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Quality & Testing in Agile

PV260 Software Quality

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About me…

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What can you expect

- What is quality?
- Agile development in nutshell
- Project deviations
- Barriers of quality improvement
- Automation
- Dashboards
- Reviews
- ISO and CMMI

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What is quality?

A problem has been detected and Windows has been shut down to prevent damage
to your computer.

DRIVER_IRQL_NOT_LESS_OR_EQUAL

If this is the first time you've seen this Stop error screen,
restart your computer. If this screen appears again, follow
these steps:

Check to make sure any new hardware or software is properly installed.
If this is a new installation, ask your hardware or software manufacturer
for any Windows updates you might need.

If problems continue, disable or remove any newly installed hardware
or software. Disable BIOS memory options such as caching or shadowing.
If you need to use Safe Mode to remove or disable components, restart
your computer, press F8 to select Advanced Startup Options, and then
select Safe Mode.

Technical information:

*** STOP: 0x000000D1 (0x0000000000000010,0x0000000000000002,0x0000000000000000,0
xFFFFFADFC80B5578)

***   NDIS.sys - Address FFFFFADFC80B5578 base at FFFFFADFC80AD000, DateStamp
 45d699f1

Beginning dump of physical memory

Physical memory dump complete.
Contact your system administrator or technical support group for further
assistance.

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What is quality?

- No bugs
- Fast and responsive software
- Satisfied user or customer
- Compliance with legislatives
- Compliance with internal rules
- …

What is quality?

Software functional quality reflects how well it complies with or conforms to a given design, based on **functional requirements** or specifications.

Software structural quality refers to how it meets **non-functional requirements** that support the delivery of the functional requirements.

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What is agile development?

Individuals and interactions **over** processes and tools

Working software **over** comprehensive documentation

Customer collaboration **over** contract negotiation

Responding to change **over** following a plan

That is, while there is value in the items on the right,
we value the items on the left more.
http://agilemanifesto.org/

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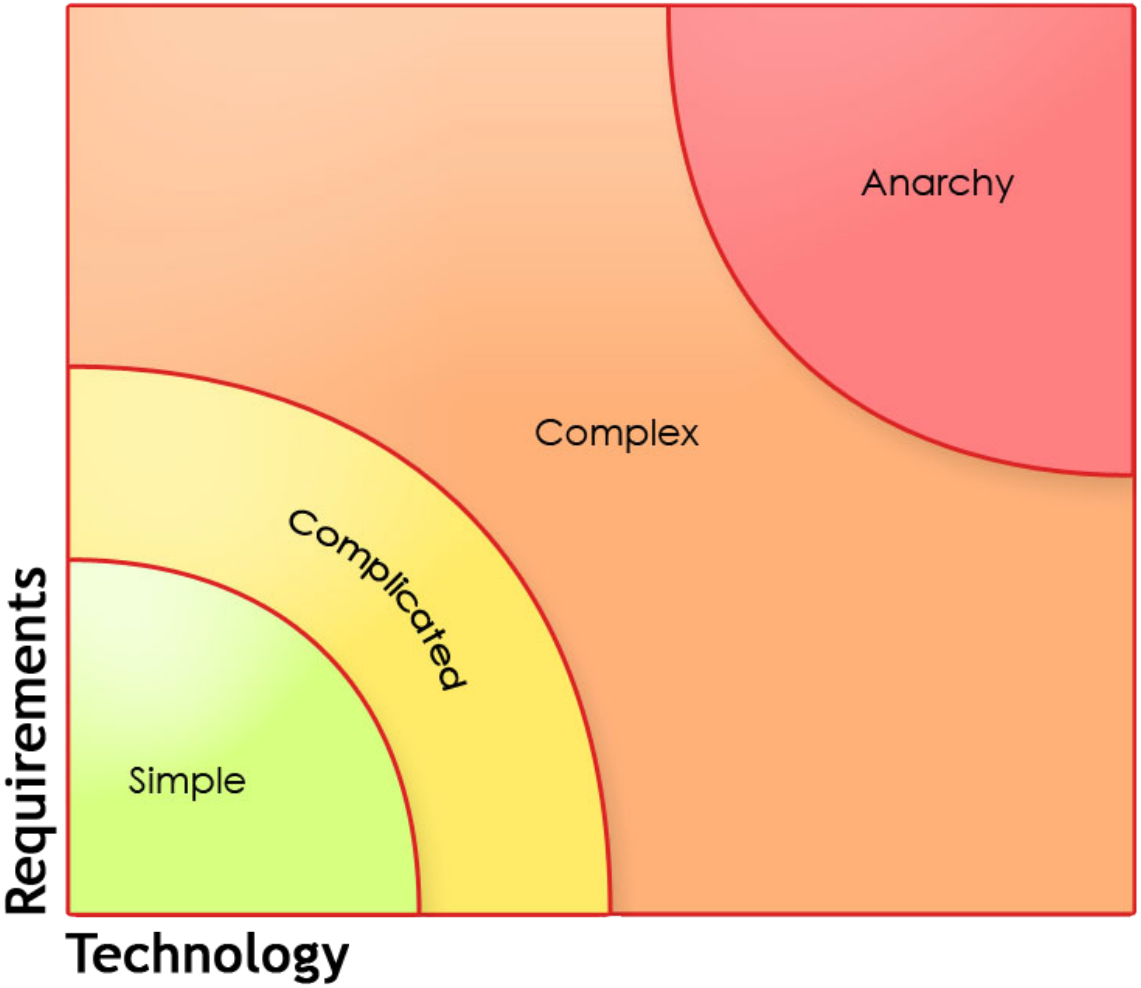
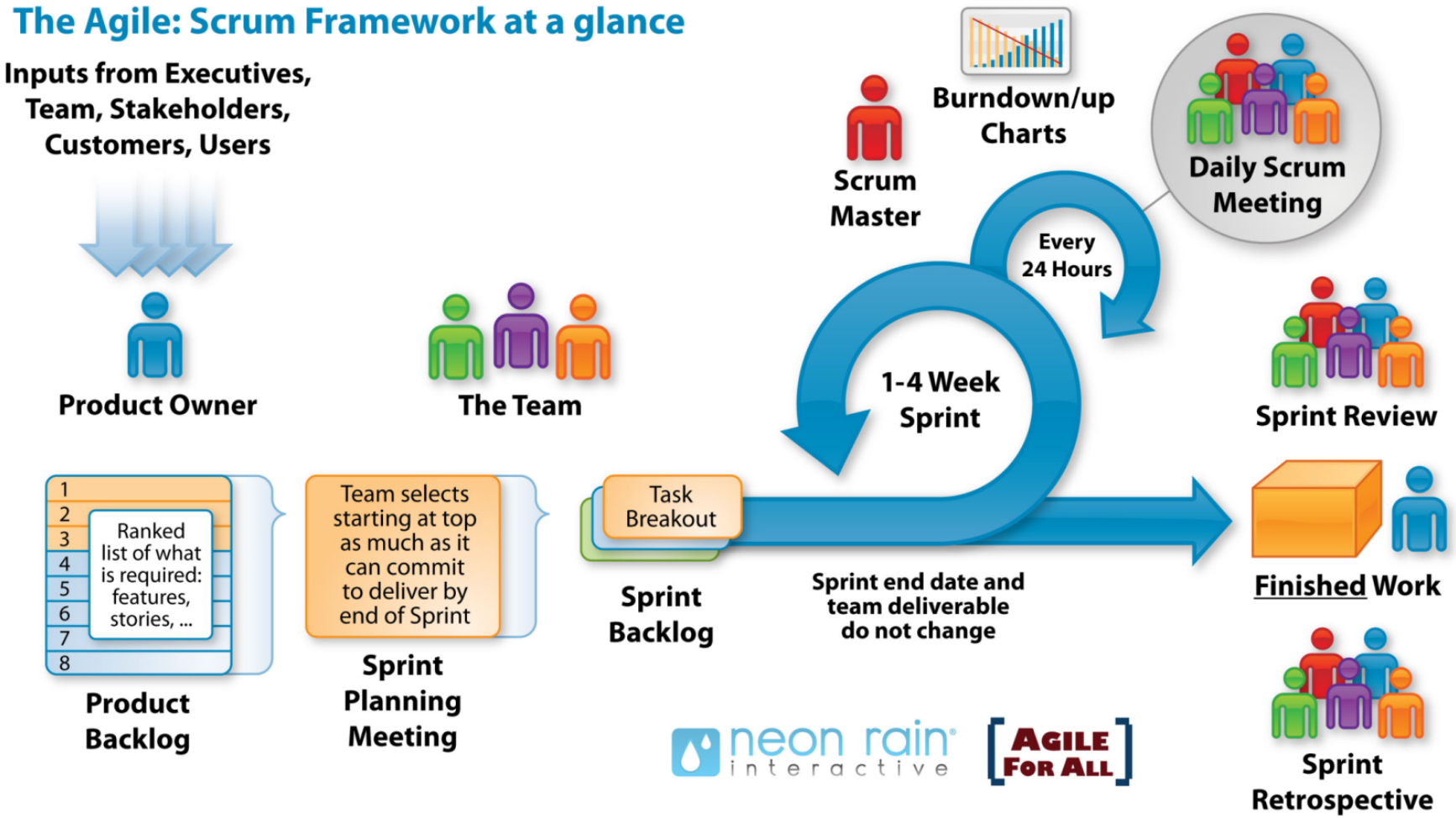
When should we use agile?



Agile process in detail



agileforall.com

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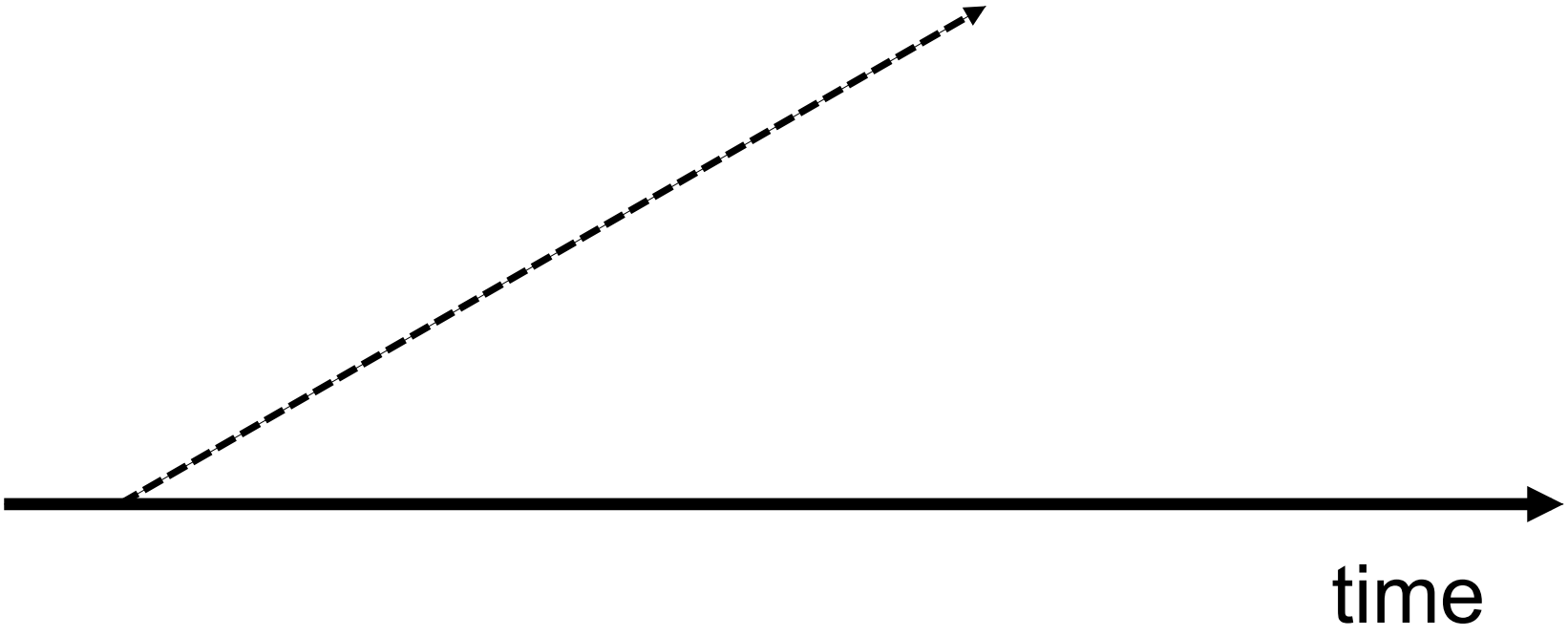
Project deviation



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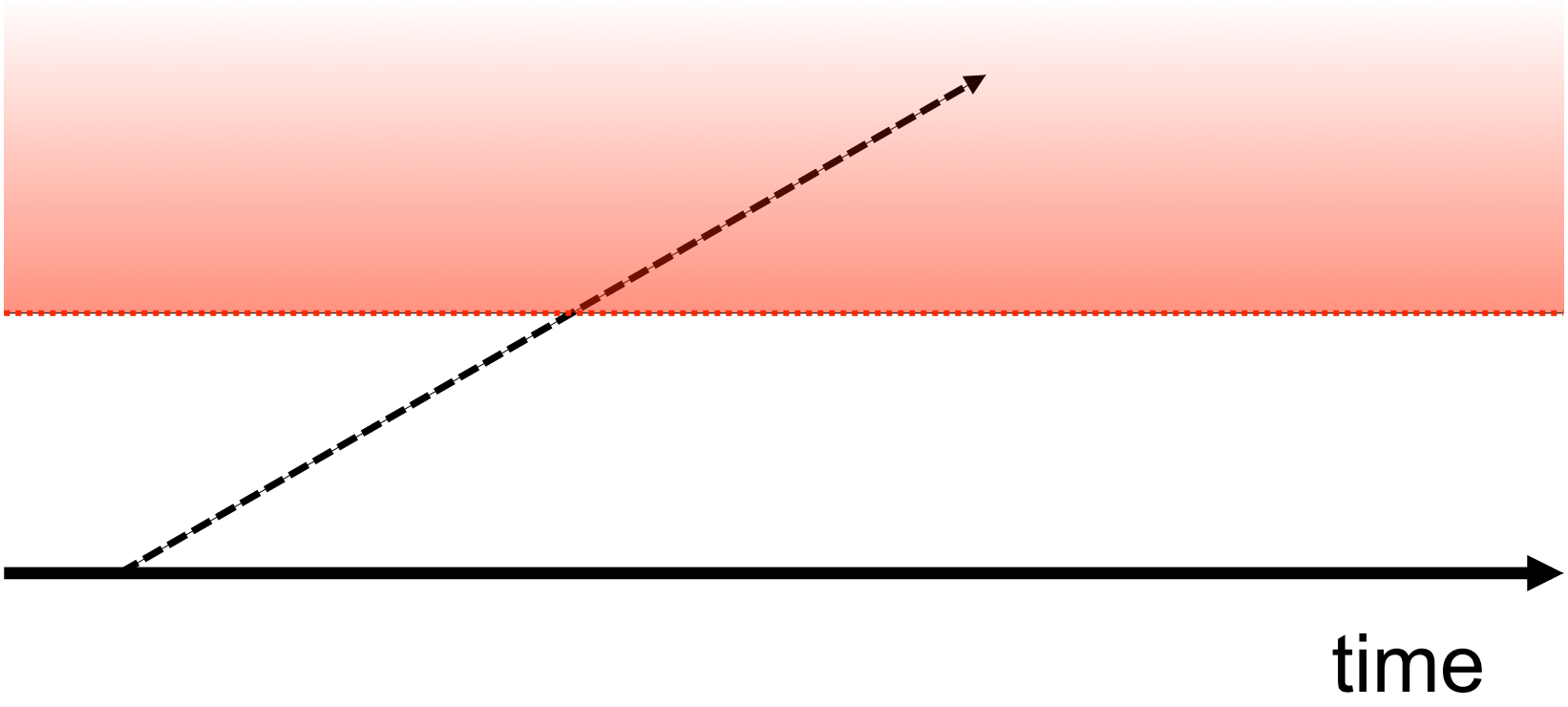
Project deviation



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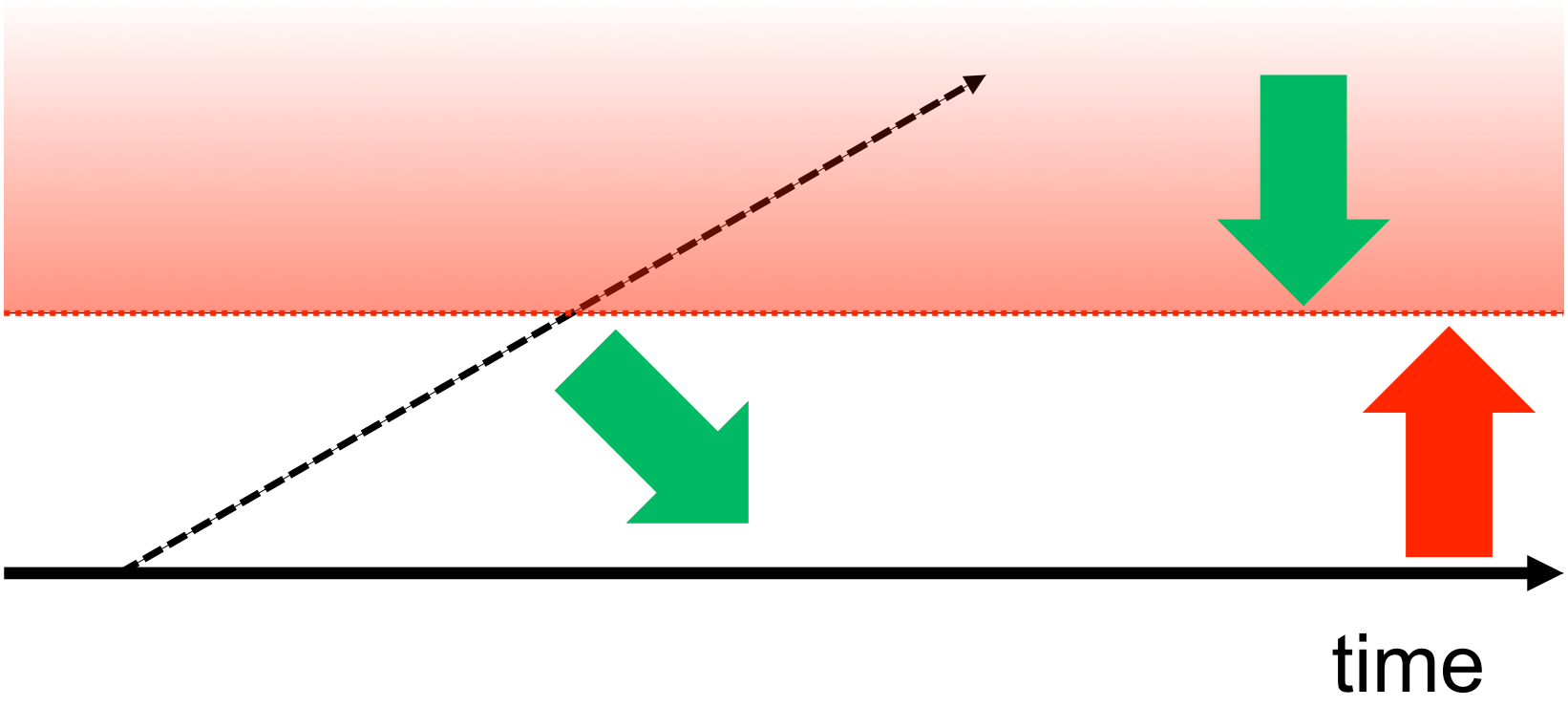
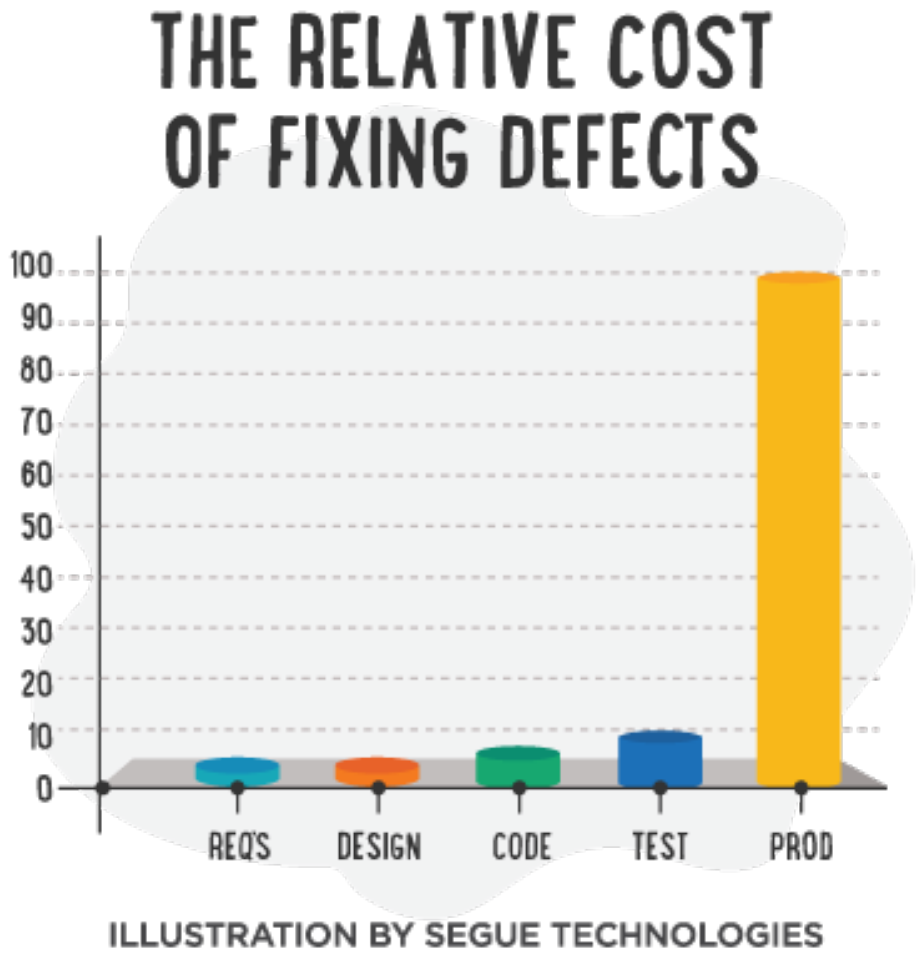
Project deviation



Project deviation

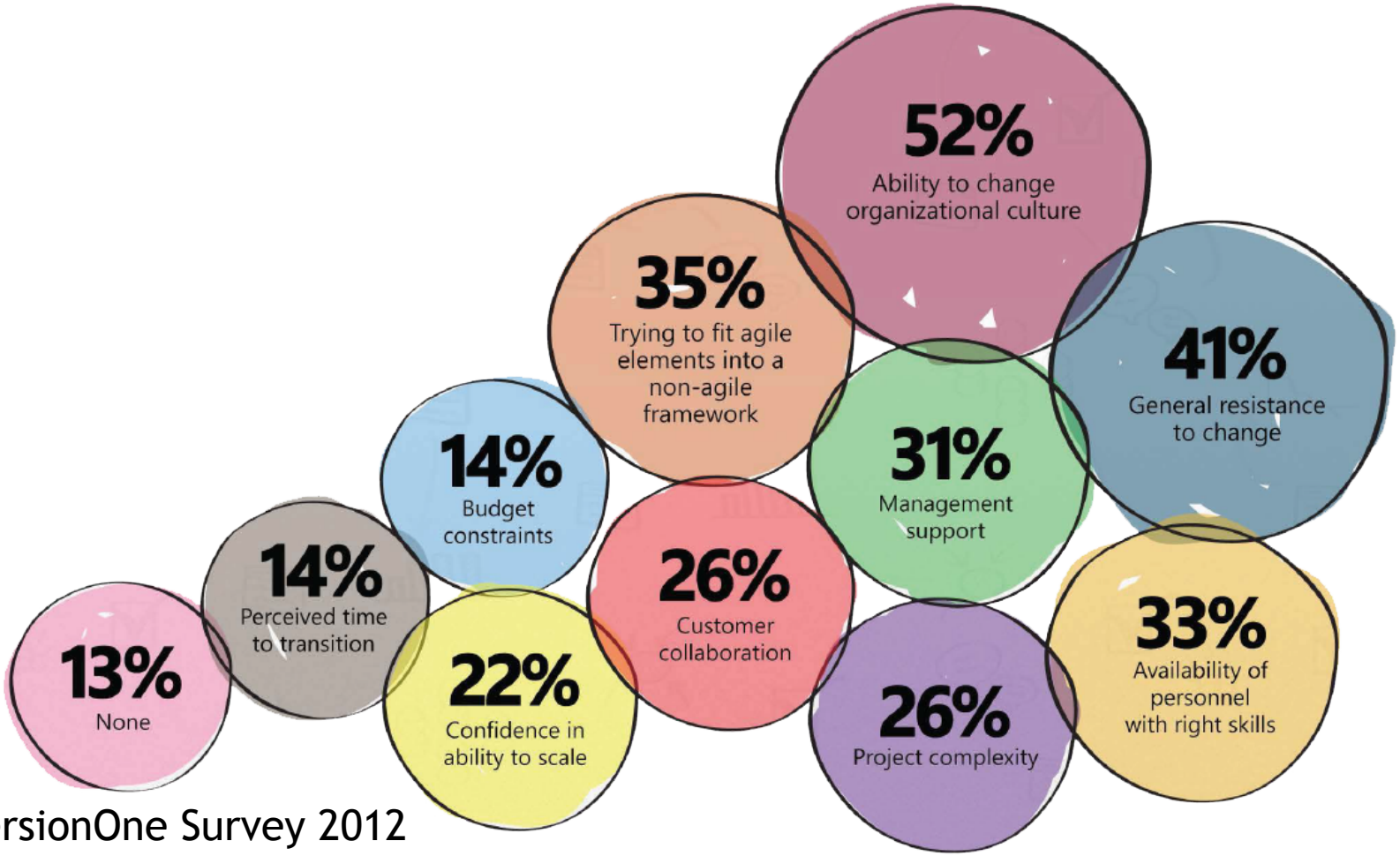


Fail fast
Learn fast

Three key messages for agile

- Communication within team is basis
  [email, communicator, face to face meeting, minutes of meeting]
- Product owner is key role
  [training, will to change mindset, non-waterfall approach]
- Retrospective quality is essential
  [focus on improvements, focus on positives]

Barriers of agile adaptation



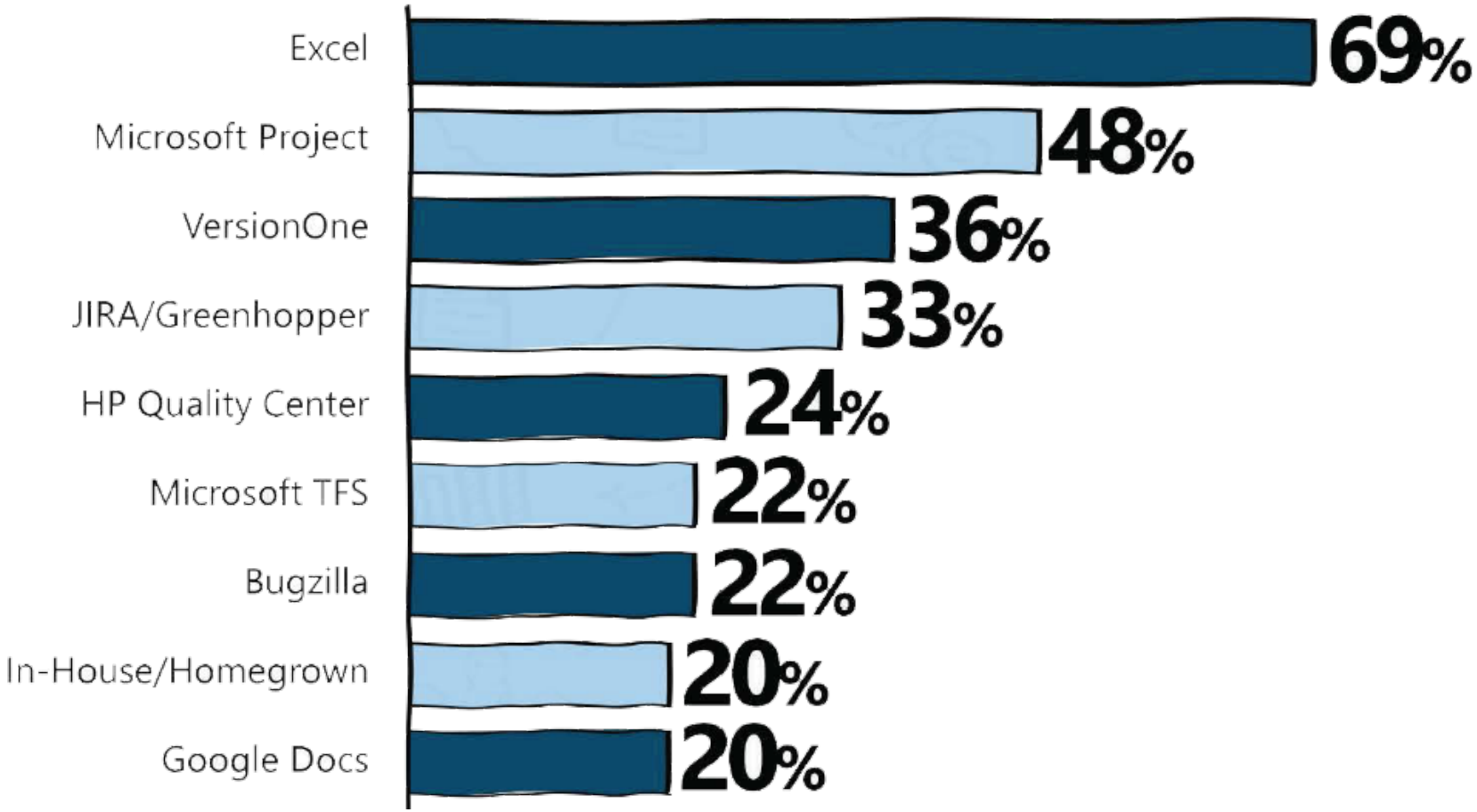
VersionOne Survey 2012

Quality-focused thinking

It is about mindset of the people
It is about cultural change
Positive results generate positive results

Start doing the quality already during **interviews**
[early detection, ability to solve difficult situations, creativity test]
You have to **invest** into development of the people
[one to one, coaching, feedbacks]

Barriers of agile adaptation



VersionOne Survey 2012

The truth is

We are lazy.
We will not repeat processes.
We want to improve.
We make errors, it is natural.
We fall ill time to time.
We may leave the project.

Realize human weaknesses

Do you have a new idea?

Does your idea work?

Automate it!

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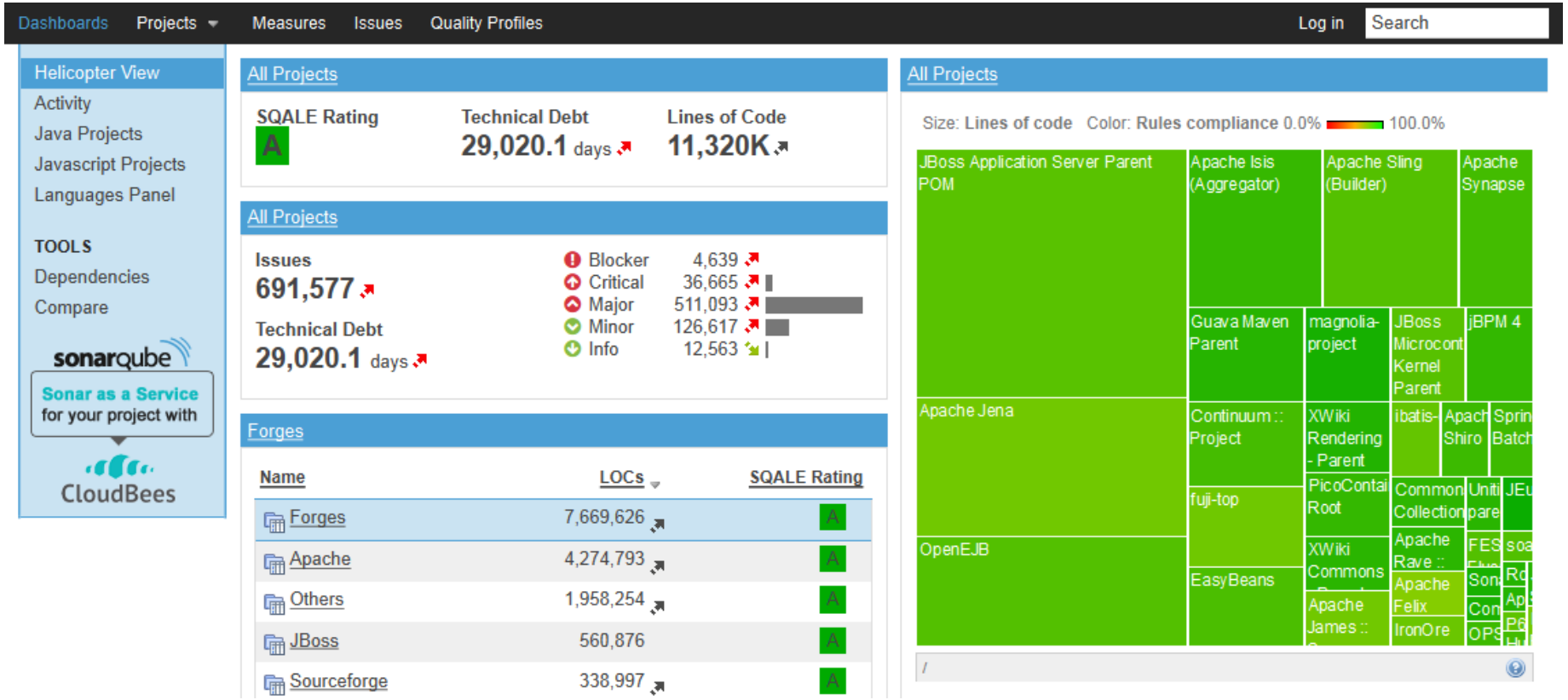
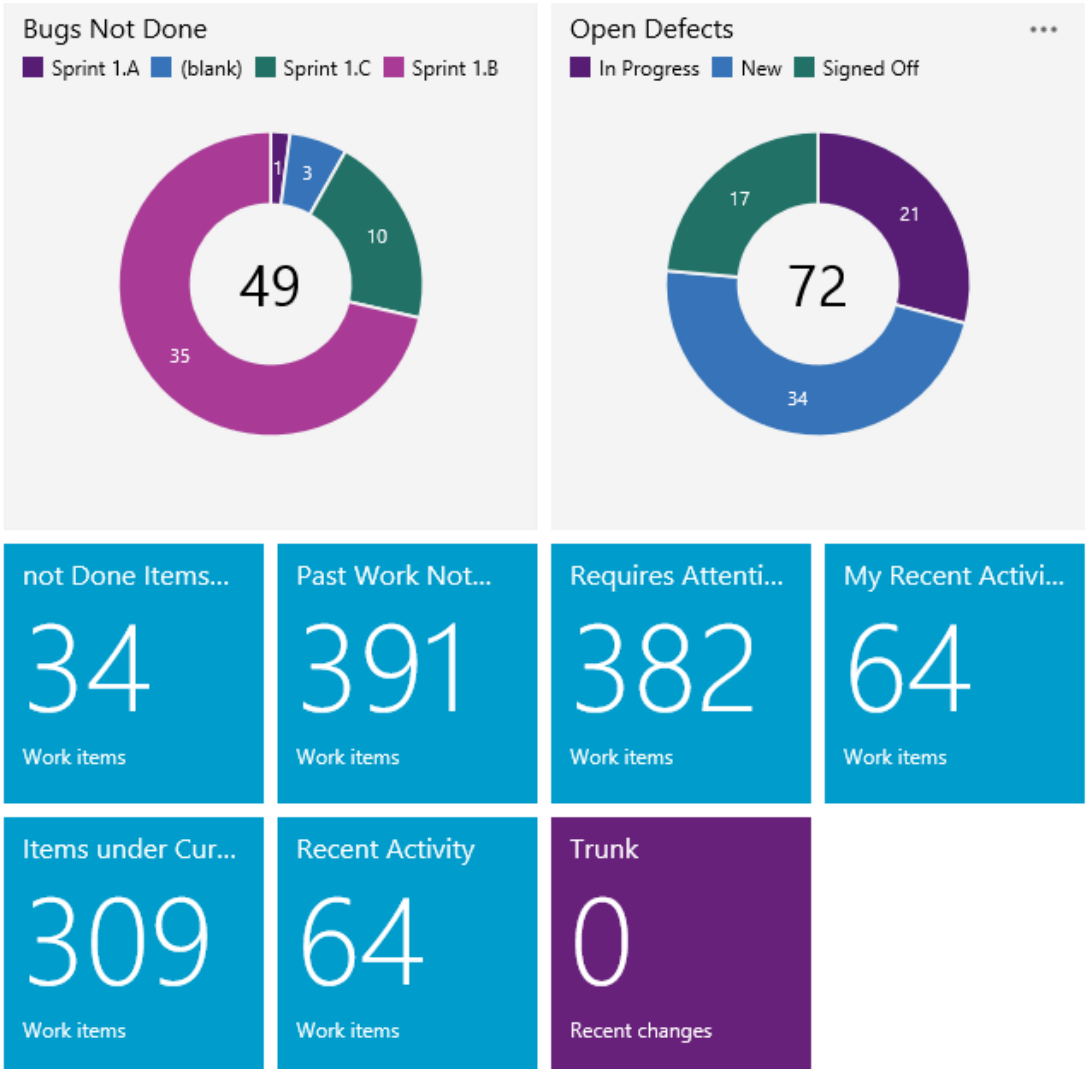
Automatic tests

- Can **not** tell you that you have not done a bug.
- Save time for developers.
- Save time for testers.
- Specially suitable for unit tests.
- Can be used to calculate test coverage.
- Advances motivation of testers.
- Maintenance of tests is needed.

Dashboards – SonarQube



Dashboards – Team Foundation Server



Dashboards - physical

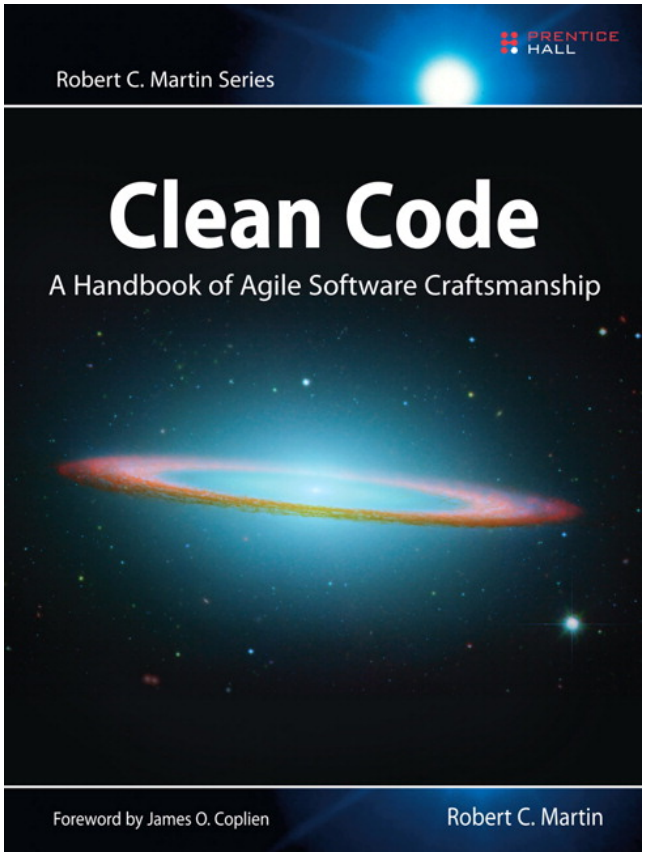
Pair programming

It is expensive!

Is it expensive?

Code reviews

Search for errors
Share know how
Train in new members faster
Review architecture
Make user interface review
Define common coding guidelines
Use dashboards statistics as input



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Code reviews

… software testing alone has limited effectiveness -- 25 – 45%
… effectiveness of design and code inspections are 55 and 60 percent.

- In a group of 11 programs developed by the same group of people, the first 5 were developed without reviews. The remaining 6 were developed with reviews. After all the programs were released to production, the first 5 had an average of **4.5 errors per 100 lines of code**. The 6 that had been inspected had an average of only **0.82 errors per 100**. Reviews cut the errors by over 80 percent.
- The Aetna Insurance Company **found 82 percent of the errors** in a program by using inspections and was able to decrease its development resources by 20 percent.
- A study of an organization at AT&T with more than 200 people reported a **14 percent increase** in productivity and a **90 percent decrease** in defects after the organization introduced reviews.

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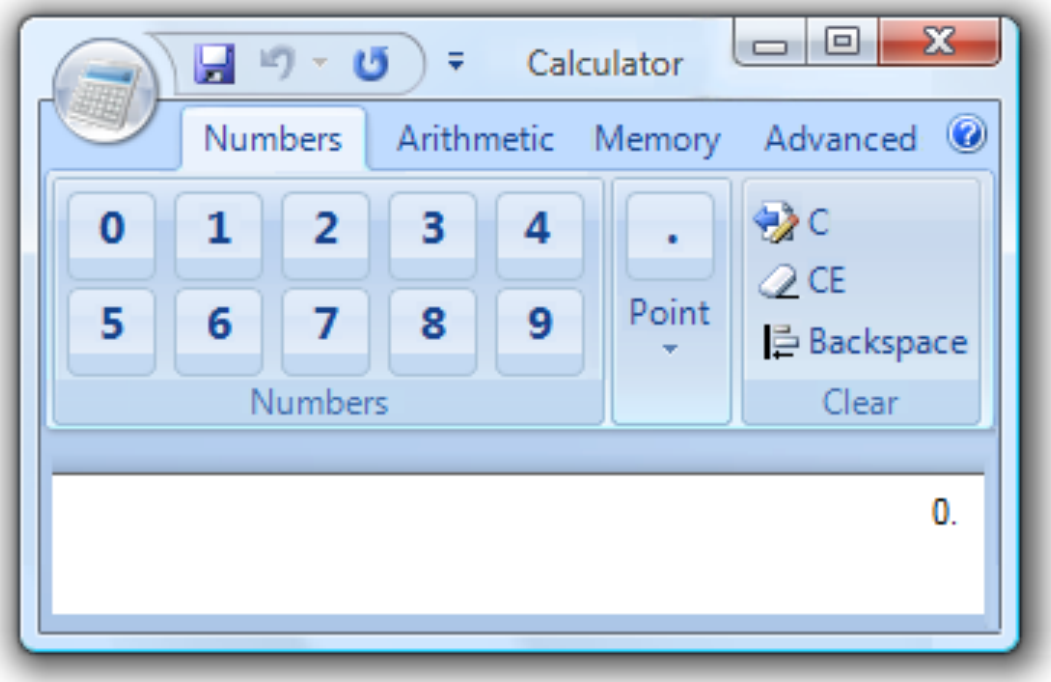
UI reviews

- It is the very same process as code review.
- Can be used to improve visual side of the product.
- It is good way to check that nothing is forgotten



UX testing

- Talk about emotions
- Measure time to complete a task

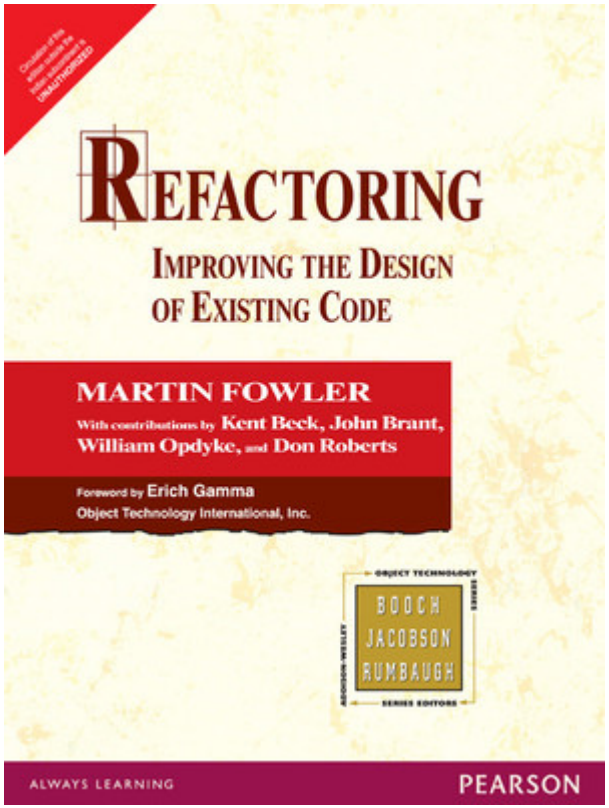
Code refactoring

Improve existing code

Set of techniques

You should have automated tests

You can use tools (e.g. ReSharper)

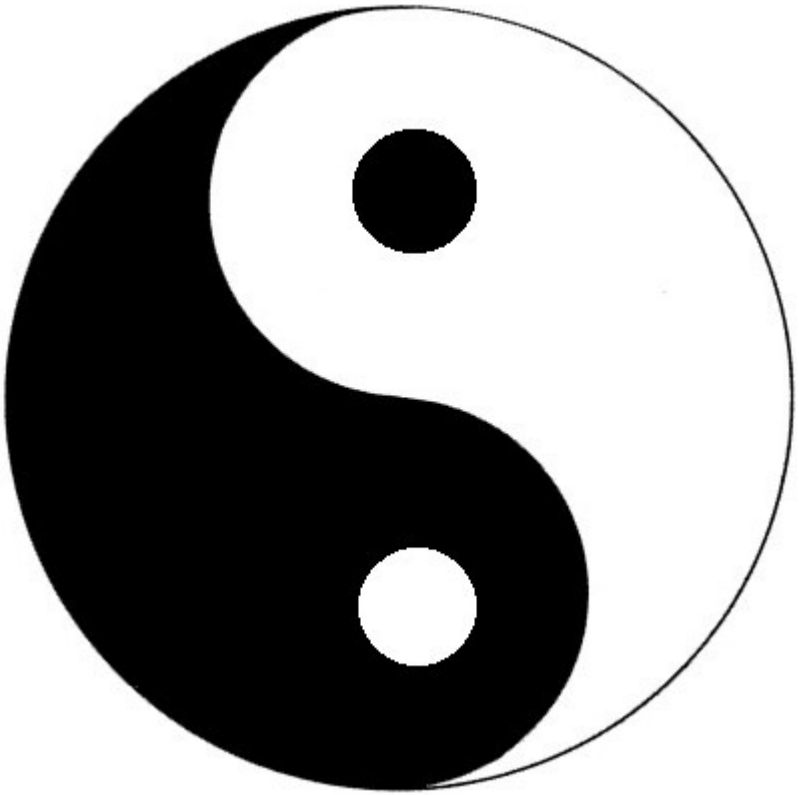


Code refactoring

```
/// <summary>
///
/// </summary>
/// <param name="file">number of parts</param>
/// <param name="line">line number</param>
/// <returns></returns>
private string ExtractMethodBody(List<string> inputFile, int lineNumber)
{
  List<string> methodBody = new List<string>();
  int numberOfParenthesis = 0;
  bool process = true;
  int index = lineNumber + 1;
  int state = 1;

  while (process)
  {
    switch (state)
    {
      case 1:

        if (inputFile[index].Contains("{"))
        {
          methodBody.Add(inputFile[index - 1]);

          numberOfParenthesis++;
          state = 2;
        }
        else
          process = false;
        break;

      case 2:
        if (inputFile[index].Contains("{"))
          numberOfParenthesis++;

        if (inputFile[index].Contains("}"))
          numberOfParenthesis--;

        if (numberOfParenthesis == 0)
          methodBody.Add(inputFile[index]);
        process = false;
        break;
```

```
/// <summary>
/// Extracts method body from given list of lines from input file
/// </summary>
/// <param name="parsedLines">list of lines with potencial method body</param>
/// <param name="lineIndex">method position in the given lines</param>
/// <returns>Methods body separated by new line characters</returns>
private string ExtractMethodBody(IList<string> parsedLines, int lineIndex)
{
  _numberOfParenthesis = 0;
  bool operationDone = false;
  _state = States.EmptyInput;
  var methodBody = new List<string>();

  while (!operationDone)
  {
    switch (_state)
    {
      case States.EmptyInput:
        ProcessEmptyLines(parsedLines, lineIndex, methodBody);
        break;

      case States.MethodBody:
        AdjustParenthesisCount(parsedLines, lineIndex);
        AddLineToBody(parsedLines, lineIndex, methodBody);
        operationDone = true;
        break;
    }
  }
```

ISO and CMMI



Feedback form

surveymonkey.com/s/BY56JB8

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