Developer's Toolbox

How can we ensure quality software?
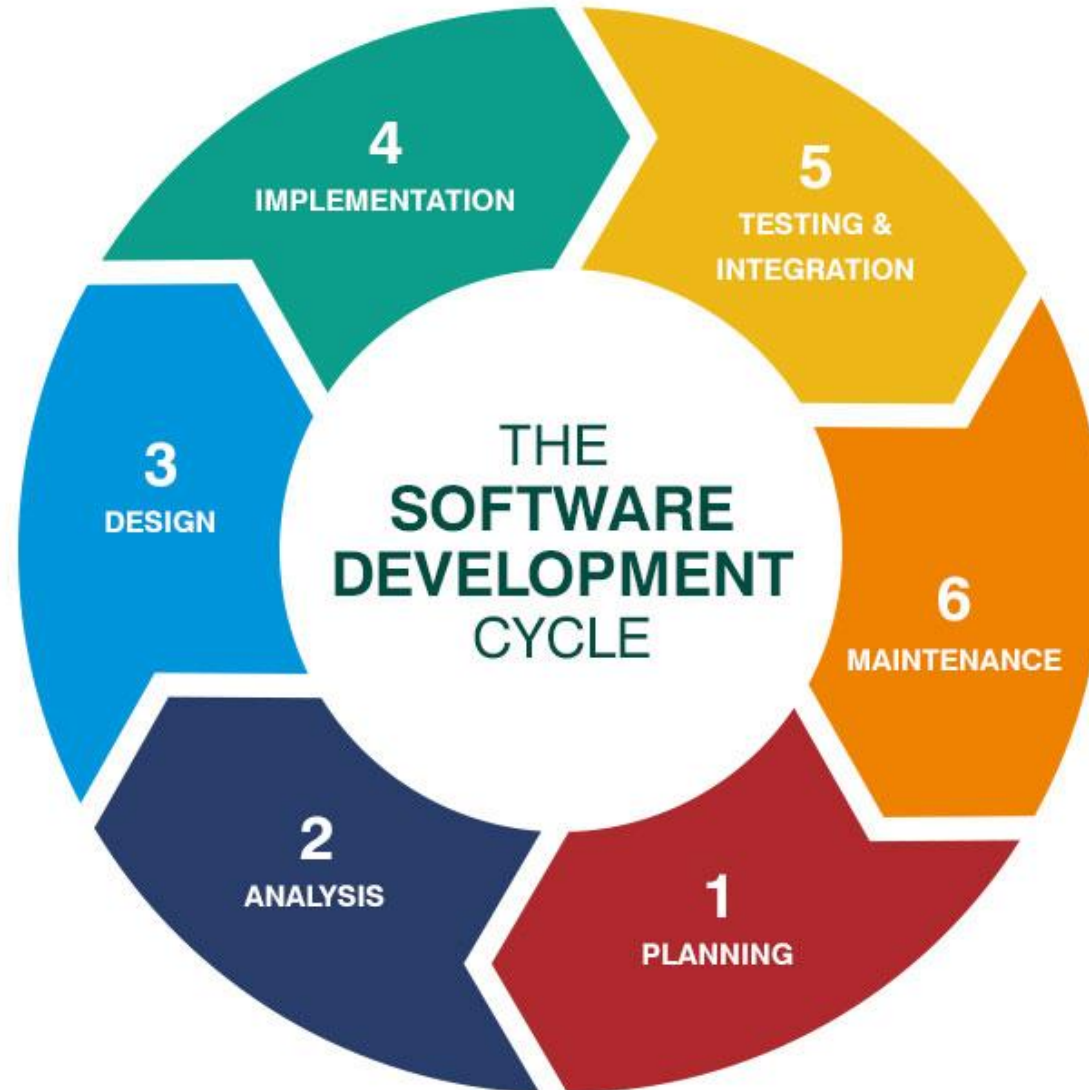
advania
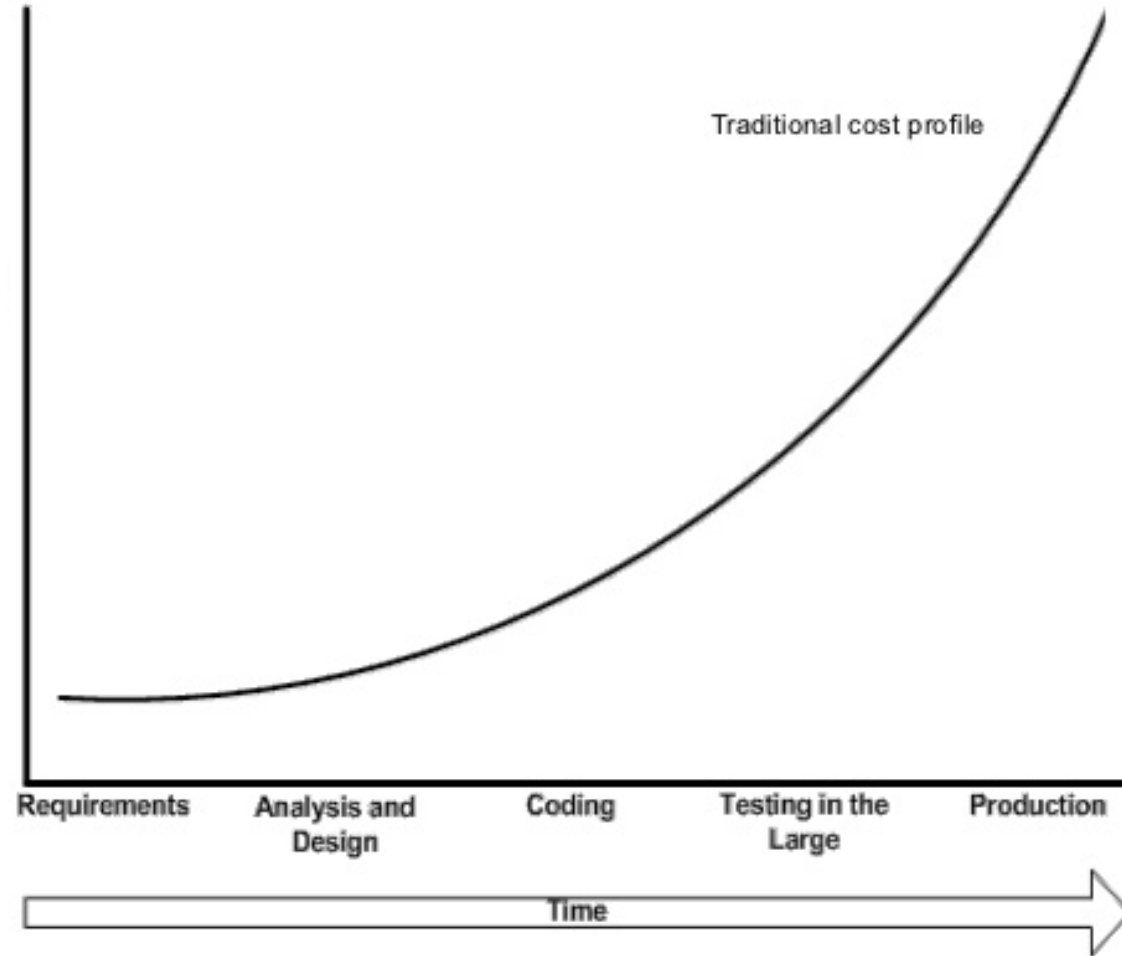Welcome to IT

About me
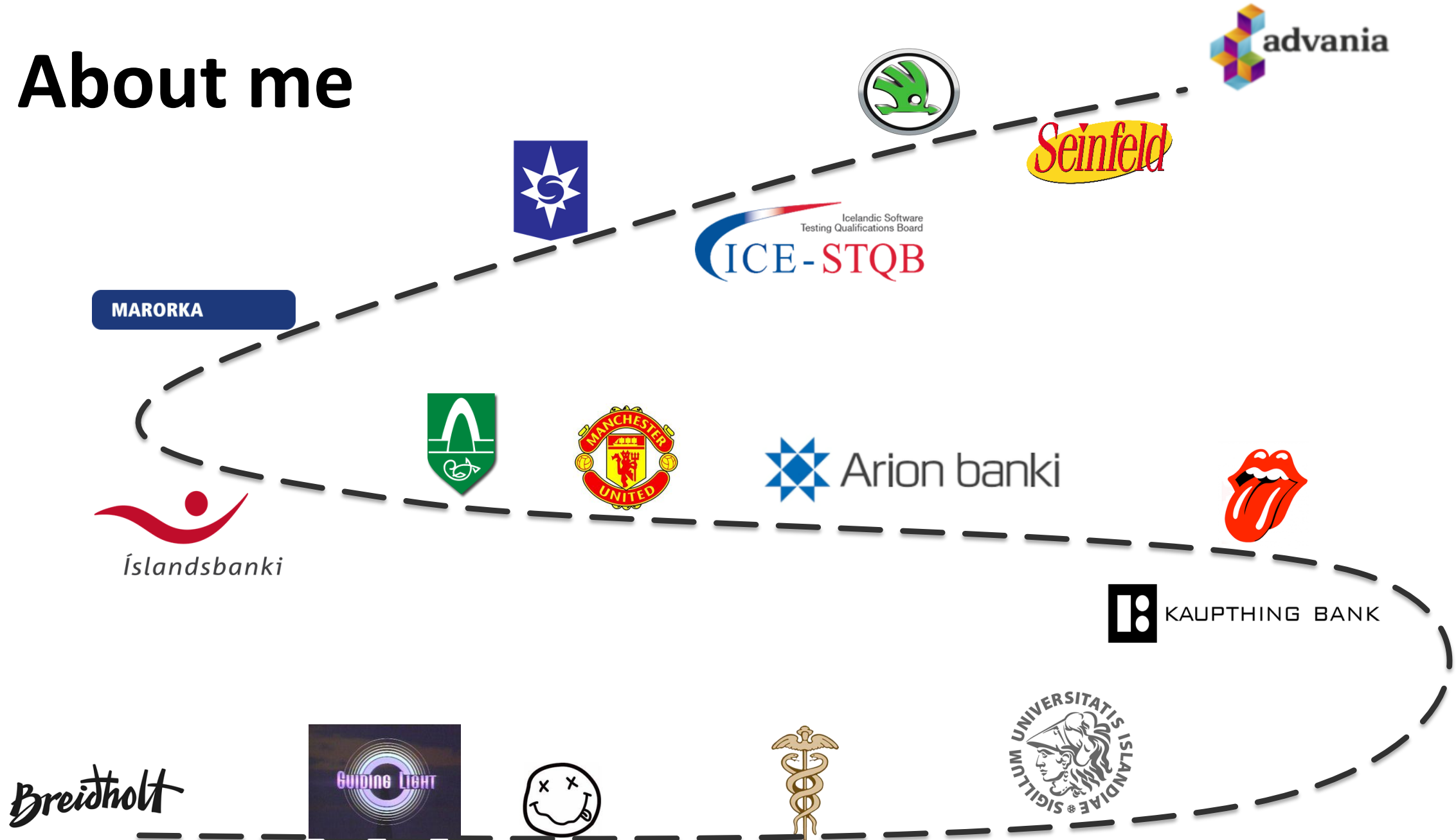
WHAT IS QUALITY SOFTWARE?

- reasonably **bug** free

- delivered **on time** and within **budget**

- meets **requirements**

- is **maintainable**

TESTING IS A PROCESS…

THE **SOFTWARE DEVELOPMENT** CYCLE

1 PLANNING

2 ANALYSIS

3 DESIGN

4 IMPLEMENTATION

5 TESTING & INTEGRATION

6 MAINTENANCE

COST OF CHANGE

REQUIREMENT REVIEW

Are the requirements clear enough?

As a user I like to create account so I can do my business

Acceptance Criteria:

* New button is visible in the menu bar or on the left pane

* User needs to apply valid username, probably password too

* Maybe enforce the user to type the password twice?

* Invalid username contains #,%,&," and more....

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UNIT TEST

Isolate the smallest testable part and verify it functions properly in isolation

- **Improves design and the code quality**

- **Simplifies debugging**

- **Fast feedback**

```csharp
using System;
using NUnit.Framework;
using TDD_with_VS2012;

namespace NUnitTests
{
    [TestFixture]
    public class UnitTests
    {
        [Test]
        public void Calculator_AdditionTest()
        {
            var calculator = new Calculator();
            Assert.AreEqual(calculator.Addition(2, 3), 5);
        }

        [Test]
        public void Calculator_MultiplicationTest()
        {
            var calculator = new Calculator();
            Assert.AreEqual(calculator.Multiplication(2, 3), 6);
        }
    }
}
```
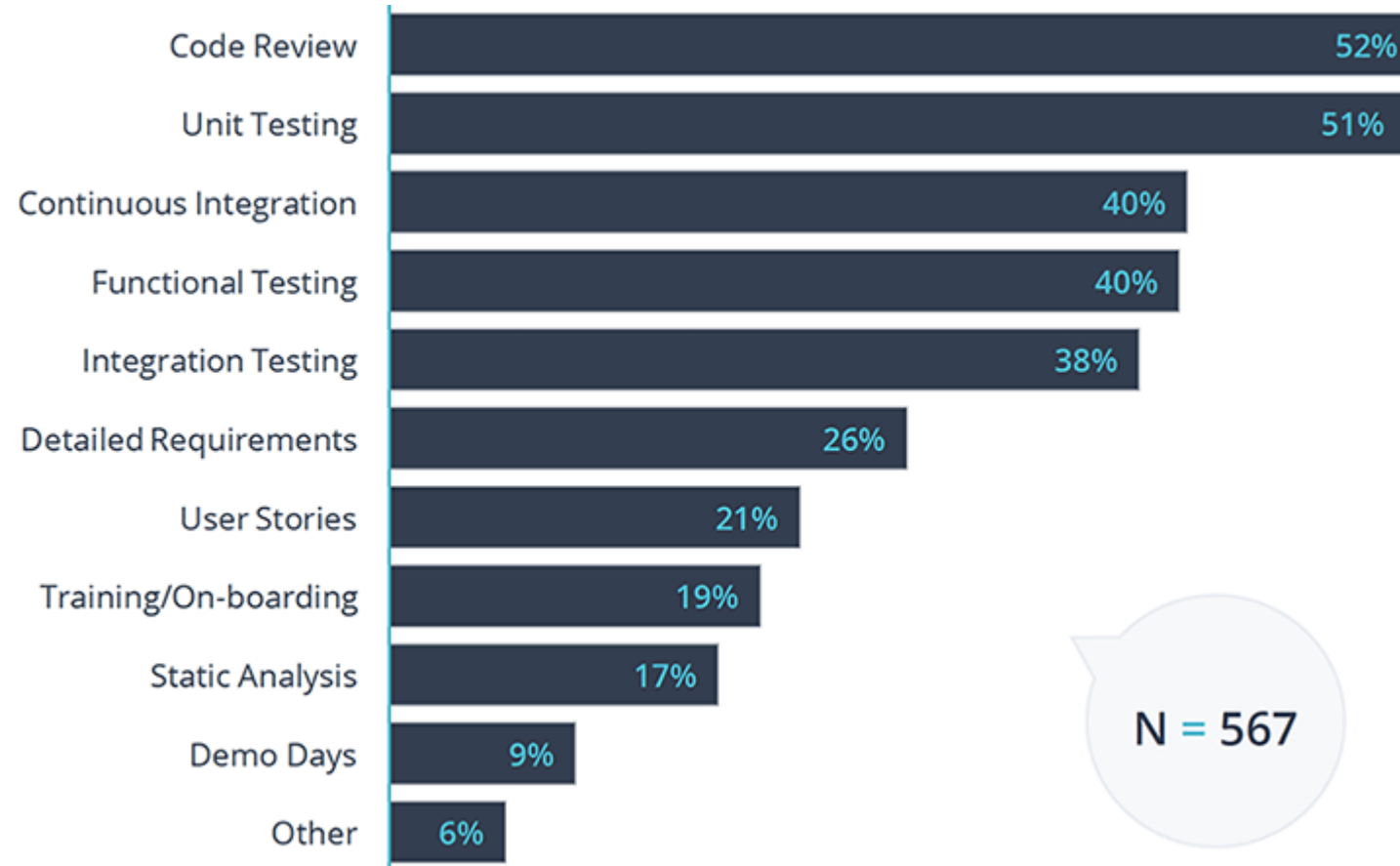
CODE REVIEW

Find and fix shortcomings of a piece of code

- **Formal – Informal**

- **Great way to:**

  - **Knowledge sharing**

  - **Mentor juniors**

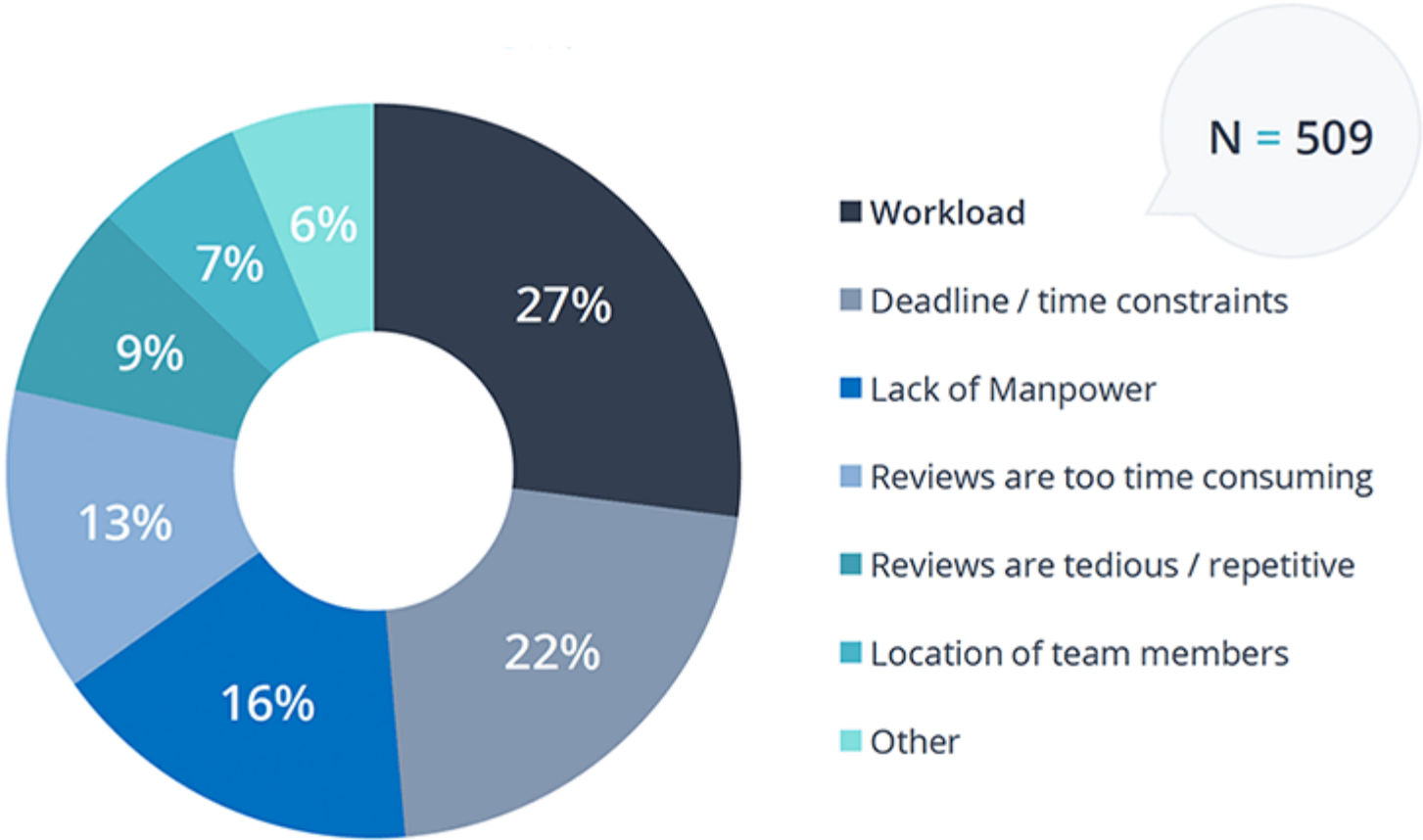 - **Increase collaboration**

- **Fast feedback**

What is the #1 way to improve code quality?

The state of the code review 2017
https://smartbear.com

What obstacles prevent you from doing the level of code review that you desire?

N = 509

- Workload — 27%
- Deadline / time constraints — 22%
- Lack of Manpower — 16%
- Reviews are too time consuming — 13%
- Reviews are tedious / repetitive — 9%
- Location of team members — 7%
- Other — 6%

The state of the code review 2017
https://smartbear.com

STATIC CODE ANALYSIS

Find potential errors and evaluate code quality

Detect areas needing refactoring:

- **too many complex methods**

- **dead code**

- **duplicate code**

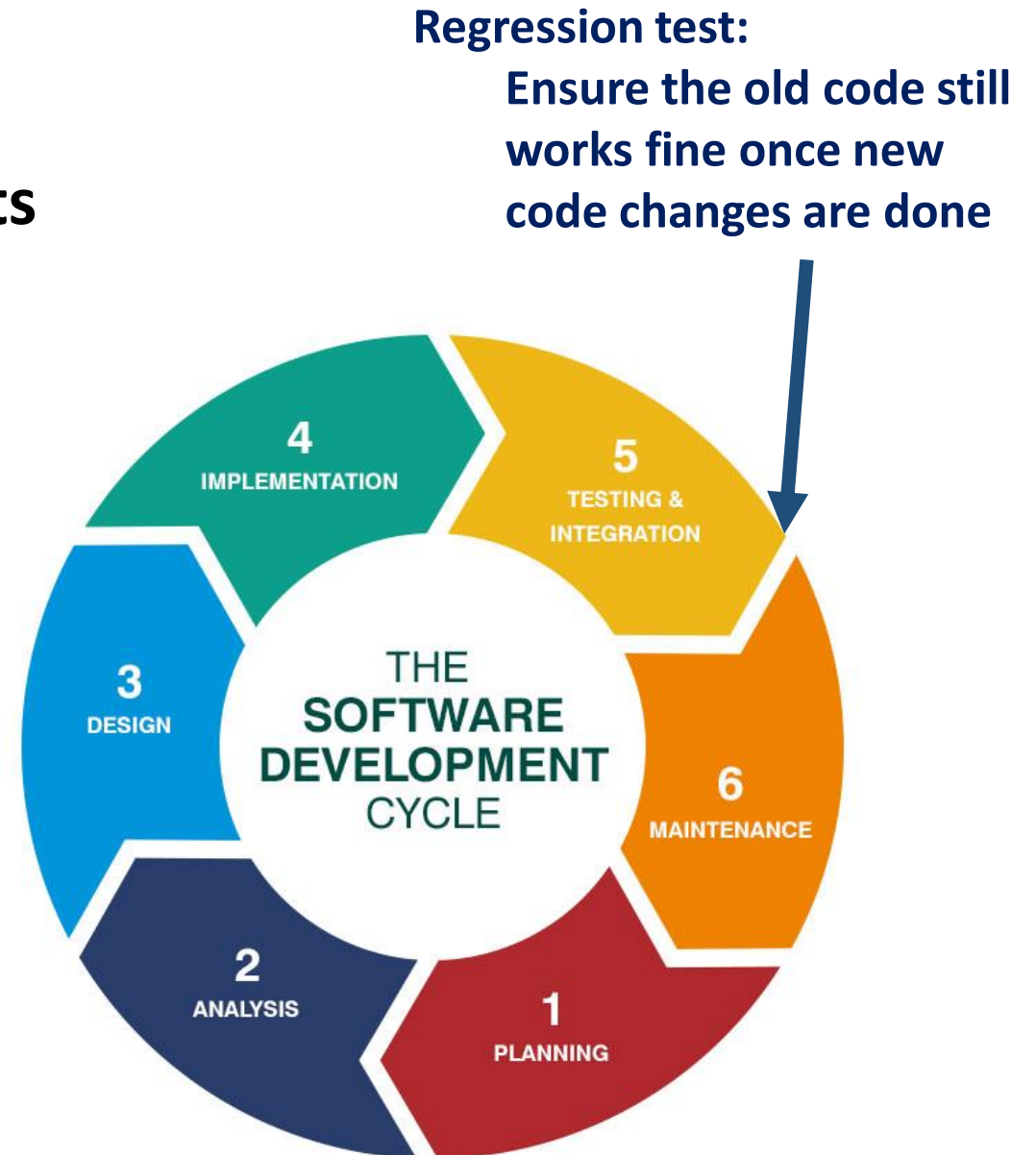- **security vulnerabilities**

Run as a part of the build process
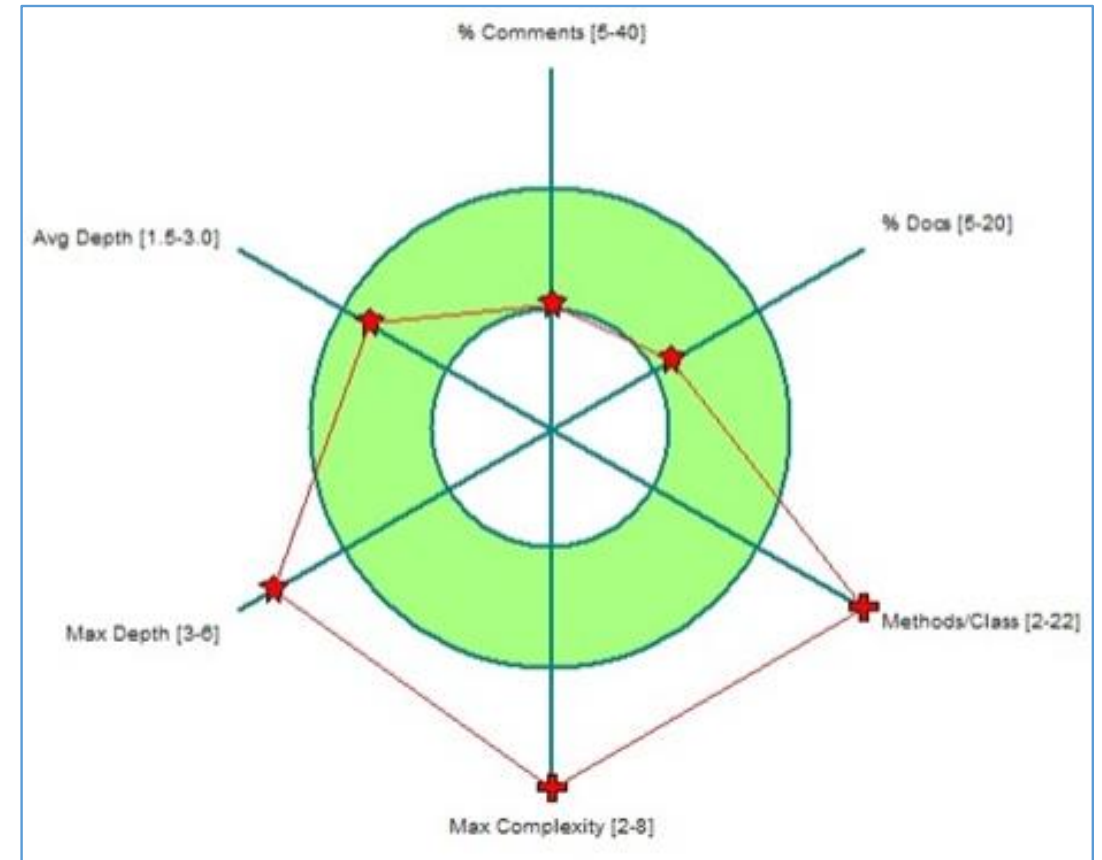
SYSTEM TEST

Verify that the system meets requirements

Regression test:
Ensure the old code still
works fine once new
code changes are done

- **Fully integrated system**

- **Test environment, test data**

- **Execute test cases**

1. Create account with valid data				
Nr	Test steps	Data	Expected results	P/F
1	Press the "Create account" button		Pop-up window opens	
2	Fill in valid data	Username: sigrid82 Password: sigga123		
3	Press Save		Account has been created Msg appears: Account has been created	

THE **SOFTWARE DEVELOPMENT** CYCLE

4 IMPLEMENTATION
5 TESTING & INTEGRATION
3 DESIGN
6 MAINTENANCE
2 ANALYSIS
1 PLANNING

PERFORMANCE TEST

Ensure the system will perform well under expected workload.

- **Gather metrics useful for tuning systems**

Load test

Scalability test

Volume test

Stress test

Endurance test

Spike test
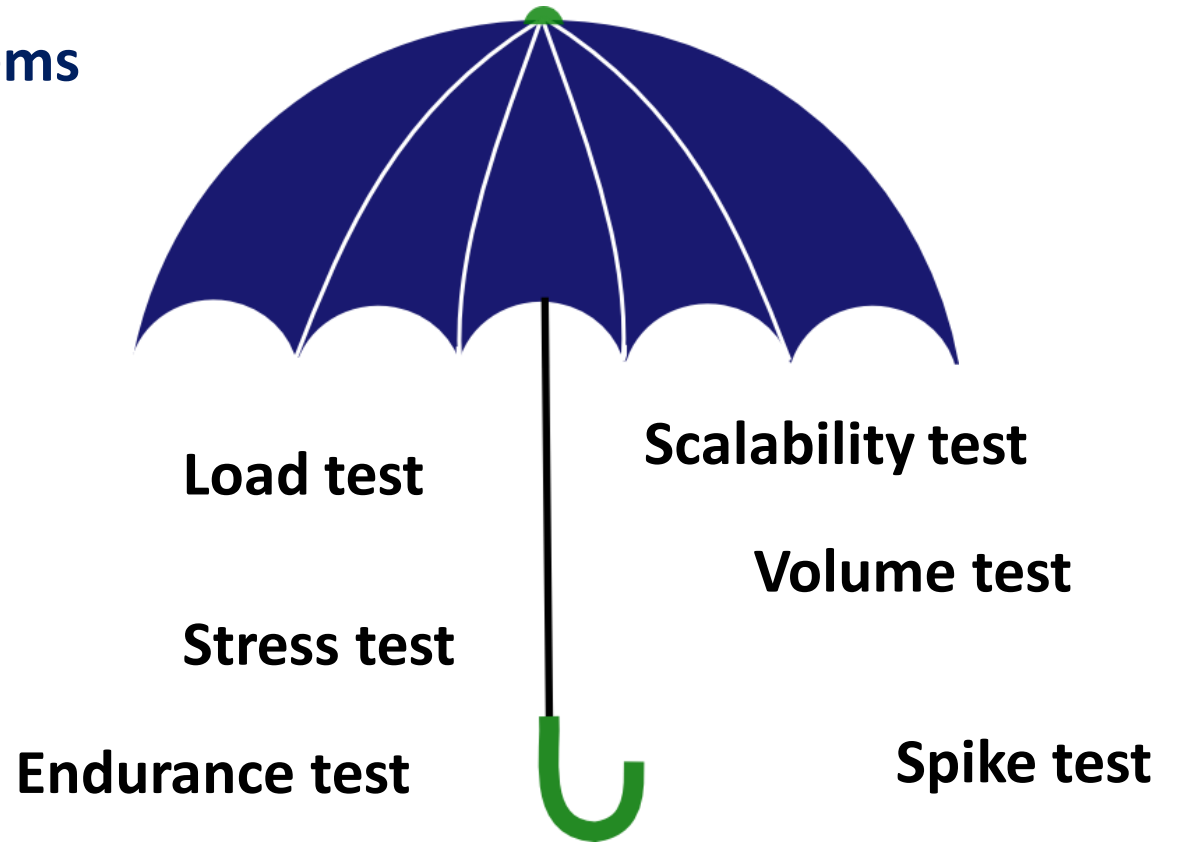
USABILITY TEST

Evaluate the user-friendliness

- **Learnability**

- **Efficiency**

- **Memorability**

- **Errors**

- **Satisfaction**

USER ACCEPTANCE TEST (UAT)

Evaluate if the solution fulfills business requirements

- **Real-world scenarios**

- **Performed <u>after</u> the system has been thoroughly tested**

How the customer explainened it. How the project leader understood it. How the analyst designed it. How the programmer wrote it. What the customer really wanted.

TO SUMMARIZE

- **Testing can start at the beginning**

- **Quality is everyone's responsibility**

- **Quality over quantity**

- **One bite at a time!**

"Why do we never have time to do it right,

but always have time to do it over?"

Anonymous