Software testing

Agile testing

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Agile software development

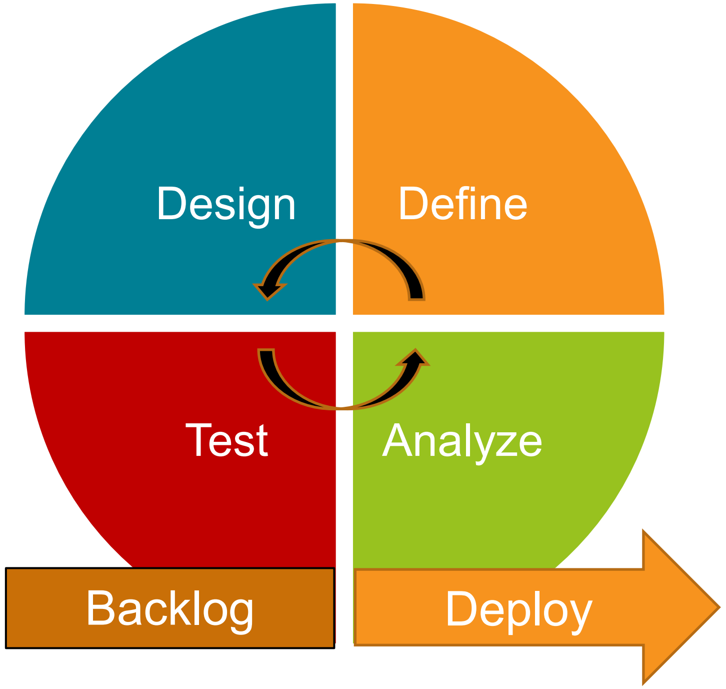
- Agile development is an umbrella term, encompassing many practises and techniques, such as Scrum, Kanban, XP and many others
- Agile development is focused on responding to change building right solution for the end users
- Work is done collaboratively (in iterations) integrating new features to the existing software
- Cross-functional and self-organizing development team

Four core values of Agile development

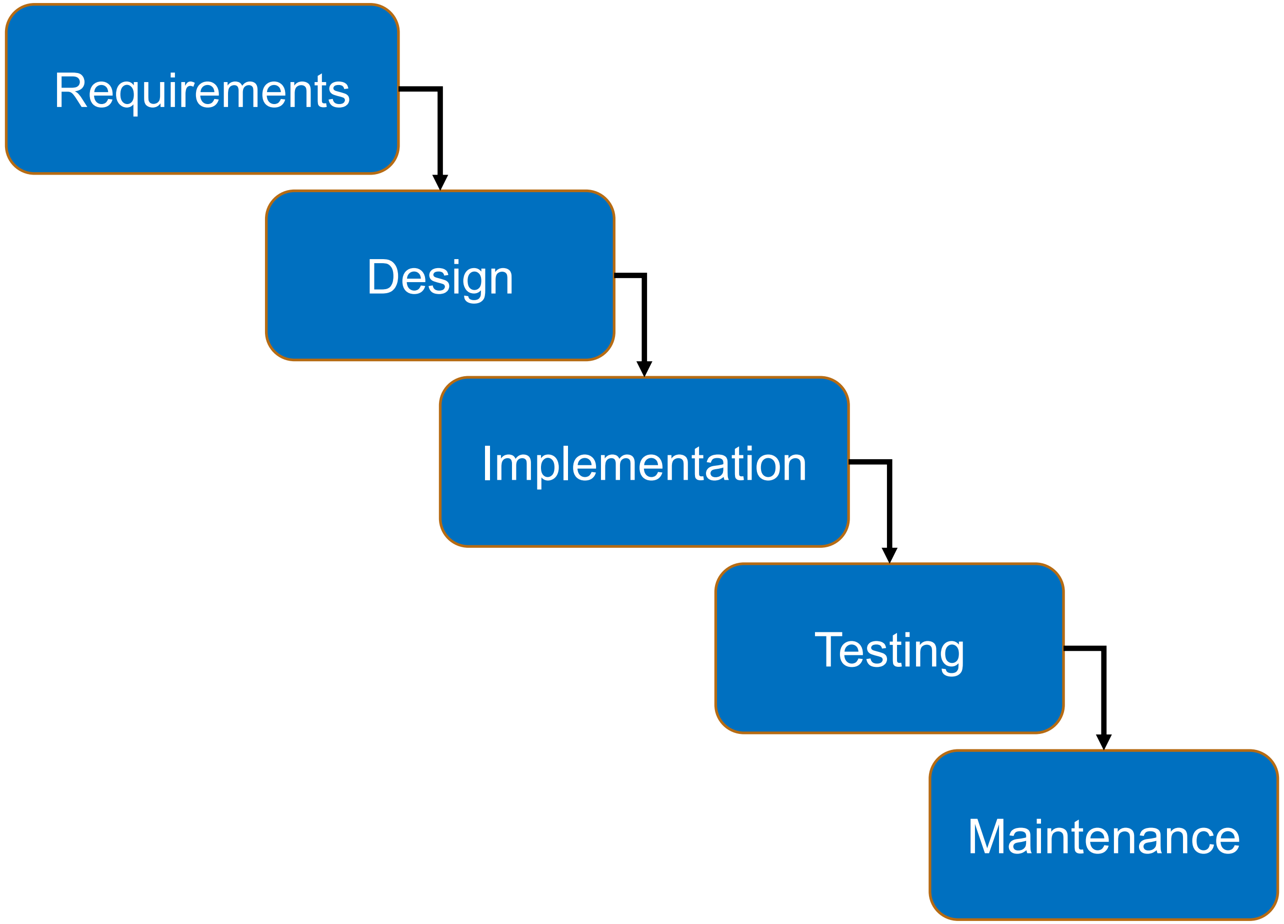
- Agile manifesto consists of four key values:
  - Individuals and interactions over processes and tools.
  - Working software over comprehensive documentation.
  - Customer collaboration over contract documentation.
  - Responding to the change over following a plan

Agile software development lifecycle

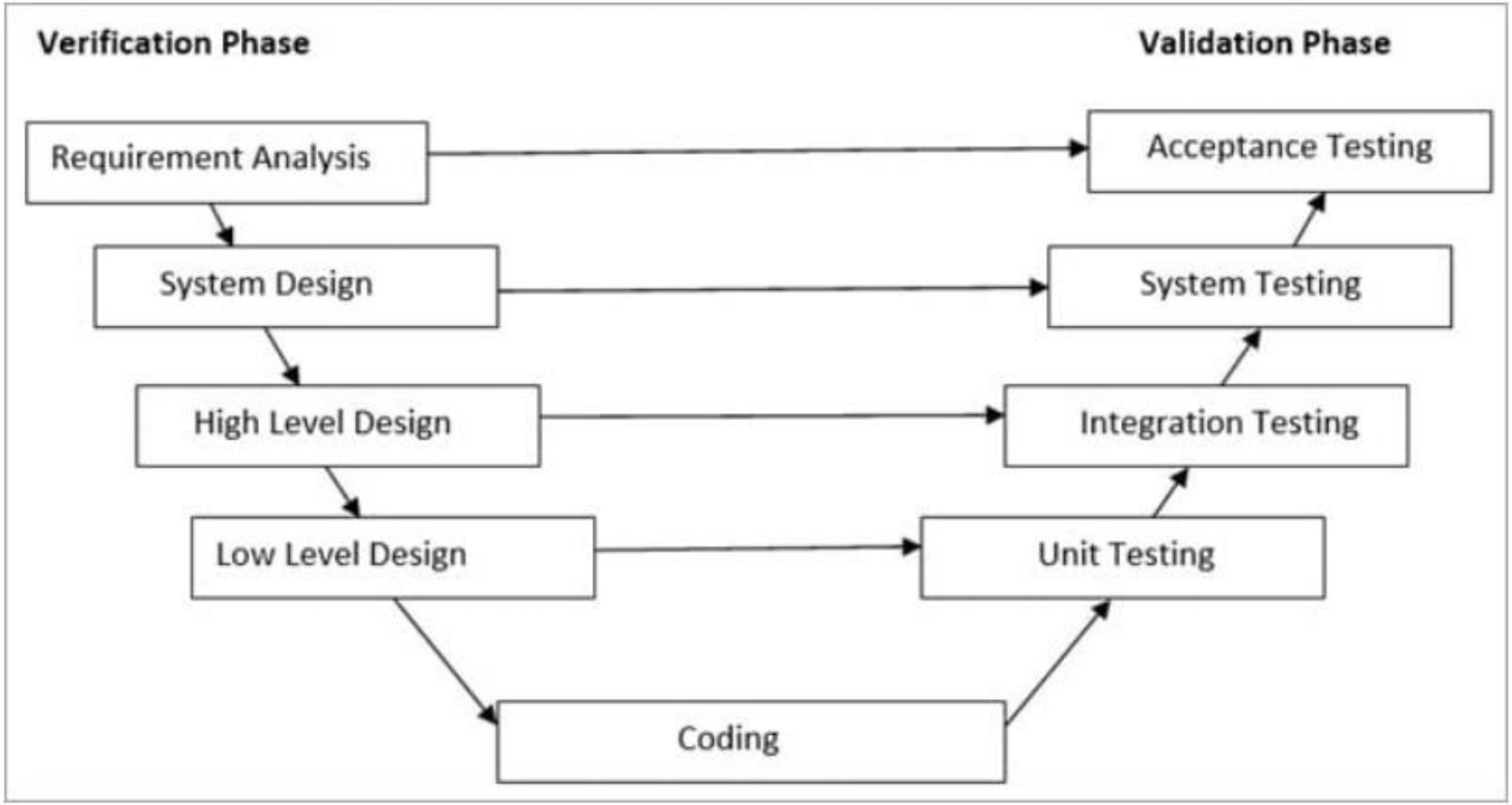
- DevOps is about streamlining and automating software delivery lifecycle using various tools
- Continuous Build
- Continuous Integration (CI)
- Continuous Delivery (CD)
- Continuous Deployment



Testing in waterfall model



V-model



Verification Phase

Validation Phase

Requirement Analysis

System Design

High Level Design

Low Level Design

Coding

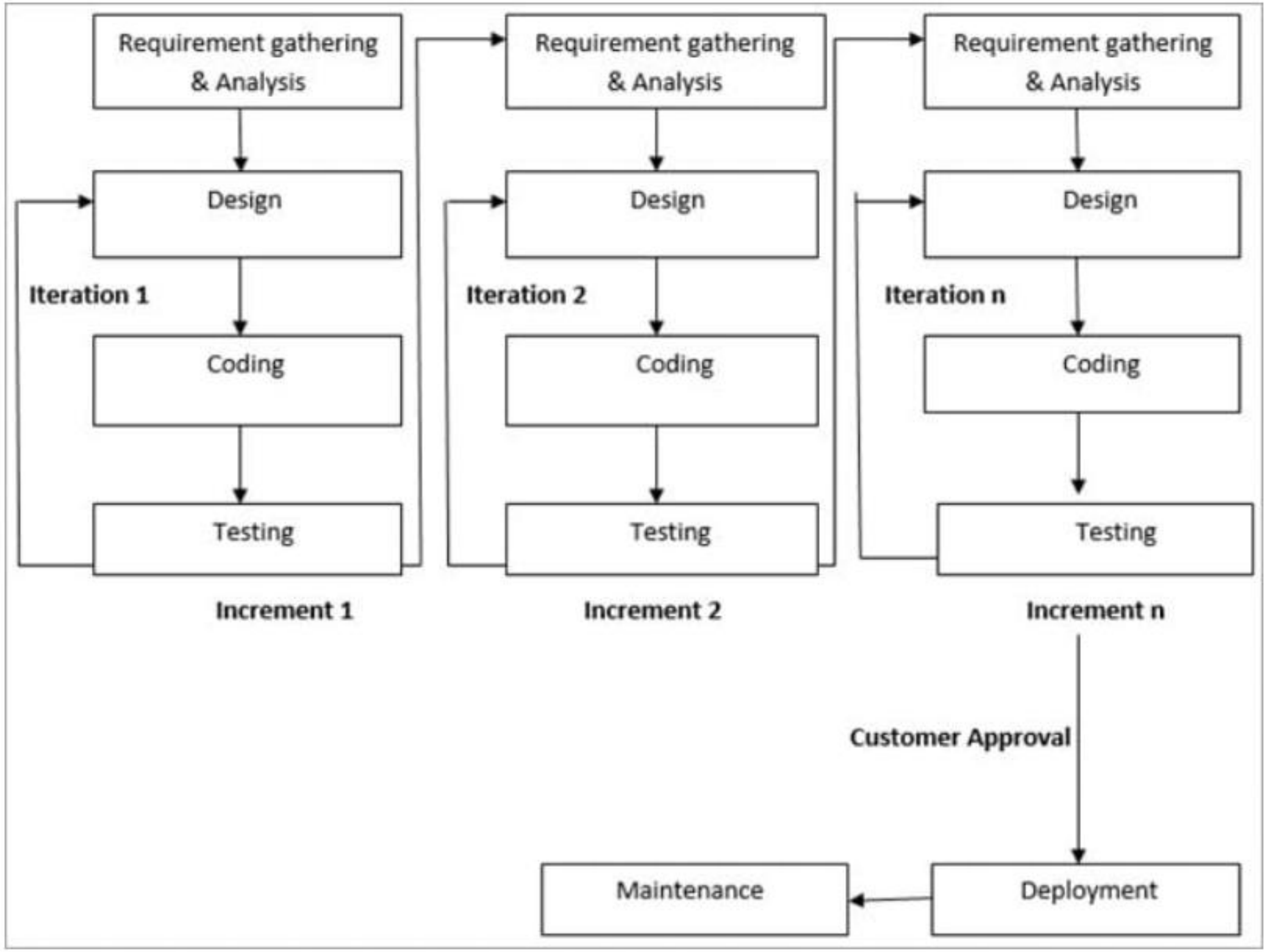
Unit Testing

Integration Testing

System Testing

Acceptance Testing

Testing in Agile



Agile testing

- Follows the rules and pricipley of agile software development
- Quality assurance (QA) has to be built-in into development process and nature of agile software development (e.g. fast, changing requirements) has to be taken into account to deliver business value for the customer
- Is not sequential and separate phase but **continuous** and **integral** part of software development
- Testing begins at the start (as early as possible) of the project
- Test-first approach might be followed in agile projects

Agile testing

- Discovering defects and bugs as early and as often as possible, this will also save costs, since it might be highly costly to fix errors in later stage of development (and after software is released)
- Ensure, that product can be released **continuously** without any (serious) problems
- Get **feedback** from users and testers, enable better communication and understanding of developed product or service
- **Cross-functional** agile team is responsible for testing and the success of the project, although team might include professional testers who are concentrated on that

Principles of Agile Testing 1/2

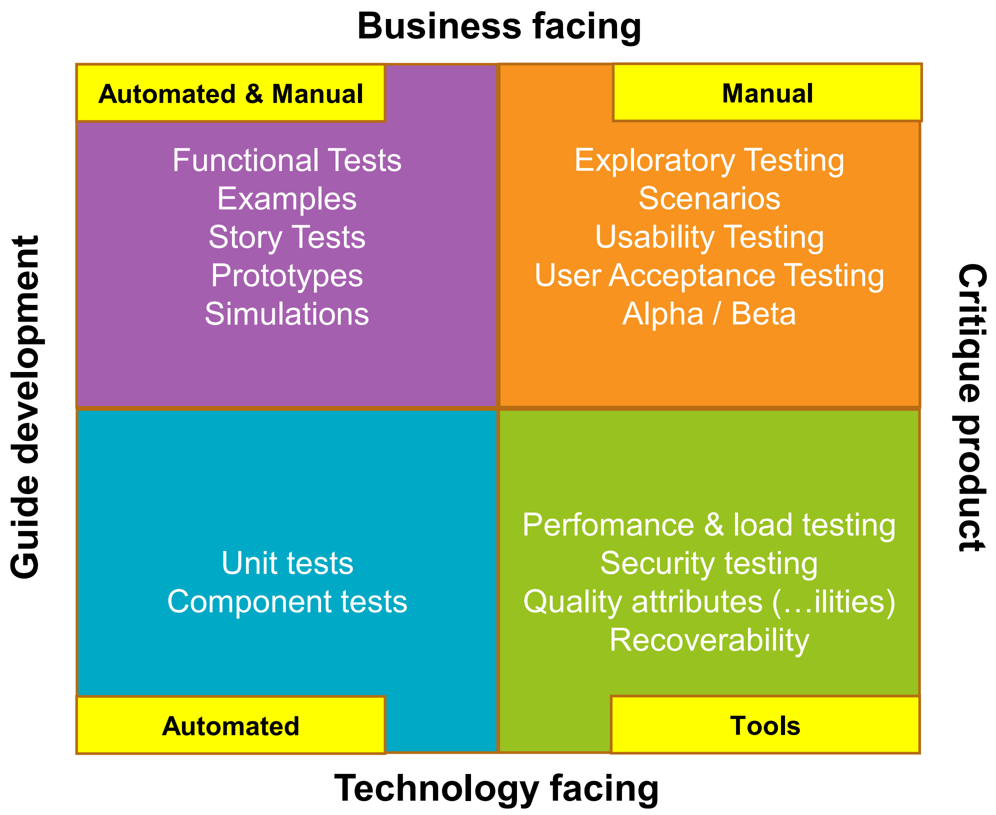
- Provide continous feedback
- Deliver value to the customer
- Enable face-to-face communication
- Have courage
- Keep it simple

Principles of Agile Testing 2/2

- Practice continuous improvement
- Respond to change
- Self-organize
- Focus on people
- Enjoy

Agile testing quadrants

- Developed by Crispin and Gregory based on Marick's agile testing matrix



Business facing

Automated & Manual

Functional Tests
Examples
Story Tests
Prototypes
Simulations

Manual

Exploratory Testing
Scenarios
Usability Testing
User Acceptance Testing
Alpha / Beta

Unit tests
Component tests

Automated

Perfomance & load testing
Security testing
Quality attributes (…ilities)
Recoverability

Tools

Guide development

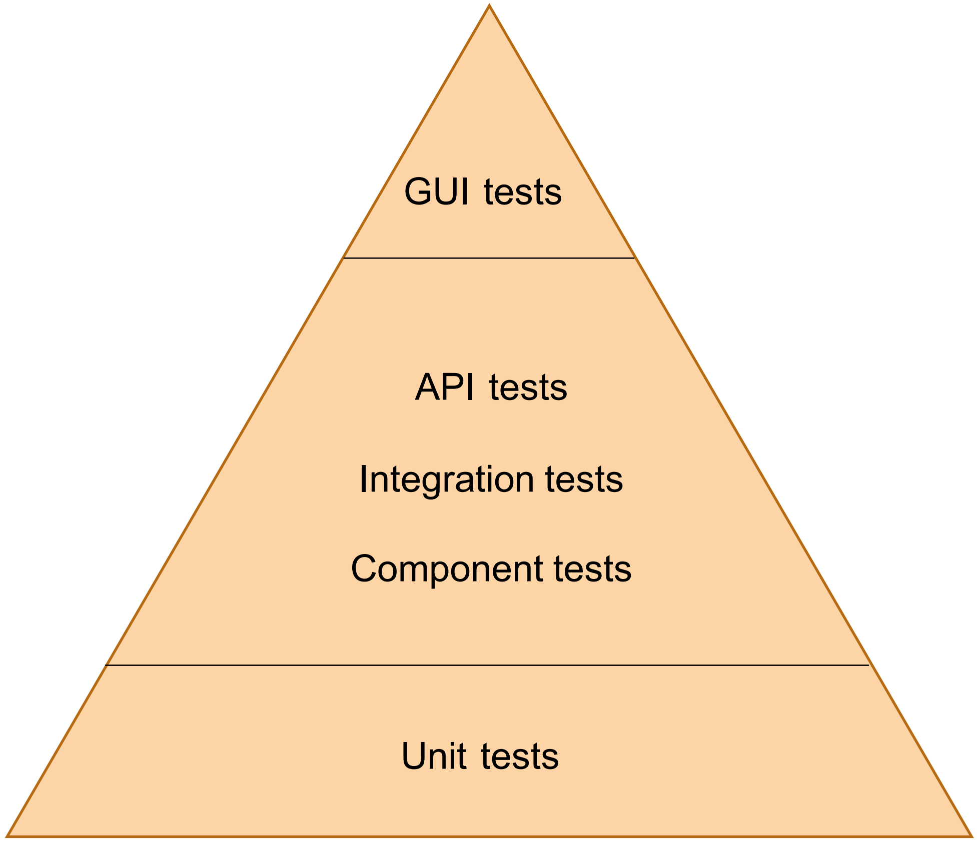
Critique product

Technology facing

Automated testing

- Using software tools to automate human-driven manual process of reviewing and validating product or service
- Test functionality, security, perfomance, …
- Examples:
  - Unit test
  - Component test
  - E2E test
  - …
- Can be implemented by coding (e.g. Jest, Cypress,…) or using specific tools (e.g. Selenium)

Test automation pyramid



Automated testing in agile project

- Automated testing can help to reduce the testing workload in agile project
- Since agile development is built for change, regression testing is required and automation helps to execute it
- Test automation allows agile teams to execute more tests in less time, increasing coverage and freeing human testers to do more high-level, exploratory testing
- Automation test scripts are reusable and can be used to execute more comprehensive testing with different data sets, environments, devices, etc.

Risks of automated testing

- Expensive (takes lot of resources) to built and maintain, slow to execute
- Quality of the automated testing is highly important, poor tests containing false positives create false confidence into the tested software
- Test should be executed regularly (tools might be used to automate this)
- Choosing right automation testing tool in important, some tests and tools might require a lot of maintaining
- Tests should be executed in regular bases
- …

Agile testing approches

- Outside in
  - Start testing from the high-lever (user perspective) and move inwards to unit tests
- Inside out
  - Start from unit tests moving upwards to higher level
- QA relies on verification and validation
  - Verification
    - Are we building product or a service right?
  - Validation
    - Are we building the right product or service?

Agile testing methods

- TDD
- BDD
- ATDD
- Exploratory testing
- …

Challenges with agile development and testing

- Chances for errors migh be high, since throughout documentation is not a prority
- Changes in requirements might be quite challenging from the testing point of view
- Development might be quite rapid and changes released often, less time for planning and executing testing, also emphazises importance of regression testing
- Testers might have other roles and responsibilities in agile team

Agile test planning

- Test plans are updated for every release (keep it short and clean)
- There might be various plans for development and release
- Other documentation, such as DoD, backlog (with user stories and acceptance criteria) are utilized in planning
- Contents for a agile test plan
  - Summary
  - Test scenarios
  - Risk analysis
  - Coverage
  - Exit criteria
  - …

Resources

- Smartbear. A Handy Guide to Using Agile Methodoly in Testing: Processes, Best Practices & Tools. https://smartbear.com/test-management/agile-testing-best-practices/
- Global App Testing. Introduction to Agile Methodology in Testing. https://www.globalapptesting.com/the-ultimate-guide-to-agile-testing
- Guru99. What is Agile Testing? Methodology, Process & Life Cycle. https://www.guru99.com/agile-testing-a-beginner-s-guide.html
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