, ch. 2

Plan-Driven: V Model



Source:
Software Engineering Institute

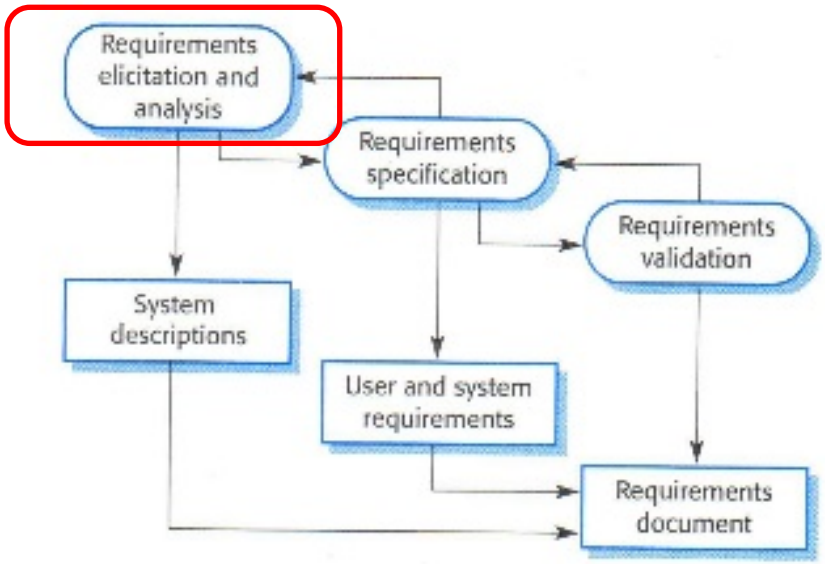
Agile: W Model



REQUIREMENTS ELICITATION

Requirements Elicitation

- From Lecture 1: Elicitation is part of Requirements Engineering

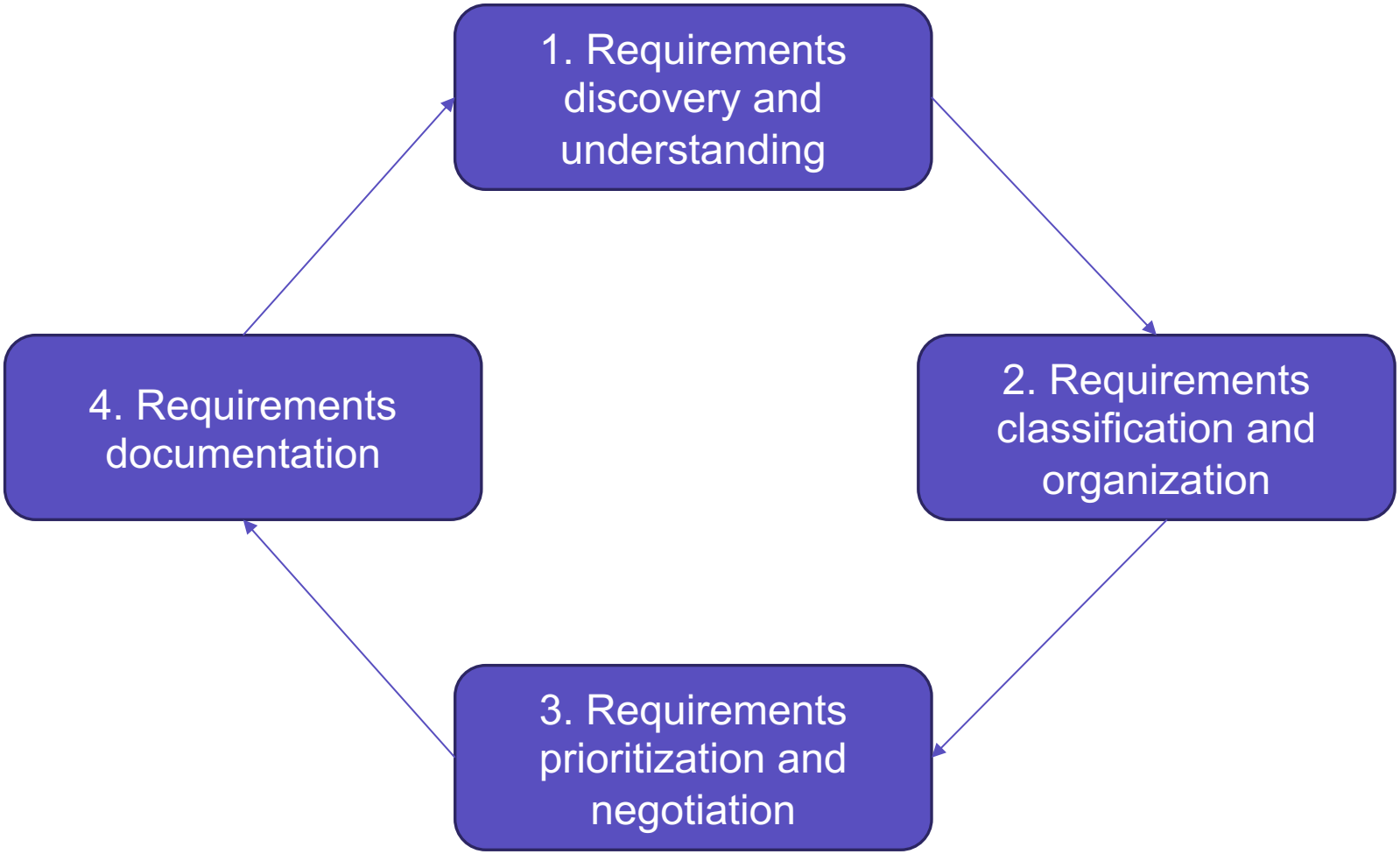


Requirements Elicitation

Requirements Elicitation is difficult because:

- Stakeholders don’t know what they want
- Stakeholders use own language and implicit knowledge
- Different stakeholders with diverse or conflicting requirements
- Political factors
- Economic and business environment is dynamic

Requirement Elicitation and analysis process

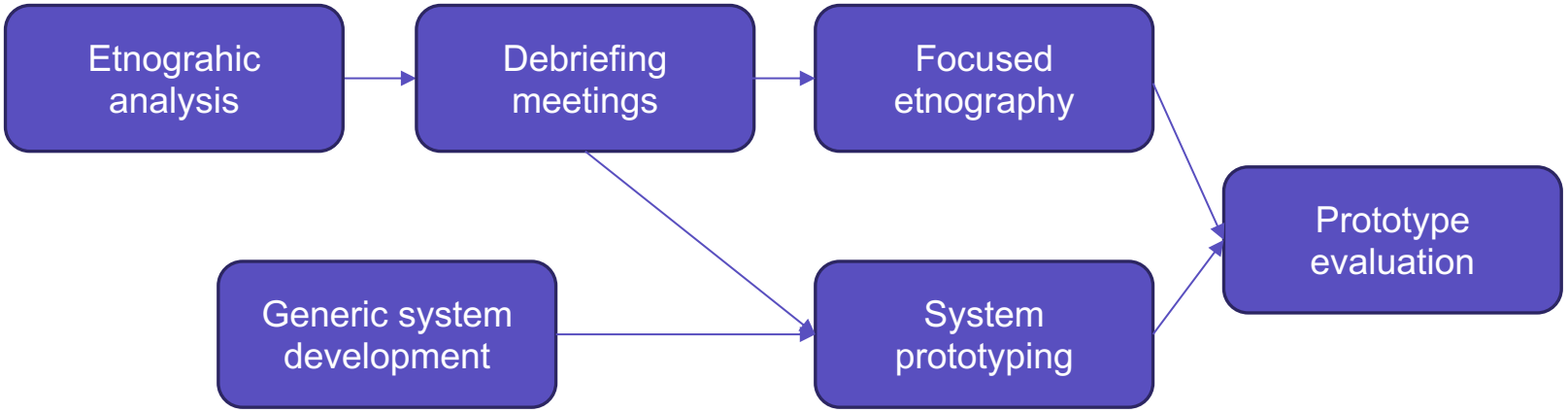


Requirements Elicitation Techniques

- Interview – Talk to people about what they do
  - Closed interviews with predefined questions
  - Open interviews with no predefined agenda

- Observation or Ethnography – watch people do their job. Good at:
  - Observing how the work is actually performed
  - Requirements derived from cooperation and awareness of other people
  - Understand existing systems

Etnography and prototyping for requirements analysis



Etnography is not effective for discovering broader organizational or domain requirements or for suggesting innovation

Stories and scenarios

- How the system can be used for a specific task
- A scenario may include:
  - What the system and users expect when the scenario starts
  - Normal flow of evengs in the scenario
  - What can go wrong and how resulting problems are handled
  - Information about other activities at the same time
  - System state when when the scenario ends

People find it easier to relate to real-life examples than abstract descriptions